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Functions and Requirements Document For Interim Store Solidified High-Level and Transuranic Waste

M. A. Smith-Fewell
Westinghouse Hanford Company, Richland, WA 99352
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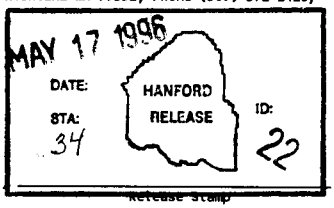
Abstract: The functions, requirements, interfaces, and architectures contained within the Functions and Requirements (F&R) Document are based on the information currently contained within the TWRS Functions and Requirements database. The database also documents the set of technically defensible functions and requirements associated with the solidified waste interim storage mission.

The F&R Document provides a snapshot in time of the technical baseline for the project. The F&R document is the product of functional analysis, requirements allocation and architectural structure definition. The technical baseline described in this document is traceable to the TWRS function 4.2.4.1, Interim Store Solidified Waste, and its related requirements, architecture, and interfaces.



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FUNCTIONS AND REQUIREMENTS DOCUMENT FOR INTERIM STORE SOLIDIFIED HIGH-LEVEL WASTE AND TRANSURANIC WASTE

Prepared for

U. S. Department of Energy
Richland Operations Office,
Richland, Washington

by

Westinghouse Hanford Company
Richland, Washington 99352

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EXECUTIVE SUMMARY

This functions and requirements document (FRD) identifies and defines the functions, requirements, interfaces, and architectures associated with the interim storage of solidified high-level waste (HLW) and transuranic (TRU) waste. The functions, requirements, interfaces, and architectures contained within this document are based on the information contained within the Tank Waste Remediation System (TWRS) requirements database, which is the result of a TWRS program-level systems engineering analysis.

This FRD also incorporates relevant facets of the U.S. Department of Energy (DOE) planned privatization effort for Hanford Site tank waste treatment and immobilization services. This privatization effort is divided into two phases. The first phase, termed the "proof of concept" or Phase I, will establish and demonstrate the technical, commercial, and procurement viability of privatized Hanford Site tank waste treatment and immobilization. The second phase, termed Phase II, will treat and immobilize the remainder of the tank waste.

The solidified waste (products) from the privatization treatment and immobilization activities will require interim storage until the products can be shipped offsite for permanent disposal at a geologic repository, or delivered to an onsite treatment facility for further processing. Facilities, services, and equipment necessary for interim storage are to be provided by the Hanford Site Management and Integration (M&I) Contractor or a subcontractor. Interim storage of the solidified waste begins with the M&I Contractor's acceptance of the solidified waste at the privatization vendor's facility, and ends with the transfer of responsibility for the solidified

waste to the DOE Office of Civilian Radioactive Waste Management or to an onsite processing facility.

The information provided in this document is traceable to the TWRS fourth-level Function 4.2.4.1, *Interim Store Solidified HLW and TRU Waste*, and its related requirements, architecture, and interfaces.* The proposed fifth-level subfunctions of Function 4.2.4.1, defined in this document, are *Interim Store Dispositioned Cs/Sr Capsules*, *Interim Store Phase I Solidified HLW*, *Interim Store Phase II Solidified HLW and TRU Waste*, and *Prepare Solidified HLW and TRU for Shipping*. This decomposition supports the privatization process. This document further decomposes the function *Interim Store Phase I Solidified HLW* to the sixth level, and identifies inputs, outputs, and requirements for each function.

The information provided in this document will be used in developing the relevant sections of the technical requirements specification for Function 4.2.4, *Dispose Waste*, and the design requirements document for the Phase I Solidified HLW Interim Storage System. The TWRS requirements database will be updated to incorporate the information provided in this document.

*WHC, 1996, *Tank Waste Remediation System Functions and Requirements*, WHC-SD-WM-FRD-020, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

ALARA	as low as reasonably achievable
ASIL	acceptance source impact level
BARCT	best available radionuclide control technology
CEDE	committed effective dose equivalent
CFR	Code of Federal Regulations
Cs	cesium
DOE	U.S. Department of Energy
EEM	Environmental Emission Management
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ETF	Effluent Treatment Facility
F&R	functions and requirements
FRD	functions and requirements document
HLW	high-level waste
ICSSC	Interagency Committee of Seismic Safety in Construction
IHLW	immobilized high-level waste
IRIS	Integrated Risk Information System
IS	interim store
ITRU	immobilized transuranic (waste)
LERF	Liquid Effluent Retention Facility
LDR	land disposal restriction
LLW	low-level waste
M&I	Management and Integration
M&O	Maintenance and Operation
MEI	maximally exposed individual
MTW	manage tank waste
NEHRP	National Earthquake Hazards Reduction Program
NOC	notice of construction
OCRWM	Office of Civilian Radioactive Waste Management
OSHA	Occupational Safety and Health Administration
PCT	product consistency test
QA	quality assurance
QAPP	quality assurance project plan
QARD	quality requirements and description
RTR	real-time radiography
SGW	system-generated waste
SNM	special nuclear materials
Sr	strontium
TAP	toxic air pollutant
TCLP	toxicity characteristics leaching procedure
TEDF	Treated Effluent Disposal Facility
TRS	technical requirements specification
TRU	transuranic (waste)
TSD	treatment, storage, or disposal
TWRS	Tank Waste Remediation System
WA	Waste Acceptance
WAC	Washington Administrative Code
WIPP	Waste Isolation Pilot Plant

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FUNCTIONS AND REQUIREMENTS DOCUMENT FOR INTERIM STORE SOLIDIFIED HIGH-LEVEL WASTE AND TRANSURANIC WASTE

1.0 INTRODUCTION

1.1 BACKGROUND

The mission of the Tank Waste Remediation System (TWRS) is to store, treat and immobilize highly radioactive waste in an environmentally safe, sound, and cost-effective manner. The U.S. Department of Energy (DOE) established this program to manage the underground waste storage tanks at the Hanford Site. The TWRS program includes all activities related to management, retrieval, processing, and disposal of all existing wastes in the tanks and new wastes introduced to the tanks.

In July 1995, the DOE embarked upon a course to acquire Hanford Site tank waste treatment and immobilization services using privatized facilities. Privatization is defined as vendors, under contract with the DOE, using private funding to design, permit, construct, operate, decontaminate, and decommission their own equipment and facilities to treat tank waste (RL 1996). Privatization is divided into two phases. The first phase, termed the "proof of concept" or Phase I, will begin with award of contract in 1996, and operate through at least 2005, while treating approximately 6% to 13% of the tank waste. Phase I will establish and demonstrate the technical, commercial, and procurement capabilities necessary for the privatization of Hanford Site tank waste treatment and immobilization. Phase II, which begins with the award of a second contract, will treat and immobilize the remainder of the tank waste.

The privatization contractor(s) will manage the Hanford Site tank waste transferred to their custody; retrieve and transfer this waste for processing; immobilize the waste; and prepare the resultant solidified waste for return to the Management and Integration (M&I) Contractor. The M&I Contractor will receive sealed containers of solidified high-level waste (HLW) and transuranic (TRU) waste for interim storage until it can be shipped offsite for permanent disposal, or sent to a treatment facility for further processing. The specific forms of solidified HLW/TRU waste produced during Phase I and requiring interim storage are solidified cesium (Cs) product separated from the low-level waste (LLW) fraction of the tank supernatant, and immobilized HLW. During Phase II, the products requiring interim storage are immobilized HLW and immobilized TRU waste. Dispositioned Cs and strontium (Sr) capsules may also require interim storage during Phase II pending a programmatic decision on whether to vitrify or overpack this material.

1.2 SYSTEM PURPOSE AND SCOPE

The purpose of the Solidified HLW and TRU Waste Interim Storage Systems is to provide the necessary facilities and equipment for interim storage of immobilized HLW, immobilized TRU waste, Cs product, and dispositioned Cs/Sr capsules. Interim storage of the solidified waste begins with acceptance of the waste from the production facility, and ends with the transfer of responsibility for the waste to the DOE Office of Civilian Radioactive Waste

Management (DOE-OCRWM) for shipment to a permanent geologic repository, or (for the Cs product only) to an onsite facility for further processing. Additional information on the interfaces between the private vendors and the interim storage system is presented in DE-RP06-96RL13308, *TWRS Privatization Request for Proposals* (RL 1996).

The primary purpose of this document is to establish a consistent basis for development of the relevant sections of the technical requirements specification (TRS) for Function 4.2.4, *Dispose Waste*, and the design requirements document for the Phase I Solidified HLW Interim Storage System. The TWRS requirements database will be updated to incorporate the information provided in this document.

2.0 DOCUMENT OVERVIEW

2.1 MISSION AND SCOPE

The functions, requirements, interfaces, and architectures associated with the TWRS mission are contained within the TWRS Systems Engineering database. The database is the result of a TWRS program-level systems engineering analysis. The functions, requirements, interfaces, and architectures contained within this functions and requirements document (FRD) are based on the information currently contained within the TWRS requirements database. The database also documents the set of technically defensible functions and requirements (F&R) associated with the solidified waste interim storage mission.

This document provides the basis for the *Interim Store Solidified HLW and TRU Waste* portion of the TRS for Dispose Waste; and for the design requirements document (DRD) for the Phase I Solidified HLW Interim Storage System. The FRD consists of the following sections.

- Introduction - Provides the background and purpose of the Solidified HLW and TRU Waste Interim Storage System.
- Overview - Provides a brief description of the FRD and its relationship to the site Systems Engineering effort.
- Functions - Includes the hierarchy of the functions applicable to this activity, defines each function, and lists the inputs and outputs of each function.
- Interfaces - Defines the interfaces (inputs and outputs) between functions, and identifies their relationships to the functions.
- Requirements Allocation - Lists the constraints, performance requirements, and proof-of-concept requirements allocated to each function and each input/output associated with the interim storage of solidified HLW and TRU waste.
- Architecture - Identifies the architecture that was selected for the Solidified HLW and TRU Waste System after evaluating and deciding on a candidate, optimal architecture output from the functional analysis. The evaluation and decision process is supported by trade-off study reports, which are referenced in this section. The section also identifies the analysis needed for the next level of architecture selection, and lists the requirements satisfied by the selected architecture.
- Requirements Definition - Provides the text of the constraints, performance requirements, and proof-of-concept requirements associated with the functions, interfaces, and architecture.
- References - Lists the documents used in development of this FRD.

2.2 CONTEXT

The information provided in this document is traceable to TWRS Function 4.2.4.1, *Interim Store Solidified HLW and TRU Waste*, and its related requirements, architecture, and interfaces. Section 3.1 describes the function hierarchy. This FRD provides the functions, requirements, inputs, outputs, and architectures that resulted from the functional analysis, requirements allocation, and architectural structure definition. Function 4.2.4.1 is decomposed to the fifth level to provide a basis for the *Interim Store Solidified HLW and TRU Waste* portion of the Dispose Waste TRS. The proposed fifth-level function *Interim Store Phase I Solidified HLW* is decomposed to the sixth level, to provide a basis for the DRD for the Phase I Solidified HLW Interim Storage System.

3.0 FUNCTIONS

3.1 FUNCTION HIERARCHY

Figure 3-1 shows the function hierarchy from Function 0, *Clean Up Hanford*, to Function 4.2.4.1, *Interim Store Solidified HLW and TRU Waste*. Shaded blocks indicate the traceability path of Function 4.2.4.1 to Function 0. This information is consistent with the TWRS Systems Engineering database.

Figure 3-2 illustrates the decomposition of Function 4.2.4.1. Shaded blocks indicate functions that will be addressed in the Phase I Solidified HLW Interim Storage System DRD.

3.2 FUNCTION DESCRIPTION

Table 3-1 provides descriptions of Function 4.2.4.1, *Interim Store Solidified HLW and TRU Waste*, and its subfunctions; and identifies the inputs and outputs associated with each function.

Figure 3-1. Function Hierarchy to Level 4.

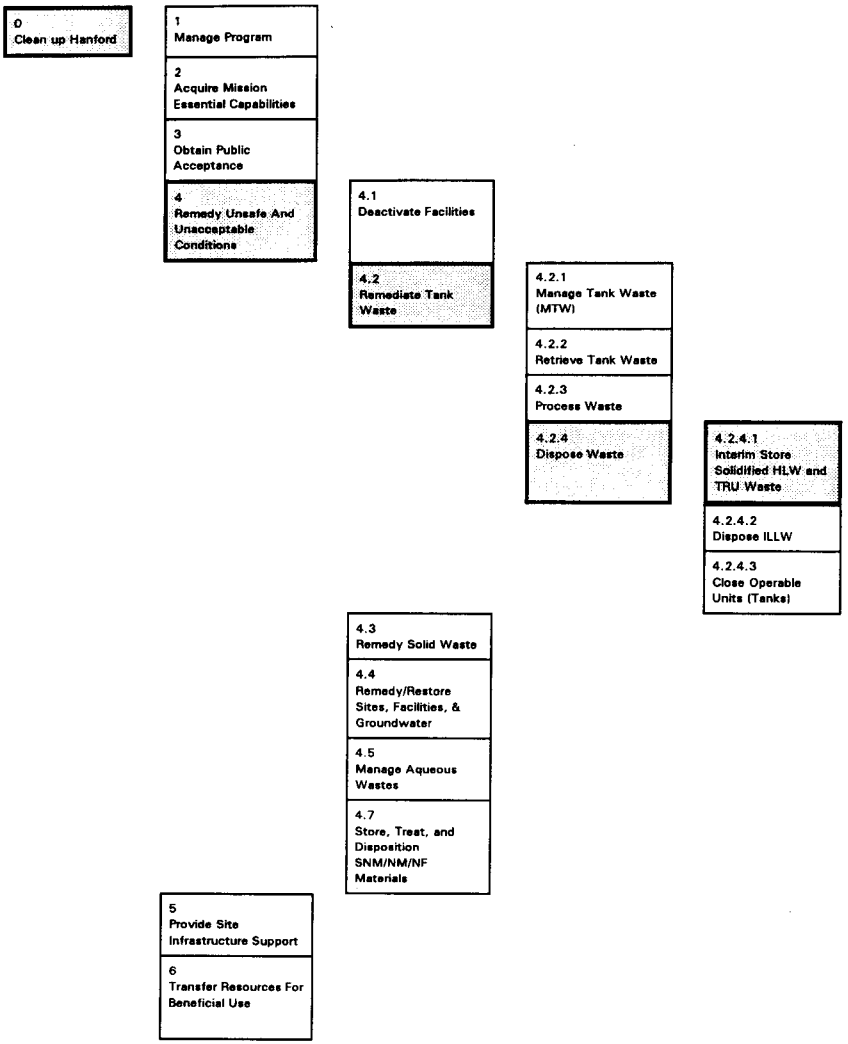
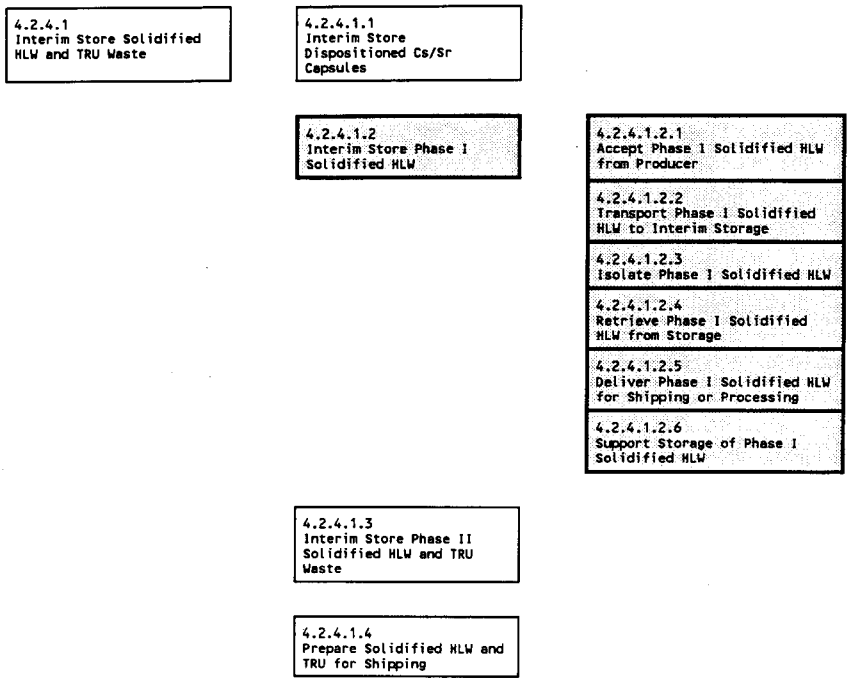


Figure 3-2. Decomposition of Function 4.2.4.1.



☐ To be addressed in Phase I Solidified HLW Interim Storage System DRD

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Cesium Product for Storage
Dispositioned Cs/Sr Capsules for Storage
Dispositioned Cs/Sr Capsules Shipping Mechanism
IHLW for Storage
  Phase I IHLW for Storage
  Phase II IHLW for Storage
IHLW Repository Shipping Mechanism
Infrastructure Support for IS Solidified HLW and TRU
  Infrastructure Support for IS Dispositioned Cs/Sr Capsules
  Infrastructure Support for IS Phase I Solidified HLW
  Infrastructure Support for IS Phase II Solidified HLW
  Infrastructure Support for Prepare Solidified HLW for Shipment
ITRU Repository Shipping Mechanism
ITRU Waste for Storage
Raw Materials for IS Solidified HLW and TRU
  Raw Materials for IS Dispositioned Cs/Sr Capsules
  Raw Materials for IS Phase I Solidified HLW
  Raw Materials for IS Phase II Solidified HLW
  Raw Materials for Prepare Solidified HLW for Shipment

4.2.4.1
Interim Store Solidified HLW and TRU Waste

Accept solidified high-level waste (HLW) [i.e., immobilized HLW (IHLW) and immobilized transuranic waste (ITRU) canisters from the HLW immobilization facility, cesium product containers from the pretreat supernatant facility, and dispositioned cesium/strontium (Cs/Sr) capsules from the Cs/Sr capsule disposal preparation system]. Transport solidified HLW to the appropriate interim storage facilities. Prepare and emplace solidified HLW in designated storage locations, monitor the storage locations for containment integrity, and eventually retrieve the solidified HLW from storage. Prepare the solidified HLW for shipment and load it into casks for shipment to an offsite geologic repository for disposal, or deliver the solidified HLW to an onsite treatment facility for further processing.

Outputs:
Cesium Product for Processing
Cesium Product Transport Mechanism
Dispositioned Cs/Sr Capsules for Shipment
Dispositioned Cs/Sr Capsules Transport Mechanism
IHLW for Shipment
IS Solidified HLW and TRU Excess Facilities
  IS Dispositioned Cs/Sr Capsules Excess Facilities
  IS Phase I Solidified HLW Excess Facilities
  IS Phase II Solidified HLW and TRU Excess Facilities
  Prepare Solidified HLW and TRU for Shipment Excess Facilities
IS Solidified HLW and TRU Garbage
  IS Dispositioned Cs/Sr Capsules Garbage
  IS Phase I Solidified HLW Garbage
  IS Phase II Solidified HLW and TRU Garbage
  Prepare Solidified HLW and TRU for Shipment Garbage
  IS Solidified HLW and TRU Hazardous Waste
  IS Dispositioned Cs/Sr Capsules Hazardous Waste
  IS Phase I Solidified HLW Hazardous Waste
  IS Phase II Solidified HLW and TRU Hazardous Waste
  Prepare Solidified HLW and TRU for Shipment Hazardous Waste

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs (continued):
Solidified HLW and TRU Production Information
Dispositioned Cs/Sr Capsules Production Information
Phase I IHLW Production Information
Cesium Product Production Information
Phase II Solidified HLW Production Information

4.2.4.1
Interim Store Solidified HLW and TRU Waste
(continued)

Subfunctions:
Interim Store Dispositioned Cs/Sr Capsules
Interim Store Phase I Solidified HLW
Interim Store Phase II Solidified HLW and TRU Waste
Prepare Solidified HLW and TRU for Shipment

Outputs (continued):
IS Solidified HLW and TRU Prepared Solid Waste
IS Dispositioned Cs/Sr Capsules Prepared Solid Waste
IS Phase I Solidified HLW Prepared Solid Waste
IS Phase II Solidified HLW and TRU Prepared Solid Waste
Prepare Solidified HLW and TRU for Shipment Prepared Solid Waste
IS Solidified HLW and TRU Treated Gaseous Effluents
IS Dispositioned Cs/Sr Capsules Treated Gaseous Effluents
IS Phase I Solidified HLW Treated Gaseous Effluents
IS Phase II Solidified HLW and TRU Treated Gaseous Effluents
Prepare Solidified HLW and TRU for Shipment Treated Gaseous Effluents
IS Solidified HLW and TRU Treated Liquid Effluents
IS Dispositioned Cs/Sr Capsules Treated Liquid Effluents
IS Phase I Solidified HLW Treated Liquid Effluents
IS Phase II Solidified HLW and TRU Treated Liquid Effluents
Prepare Solidified HLW and TRU for Shipment Treated Liquid Effluents

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

4.2.4.1 **Interim Store Solidified HLW and TRU Waste** (continued)	**Outputs** (continued): IS Solidified HLW and TRU Untreated Liquid Effluents IS Dispositioned Cs/Sr Capsules Untreated Liquid Effluents IS Phase I Solidified HLW Untreated Liquid Effluents IS Phase II Solidified HLW and TRU Untreated Liquid Effluents Prepare Solidified HLW and TRU for Shipment Untreated Liquid Effluents ITRU for Shipment Phase I IHLW Transport Mechanism Phase II Solidified HLW and TRU Transport Mechanism Solidified HLW and TRU Recertification Information Solidified HLW and TRU Storage Information Dispositioned Cs/Sr Capsules Storage Information Phase I IHLW Storage Information Cesium Product Storage Information Phase II Solidified HLW Storage Information

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Dispositioned Cs/Sr Capsules for Storage
Dispositioned Cs/Sr Capsules Production Information
Infrastructure Support for IS Dispositioned Cs/Sr Capsules
Raw Materials for IS Dispositioned Cs/Sr Capsules

4.2.4.1.1
Interim Store Dispositioned Cs/Sr Capsules

Accept sealed onsite transport casks loaded with dispositioned cesium/strontium (Cs/Sr) capsules. Transport the casks from the Cs/Sr capsule disposal preparation system to the interim storage site. Remove the Cs/Sr capsules from the onsite transport casks and emplace in their designated storage locations. Control the Cs/Sr capsule storage environment and monitor for containment integrity. Retrieve the Cs/Sr capsules from their storage locations and prepare them for loading into onsite transport casks. Load dispositioned Cs/Sr capsules into casks, and load the casks onto transport vehicles. Transport the casks containing dispositioned Cs/Sr capsules to a shipping cask loading station. Provide support services for the Interim Store Dispositioned Cs/Sr Capsules function.

Outputs:
Dispositioned Cs/Sr Capsules for Disposal
Dispositioned Cs/Sr Capsules Storage Information
Dispositioned Cs/Sr Capsules Transport Mechanism
IS Dispositioned Cs/Sr Capsules Excess Facilities
IS Dispositioned Cs/Sr Capsules Garbage
IS Dispositioned Cs/Sr Capsules Hazardous Waste
IS Dispositioned Cs/Sr Capsules Prepared Solid Waste
IS Dispositioned Cs/Sr Capsules Treated Gaseous Effluents
IS Dispositioned Cs/Sr Capsules Treated Liquid Effluents
IS Dispositioned Cs/Sr Capsules Untreated Liquid Effluents

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Cesium Product for Storage
Cesium Product Production Information
Infrastructure Support for IS Phase I Solidified HLW
Phase I IHLW for Storage
Phase I IHLW Production Information
Raw Materials for IS Phase I Solidified HLW

4.2.4.1.2
Interim Store Phase I Solidified HLW

Accept onsite transport casks loaded with Phase I solidified HLW (i.e., IHLW canisters or cesium product containers). Transport the casks from the production facilities to the interim storage site. Remove Phase I solidified HLW from the onsite transport casks and emplace in their designated storage locations. Control Phase I solidified HLW storage environment and monitor for containment integrity. Retrieve Phase I solidified HLW from their storage locations and prepare them for loading into onsite transport casks. Load Phase I solidified HLW into casks, and load the casks onto transport vehicles. Transport casks containing cesium product to the HLW Immobilization facility, and transfer cesium product container responsibility to the HLW Immobilization process. Transport casks containing IHLW canisters to an onsite shipping cask loading station.

Outputs:
Cesium Product for Processing
Cesium Product Storage Information
Cesium Product Transport Mechanism
IS Phase I Solidified HLW Excess Facilities
IS Phase I Solidified HLW Garbage
IS Phase I Solidified HLW Hazardous Waste
IS Phase I Solidified HLW Prepared Solid Waste
IS Phase I Solidified HLW Treated Gaseous Effluents
IS Phase I Solidified HLW Treated Liquid Effluents
IS Phase I Solidified HLW Untreated Liquid Effluents
Phase I IHLW for Disposal
Phase I IHLW Storage Information
Phase I IHLW Transport Mechanism

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

4.2.4.1.2
Interim Store Phase I Solidified HLW
(continued)

Provide support services for the Interim Store (IS) Phase I HLW function.

Subfunctions:
- Accept Phase I Solidified HLW from Producers
- Transport Phase I Solidified HLW to Interim Storage
- Isolate Phase I Solidified HLW
- Retrieve Phase I Solidified HLW from Storage
- Deliver Phase I Solidified HLW for Shipping or Processing
- Support Interim Store Phase I Solidified HLW

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Cesium Product for Storage
Cesium Product Production Information
Phase I IHLW for Storage
Phase I IHLW Production Information

4.2.4.1.2.1
Accept Phase I Solidified HLW from Producers

Verify that Phase I solidified HLW (i.e., sealed IHLW canisters or sealed cesium product containers) satisfy interim storage acceptance requirements. Verify that the Phase I IHLW satisfies repository acceptance requirements. Verify that the sealed transport cask meets onsite transportation requirements. Accept responsibility for the Phase I solidified HLW from the producer. Collect system-generated waste (SGW) for disposition by the Support Interim Store Phase I Solidified HLW function.

Outputs:
Accept Phase I Solidified HLW from Producers SGW
Accepted Cesium Product for Transport
Accepted Phase I IHLW for Transport
Cesium Product Acceptance Documentation
Phase I IHLW Acceptance Documentation

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Accepted Cesium Product for Transport
Accepted Phase I IHLW for Transport

4.2.4.1.2.2
Transport Phase I Solidified HLW to Interim Storage

Transport onsite transportation casks, loaded with Phase I solidified HLW, from the production facilities to the Phase I solidified HLW interim storage facility. Collect system-generated waste (SGW) for disposition by the Support Interim Store Phase I Solidified HLW function.

Outputs:
Cesium Product for Isolation
Phase I IHLW for Isolation
Transport Phase I Solidified HLW to Interim Storage SGW

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Cesium Product for Isolation
Phase I IHLW for Isolation

4.2.4.1.2.3
Isolate Phase I Solidified HLW

Remove Phase I solidified HLW from the onsite transportation casks, and release the casks and vehicle to the Support Interim Store Phase I Solidified HLW function for reconditioning. Prepare Phase I solidified HLW for interim storage. Move Phase I solidified HLW to interim storage locations, emplace, and isolate from the environment. Control and monitor the storage environment and integrity of storage location. Prevent and recover from accidents and abnormal situations during the interim storage period. Collect system-generated waste (SGW) for disposition by the Support Interim Store Phase I Solidified HLW function.

Outputs:
Cesium Product for Retrieval
Cesium Product Isolation Data
Cesium Product Transport Mechanism for Reconditioning
Isolate Phase I Solidified HLW SGW
Phase I IHLW for Retrieval
Phase I IHLW Isolation Data
Phase I IHLW Transport Mechanism for Reconditioning

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Cesium Product for Retrieval
Phase I IHLW for Retrieval

4.2.4.1.2.4
Retrieve Phase I Solidified HLW from Storage

Remove Phase I solidified HLW from their storage locations and move them to the transport cask loading location. Collect system-generated waste (SGW) for disposition by the Support Interim Store Phase I Solidified HLW function.

Outputs:
Retrieve Phase I Solidified HLW from Storage SGW
Retrieved Cesium Product
Retrieved Phase I IHLW

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Cesium Product Transport Mechanism for Loading
Phase I IHLW Transport Mechanism for Loading
Retrieved Cesium Product
Retrieved Phase I IHLW

4.2.4.1.2.5
Deliver Phase I Solidified HLW for Shipping or Processing

Prepare Phase I solidified HLW for transport to an onsite HLW immobilization facility or shipping facility. Load Phase I solidified HLW into onsite transport casks, load the casks onto transport vehicle, and transport the casks to the designated receipt facility. Collect system-generated waste (SGW) for disposition by the Support Interim Store Phase I Solidified HLW function.

Outputs:
Cesium Product for Processing
Cesium Product Transport Mechanism for Reuse
Deliver Phase I Solidified HLW for Shipping or Processing SGW
Phase I IHLW for Disposal
Phase I IHLW Transport Mechanism for Reuse

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Accept Phase I Solidified HLW from Producers SGW
Cesium Product Acceptance Documentation
Cesium Product Isolation Data
Cesium Product Transport Mechanism for Reconditioning
Cesium Product Transport Mechanism for Reuse
Deliver Phase I Solidified HLW for Shipping or Processing SGW
Infrastructure Support for IS Phase I Solidified HLW
Isolate Phase I Solidified HLW SGW
Phase I IHLW Acceptance Documentation
Phase I IHLW Isolation Data
Phase I IHLW Transport Mechanism for Reconditioning
Phase I IHLW Transport Mechanism for Reuse
Raw Materials for IS Phase I Solidified HLW
Retrieve Phase I Solidified HLW from Storage SGW
Transport Phase I Solidified HLW to Interim Storage SGW

4.2.4.1.2.6
Support Interim Store Phase I Solidified HLW

Provide support services for Phase I solidified HLW interim storage (IS). Services include heating, ventilation, and air conditioning (HVAC); electrical power distribution; instrument and service air; service water; maintenance services; receiving and storage of supplies and equipment; health physics/operations support; contaminated equipment repair shop; records management; and treatment, preparation, packaging, discharge, etc. of system generated solid, liquid and gaseous effluents.

Outputs:
Cesium Product Storage Information
Cesium Product Transport Mechanism
Cesium Product Transport Mechanism for Loading
IS Phase I Solidified HLW Excess Facilities
IS Phase I Solidified HLW Garbage
IS Phase I Solidified HLW Hazardous Waste
IS Phase I Solidified HLW Prepared Solid Waste
IS Phase I Solidified HLW Treated Gaseous Effluents
IS Phase I Solidified HLW Treated Liquid Effluents
IS Phase I Solidified HLW Untreated Liquid Effluents
Phase I IHLW Storage Information
Phase I IHLW Transport Mechanism
Phase I IHLW Transport Mechanism for Loading

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Infrastructure Support for IS Phase II Solidified HLW and TRU
ITRU Waste for Storage
Phase II IHLW for Storage
Phase II Solidified HLW and TRU Production Information
Raw Materials for IS Phase II Solidified HLW and TRU

4.2.4.1.3
Interim Store Phase II Solidified HLW and TRU Waste

Accept onsite transport casks loaded with Phase II solidified HLW/TRU (i.e., IHLW canisters or ITRU canisters). Transport the casks from the production facility to the interim storage site. Remove Phase II solidified HLW/TRU from the onsite transport casks and emplace in their designated storage locations. Control Phase II solidified HLW/TRU storage environment and monitor for containment integrity. Retrieve Phase II solidified HLW/TRU from their designated storage locations and prepare them for loading into onsite transport casks. Load Phase II solidified HLW/TRU into casks, and load the casks onto transport vehicles. Transport the casks containing IHLW or ITRU canisters to an onsite shipping cask loading station Provide support services for the Interim Store (IS) Phase II Solidified HLW and TRU function.

Outputs:
IS Phase II Solidified HLW and TRU Excess Facilities
IS Phase II Solidified HLW and TRU Garbage
IS Phase II Solidified HLW and TRU Hazardous Waste
IS Phase II Solidified HLW and TRU Prepared Solid Waste
IS Phase II Solidified HLW and TRU Treated Gaseous Effluents
IS Phase II Solidified HLW and TRU Treated Liquid Effluents
IS Phase II Solidified HLW and TRU Untreated Liquid Effluents
ITRU for Disposal
Phase II IHLW for Disposal
Phase II Solidified HLW and TRU Storage Information
Phase II Solidified HLW and TRU Transport Mechanism

Table 3-1. Functions and Inputs/Outputs. (14 sheets)

Inputs:
Dispositioned Cs/Sr Capsules for Disposal
Dispositioned Cs/Sr Capsules Shipping Mechanism
IHLW Repository Shipping Mechanism
Infrastructure Support for Prepare Solidified HLW and TRU for Shipment
ITRU for Disposal
ITRU Repository Shipping Mechanism
Phase I IHLW for Disposal
Phase II IHLW for Disposal
Raw Materials for Prepare Solidified HLW and TRU for Shipment

4.2.4.1.4
Prepare Solidified HLW and TRU for Shipment

Accept onsite transport casks loaded with solidified HLW/TRU destined for offsite shipment (i.e., dispositioned Cs/Sr capsules, IHLW canisters, or ITRU canisters). Receive shipping casks furnished by the U.S. Department of Energy - Office of Civilian Radioactive Waste Management (DOE-OCRWM). Unload the solidified HLW/TRU from the onsite transport casks. Re-certify the solidified HLW/TRU for repository acceptability. Load the solidified HLW/TRU into shipping casks, load the shipping casks onto shipping vehicles, and transfer responsibility to the DOE-OCRWM. The DOE-OCRWM, upon taking receipt of the shipping casks loaded with dispositioned Cs/Sr capsules, IHLW, and ITRU, ships the casks to their final disposition.

Outputs:
Dispositioned Cs/Sr Capsules for Shipment
IHLW for Shipment
ITRU for Shipment
Prepare Solidified HLW and TRU for Shipment Excess Facilities
Prepare Solidified HLW and TRU for Shipment Garbage
Prepare Solidified HLW and TRU for Shipment Hazardous Waste
Prepare Solidified HLW and TRU for Shipment Prepared Solid Waste
Prepare Solidified HLW and TRU for Shipment Treated Gaseous Effluents
Prepare Solidified HLW and TRU for Shipment Treated Liquid Effluents
Prepare Solidified HLW and TRU for Shipment Untreated Liquid Effluents
Solidified HLW and TRU Recertification Information

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4.0 INTERFACES

4.1 INTERFACE IDENTIFICATION

Interfaces are items entering a function to be acted upon by that function (inputs), and items leaving a function after having been acted upon by that function (outputs). The inputs to and outputs from each of the functions addressed in this document are identified in Table 3-1.

4.2 INTERFACE DESCRIPTION

Table 4-1 provides descriptions of the inputs and outputs identified in Table 3-1.

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
Accept Phase I Solidified HLW from Producers SGW	Solid, liquid, and gaseous waste generated by system operation.	4.2.4.1.2.1	4.2.4.1.2.6	
Accepted Cesium Product for Transport	Cesium product that is acceptable for interim storage and ready for transport from the Phase I LLW immobilization facility.	4.2.4.1.2.1	4.2.4.1.2.2	
Accepted Phase I IHLW for Transport	IHLW that is acceptable for interim storage and ready for transport from the Phase I HLW immobilization facility.	4.2.4.1.2.1	4.2.4.1.2.2	
Cesium Product Acceptance Documentation	Documentation certifying that, at the time of transport to interim storage, the cesium product meets the interim storage acceptance requirements.	4.2.4.1.2.1	4.2.4.1.2.6	
Cesium Product for Isolation	Cesium product that has been transported from the production facility and is ready for unloading from the transport casks and emplacement in interim storage location.	4.2.4.1.2.2	4.2.4.1.2.3	
Cesium Product for Processing	Containers of solid cesium material sealed in onsite transport casks and delivered to an HLW immobilization facility.	4.2.4 4.2.4.1 4.2.4.1.2 4.2.4.1.2.5	4.2.3 4.2.3.5	
Cesium Product for Retrieval	Cesium product that is scheduled for retrieval from interim storage.	4.2.4.1.2.3	4.2.4.1.2.4	
Cesium Product for Storage	Solidified cesium sealed in a container, ready for transport to onsite interim storage (i.e., loaded into a cask placed on a transport vehicle). At time of transport to the interim storage facility the waste will be certified to meet interim storage requirements.	4.2.3 4.2.3.3	4.2.4 4.2.4.1 4.2.4.1.2 4.2.4.1.2.1	
Cesium Product Isolation Data	Data generated by the monitoring of cesium product containers during isolation in the interim storage facility.	4.2.4.1.2.3	4.2.4.1.2.6	
Cesium Product Production Information	Documentation supplied by Phase I LLW immobilization facility certifying that the cesium product complies with interim storage facility acceptance specifications.		4.2.4.1.2 4.2.4.1.2.1	Solidified HLW and TRU Production Information

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
Cesium Product Storage Information	Documentation supplied by the Phase I solidified HLW interim storage facility certifying that the cesium product was stored in accordance with interim storage specifications.	4.2.4.1.2 4.2.4.1.2.6		Solidified HLW and TRU Storage Information
Cesium Product Transport Mechanism	The ready-to-use cask and vehicle for on-site transport of cesium product from the Phase I LLW Immobilization Facility to the interim storage facility. The transport mechanism is provided by the Interim Store Solidified HLW and TRU Waste function (4.2.4.1).	4.2.4 4.2.4.1 4.2.4.1.2 4.2.4.1.2.6	4.2.3 4.2.3.3	
Cesium Product Transport Mechanism for Loading	Empty cesium product transport vehicle and casks, ready for loading with retrieved cesium product.	4.2.4.1.2.6	4.2.4.1.2.5	
Cesium Product Transport Mechanism for Reconditioning	Empty cesium product transport vehicle and casks, ready for maintenance after transporting the product from the producer's facility to interim storage.	4.2.4.1.2.3	4.2.4.1.2.6	
Cesium Product Transport Mechanism for Reuse	Empty cesium product transport vehicle and casks, ready for maintenance after transporting the product from interim storage to the HLW immobilization facility.	4.2.4.1.2.5	4.2.4.1.2.6	
Deliver Phase I Solidified HLW for Shipping or Processing SGW	Solid, liquid, and gaseous waste generated by system operation.	4.2.4.1.2.5	4.2.4.1.2.6	
Dispositioned Cs/Sr Capsules for Disposal	Dispositioned Cs/Sr capsules delivered from the interim storage facility to the shipping cask loading station.	4.2.4.1.1	4.2.4.1.4	
Dispositioned Cs/Sr Capsules for Shipment	Cs/Sr capsules prepared to meet repository acceptance requirements, loaded into the shipping mechanism for shipment to the repository.	0 4 4.2 4.2.4 4.2.4.1 4.2.4.1.4	External	
Dispositioned Cs/Sr Capsules for Storage	Cs/Sr capsules dispositioned in a manner suitable for interim onsite storage and eventual offsite disposal.	4.2.3 4.2.3.6 4.2.3.6.3 orig.	4.2.4 4.2.4.1 4.2.4.1.1	

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
Dispositioned Cs/Sr Capsules Production Information	Documentation supplied by the Cs/Sr capsule disposal preparation system certifying that the dispositioned Cs/Sr capsules comply with interim storage facility acceptance specifications. Those specifications will include HLW geologic repository acceptance criteria.		4.2.4.1.1	Solidified HLW and TRU Production Information
Dispositioned Cs/Sr Capsules Shipping Mechanism	The shipping cask and vehicle provided by DOE-OCRWM for the shipment of containers of dispositioned Cs/Sr capsule product to the geologic repository.	External	0 4 4.2 4.2.4 4.2.4.1 4.2.4.1.4	
Dispositioned Cs/Sr Capsules Storage Information	Documentation supplied by the dispositioned Cs/Sr capsule interim storage facility certifying that containers were stored in accordance with interim storage specifications.	4.2.4.1.1		Solidified HLW and TRU Storage Information
Dispositioned Cs/Sr Capsules Transport Mechanism	The ready-to-use cask and vehicle for on-site transport of dispositioned Cs/Sr capsules from the capsule preparation system to the interim storage facility. The transport mechanism is provided by the Interim Store Solidified HLW and TRU Waste function (4.2.4.1).	4.2.4 4.2.4.1 4.2.4.1.1	4.2.3 4.2.3.6 4.2.3.6.3 orig.	
IHLW for Shipment	Sealed containers of IHLW that are placed in offsite shipping casks and loaded onto a vehicle for shipment to the repository by DOE-OCRWM personnel. The waste will be accompanied by the required characterization information. At the time of shipment to the repository, the waste will be certified to meet repository acceptance requirements.	0 4 4.2 4.2.4 4.2.4.1 4.2.4.1.4	External	
IHLW for Storage	IHLW sealed in canisters suitable for interim onsite storage and eventual emplacement in HLW geologic repository. At time of transport to the interim storage facility the waste will be certified to meet repository acceptance requirements.	4.2.3 4.2.3.5 4.2.3.5.1 4.2.3.5.1.5	4.2.4 4.2.4.1	

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
IHLW Repository Shipping Mechanism	The shipping cask and vehicle provided by DOE-OCRWM for the shipment of sealed IHLW containers to the geologic repository.	External	0 4 4.2 4.2.4 4.2.4.1 4.2.4.1.4	
Infrastructure Support for IS Dispositioned Cs/Sr Capsules	General infrastructure support needed to interim store dispositioned Cs/Sr capsules. This will include but is not limited to fire protection, police, emergency preparedness, medical services, road services, telecommunications, radiological services, laboratory services, transportation, and sewer. This includes land for siting facilities.		4.2.4.1.1	Infrastructure Support for IS Solidified HLW and TRU
Infrastructure Support for IS Phase I Solidified HLW	General infrastructure support needed to interim store Phase I solidified HLW. This will include but is not limited to fire protection, police, emergency preparedness, medical services, road services, telecommunications, radiological services, transportation, and sewer. This includes land for siting facilities.		4.2.4.1.2 4.2.4.1.2.6	Infrastructure Support for IS Solidified HLW and TRU
Infrastructure Support for IS Phase II Solidified HLW and TRU	General infrastructure support needed to interim store Phase II solidified HLW. This will include but is not limited to fire protection, police, emergency preparedness, medical services, road services, telecommunications, radiological services, laboratory services, transportation, and sewer. This includes land for siting facilities.		4.2.4.1.3	Infrastructure Support for IS Solidified HLW and TRU
Infrastructure Support for IS Solidified HLW and TRU	General infrastructure support needed to interim store solidified HLW and TRU waste. This will include but is not limited to fire protection, police, emergency preparedness, medical services, road services, telecommunications, radiological services, laboratory services, transportation, and sewer. This includes land for siting facilities.		4.2.4.1	Infrastructure Support for Dispose Waste

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
Infrastructure Support for Prepare Solidified HLW and TRU for Shipment	General infrastructure support needed to prepare solidified HLW for shipment to an offsite disposal site. This will include but is not limited to fire protection, police, emergency preparedness, medical services, road services, telecommunications, radiological services, laboratory services, transportation, and sewer. This includes land for siting facilities.		4.2.4.1.4	Infrastructure Support for IS Solidified HLW and TRU
IS Dispositioned Cs/Sr Capsules Excess Facilities	Facilities that, having fulfilled their original purposes and completed the function/processes described in the Interim Store Dispositioned Cs/Sr Capsules function, are now available and appropriate for reuse or deactivation.	4.2.4.1.1		IS Solidified HLW and TRU Excess Facilities
IS Dispositioned Cs/Sr Capsules Garbage	Ordinary nonradioactive, nonhazardous solid waste generated within the Interim Store Cs/Sr Capsules function, suitable for disposal in a sanitary landfill.	4.2.4.1.1		IS Solidified HLW and TRU Garbage
IS Dispositioned Cs/Sr Capsules Hazardous Waste	Solid waste generated within the Interim Store Dispositioned Cs/Sr Capsules function that is classified as hazardous (dangerous) per EPA or State of Washington regulations.	4.2.4.1.1		IS Solidified HLW and TRU Waste Hazardous Waste
IS Dispositioned Cs/Sr Capsules Prepared Solid Waste	Solid waste, generated from the Interim Store Dispositioned Cs/Sr Capsules function, that has been segregated, packaged, assayed, and certified for transfer to Hanford Site Function 4.3,Remedy Solid Waste, for further treatment or disposal. This includes mixed and radioactive wastes.	4.2.4.1.1		IS Solidified HLW and TRU Prepared Solid Waste
IS Dispositioned Cs/Sr Capsules Treated Gaseous Effluents	Treated gaseous waste from functions associated with the interim storage of dispositioned Cs/Sr capsules. Treated gaseous effluents are discharged to the atmosphere.	4.2.4.1.1		IS Solidified HLW and TRU Treated Gaseous Effluents
IS Dispositioned Cs/Sr Capsules Treated Liquid Effluents	Liquid effluents which meet interface acceptance criteria for discharge directly to the 200 Area Treated Effluent Disposal Facility (TEDF).	4.2.4.1.1		IS Solidified HLW and TRU Treated Liquid Effluents

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
IS Dispositioned Cs/Sr Capsules Untreated Liquid Effluents	Generated liquid effluents which require treatment and meet interface acceptance criteria for discharge directly to the Liquid Effluent Retention Facility (LERF) and subsequent treatment in the Effluent Treatment Facility (ETF).	4.2.4.1.1		IS Solidified HLW and TRU Untreated Liquid Effluents
IS Phase I Solidified HLW Excess Facilities	Facilities that, having fulfilled their original purposes and completed the function/processes described in the interim store Phase I solidified HLW function, are now available and appropriate for reuse or deactivation.	4.2.4.1.2 4.2.4.1.2.6		IS Solidified HLW and TRU Excess Facilities
IS Phase I Solidified HLW Garbage	Ordinary nonradioactive, nonhazardous solid waste generated within the Interim Store Phase I Solidified HLW function, suitable for disposal in a sanitary landfill.	4.2.4.1.2 4.2.4.1.2.6		IS Solidified HLW and TRU Garbage
IS Phase I Solidified HLW Hazardous Waste	Solid waste generated within the Interim Store Phase I Solidified HLW function that is classified as hazardous (dangerous) per EPA or State of Washington regulations.	4.2.4.1.2 4.2.4.1.2.6		IS Solidified HLW and TRU Waste Hazardous Waste
IS Phase I Solidified HLW Prepared Solid Waste	Solid waste, generated from the Interim Store Phase I Solidified HLW function, that has been segregated, packaged, assayed, and certified for transfer to Hanford Site Function 4.3, Remedy Solid Waste, for further treatment or disposal. This includes mixed and radioactive wastes.	4.2.4.1.2 4.2.4.1.2.6		IS Solidified HLW and TRU Prepared Solid Waste
IS Phase I Solidified HLW Treated Gaseous Effluents	Treated gaseous waste from functions associated with the interim storage of Phase I solidified HLW. Treated gaseous effluents are discharged to the atmosphere.	4.2.4.1.2 4.2.4.1.2.6		IS Solidified HLW and TRU Treated Gaseous Effluents
IS Phase I Solidified HLW Treated Liquid Effluents	Liquid effluents which meet interface acceptance criteria for discharge directly to the 200 Area Treated Effluent Disposal Facility (TEDF).	4.2.4.1.2 4.2.4.1.2.6		IS Solidified HLW and TRU Treated Liquid Effluents
IS Phase I Solidified HLW Untreated Liquid Effluents	Generated liquid effluents which require treatment and meet interface acceptance criteria for discharge directly to the Liquid Effluent Retention Facility (LERF) and subsequent treatment in the Effluent Treatment Facility (ETF).	4.2.4.1.2 4.2.4.1.2.6		IS Solidified HLW and TRU Untreated Liquid Effluents

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
IS Phase II Solidified HLW and TRU Excess Facilities	Facilities that, having fulfilled their original purposes and completed the function/processes described in the Interim Store Phase II Solidified HLW and TRU function, are now available and appropriate for reuse or deactivation.	4.2.4.1.3		IS Solidified HLW and TRU and TRU Excess Facilities
IS Phase II Solidified HLW and TRU Garbage	Ordinary nonradioactive, nonhazardous solid waste generated within the Interim Store Phase II Solidified HLW and TRU function, suitable for disposal in a sanitary landfill.	4.2.4.1.3		IS Solidified HLW and TRU and TRU Garbage
IS Phase II Solidified HLW and TRU Hazardous Waste	Solid waste generated within the Interim Store Phase II Solidified HLW and TRU function that is classified as hazardous (dangerous) per EPA or State of Washington regulations.	4.2.4.1.3		IS Solidified HLW and TRU and TRU Waste Hazardous Waste
IS Phase II Solidified HLW and TRU Prepared Solid Waste	Solid waste, generated from the Interim Store Phase II Solidified HLW and TRU function, that has been segregated, packaged, assayed, and certified for transfer to Hanford Site Function 4.3, Remedy Solid Waste, for further treatment or disposal. This includes mixed and radioactive wastes.	4.2.4.1.3		IS Solidified HLW and TRU and TRU Prepared Solid Waste
IS Phase II Solidified HLW and TRU Treated Gaseous Effluents	Treated gaseous waste from functions associated with the interim storage of Phase II solidified HLW and TRU. Treated gaseous effluents are discharged to the atmosphere.	4.2.4.1.3		IS Solidified HLW and TRU and TRU Treated Gaseous Effluents
IS Phase II Solidified HLW and TRU Treated Liquid Effluents	Liquid effluents which meet interface acceptance criteria for discharge directly to the 200 Area Treated Effluent Disposal Facility (TEDF).	4.2.4.1.3		IS Solidified HLW and TRU and TRU Treated Liquid Effluents
IS Phase II Solidified HLW and TRU Untreated Liquid Effluents	Generated liquid effluents which require treatment and meet interface acceptance criteria for discharge directly to the Liquid Effluent Retention Facility (LERF) and subsequent treatment in the Effluent Treatment Facility (ETF).	4.2.4.1.3		IS Solidified HLW and TRU Untreated Liquid Effluents

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
IS Solidified HLW and TRU Excess Facilities	Facilities that, having fulfilled their original purposes and completed the function/processes described in the interim store solidified HLW and TRU waste function, are now available and appropriate for reuse or deactivation. Excess facilities are transferred to Hanford Site Function 4.1; Deactivate Facilities. Reuse will be decided at the site level.	4.2.4.1		DW Excess Facilities
IS Solidified HLW and TRU Garbage	Ordinary nonradioactive, nonhazardous solid waste generated within the Interim Store Solidified HLW and TRU Waste function, suitable for disposal in a sanitary landfill.	4.2.4.1		DW Garbage
IS Solidified HLW and TRU Hazardous Waste	Solid waste generated within the Interim Store Solidified HLW and TRU Waste function that is classified as hazardous (dangerous) per EPA or State of Washington regulations.	4.2.4.1		DW Hazardous Waste
IS Solidified HLW and TRU Prepared Solid Waste	Solid waste generated from the Interim Store Solidified HLW and TRU Waste function that has been segregated, packaged, assayed, and certified for transfer to Hanford Site Function 4.3, Remedy Solid Waste, for further treatment or disposal. This includes mixed and radioactive wastes.	4.2.4.1		DW Prepared Solid Waste
IS Solidified HLW and TRU Treated Gaseous Effluents	Treated gaseous waste from functions associated with the interim storage of solidified HLW and TRU waste. Treated gaseous effluents are discharged to the atmosphere.	4.2.4.1		DW Treated Gaseous Effluents
IS Solidified HLW and TRU Treated Liquid Effluents	Liquid effluents which meet interface acceptance criteria for discharge directly to the 200 Area Treated Effluent Disposal Facility (TEDF).	4.2.4.1		DW Treated Liquid Effluents
IS Solidified HLW and TRU Untreated Liquid Effluents	Generated liquid effluents which require treatment and meet interface acceptance criteria for discharge directly to the Liquid Effluent Retention Facility (LERF) and subsequent treatment in the Effluent Treatment Facility (ETF).	4.2.4.1		DW Untreated Liquid Effluents
Isolate Phase 1 Solidified HLW SGW	Solid, liquid, and gaseous waste generated by system operation.	4.2.4.1.2.3	4.2.4.1.2.6	

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
ITRU for Disposal	ITRU delivered from the interim storage facility to the shipping cask loading station.	4.2.4.1.3	4.2.4.1.4	
ITRU for Shipment	Sealed containers of ITRU waste that are placed in offsite shipping casks and loaded onto a vehicle for shipment to WIPP or to the HLW geologic repository. The waste will be accompanied by the required characterization information. At the time of shipment to WIPP/HLW geologic repository the waste will be certified to meet the WIPP/HLW geologic repository acceptance requirements.	0 4 4.2 4.2.4 4.2.4.1 4.2.4.1.4	External	
ITRU for Storage	ITRU sealed in canisters suitable for interim storage and eventual emplacement in WIPP or HLW geologic repository (as required). The ITRU will be certified to meet WIPP/HLW geologic repository acceptance at time of transport to the interim storage facility.	4.2.3 4.2.3.5 4.2.3.5.1 4.2.3.5.1.5	4.2.4 4.2.4.1 4.2.4.1.3	
ITRU Repository Shipping Mechanism	The shipping cask and vehicle for the shipment of sealed ITRU containers to the WIPP.	External	0 4 4.2 4.2.4 4.2.4.1 4.2.4.1.4	
Phase I IHLW Acceptance Documentation	Documentation certifying that, at the time of transport to interim storage, the Phase I IHLW meets the repository acceptance requirements and interim storage acceptance requirements.	4.2.4.1.2.1	4.2.4.1.2.6	
Phase I IHLW for Disposal	Phase I IHLW delivered from the interim storage facility to the shipping cask loading station.	4.2.4.1.2 4.2.4.1.2.5	4.2.4.1.4	
Phase I IHLW for Isolation	Phase I IHLW that has been transported from the production facility and is ready for unloading from the transport casks and emplacement in interim storage location.	4.2.4.1.2.2	4.2.4.1.2.3	
Phase I IHLW for Retrieval	Phase I IHLW that is scheduled for retrieval from interim storage.	4.2.4.1.2.3	4.2.4.1.2.4	

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
Phase I IHLW for Storage	IHLW from the Phase I HLW immobilization facility, sealed in canisters suitable for interim onsite storage and eventual emplacement in HLW geologic repository. At time of transport to the interim storage facility the waste will be certified to meet repository acceptance requirements.		4.2.4.1.2 4.2.4.1.2.1	IHLW for Storage
Phase I IHLW Isolation Data	Data generated by the monitoring of Phase I IHLW canisters during isolation in the interim storage facility.	4.2.4.1.2.3	4.2.4.1.2.6	
Phase I IHLW Production Information	Documentation supplied by Phase I HLW immobilization facility certifying that the product complies with interim storage facility acceptance specifications. Those specifications will include HLW geologic repository acceptance criteria.		4.2.4.1.2 4.2.4.1.2.1	Solidified HLW and TRU Production Information
Phase I IHLW Storage Information	Documentation supplied by the Phase I Solidified HLW interim storage facility certifying that the Phase I IHLW was stored in accordance with interim storage specifications.	4.2.4.1.2 4.2.4.1.2.6		Solidified HLW and TRU Storage Information
Phase I IHLW Transport Mechanism	The ready-to-use cask and vehicle for onsite transport of IHLW from the Phase I HLW immobilization facility to the interim storage facility. The transport mechanism is provided by the Interim Store Solidified HLW and TRU Waste function (4.2.4.1).	4.2.4 4.2.4.1 4.2.4.1.2 4.2.4.1.2.6	4.2.3 4.2.3.5 4.2.3.5.4	
Phase I IHLW Transport Mechanism for Loading	Empty Phase I IHLW transport vehicle and casks, ready for loading with retrieved Phase I IHLW.	4.2.4.1.2.6	4.2.4.1.2.5	
Phase I IHLW Transport Mechanism for Reconditioning	Empty Phase I IHLW transport vehicle and casks, ready for maintenance after transporting the product from the producer's facility to interim storage.	4.2.4.1.2.3	4.2.4.1.2.6	
Phase I IHLW Transport Mechanism for Reuse	Empty Phase I IHLW transport vehicle and casks, ready for maintenance after transporting the product from interim storage to the shipping cask loading station.	4.2.4.1.2.5	4.2.4.1.2.6	
Phase II IHLW for Disposal	Phase II IHLW delivered from the interim storage facility to the shipping cask loading station.	4.2.4.1.3	4.2.4.1.4	

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
Phase II IHLW for Storage	IHLW from the Phase II HLW immobilization facility, sealed in canisters suitable for interim on-site storage and eventual emplacement in HLW geologic repository. At time of transport to the interim storage facility the waste will be certified to meet repository acceptance requirements.		4.2.4.1.3	IHLW for Storage
Phase II Solidified HLW and TRU Production Information	Documentation supplied by the Phase II HLW and TRU immobilization facility certifying that the product complies with interim storage facility acceptance specifications. Those specifications will include WIPP/HLW geologic repository acceptance criteria, as applicable.		4.2.4.1.3	Solidified HLW and TRU Production Information
Phase II Solidified HLW and TRU Storage Information	Documentation supplied by the Phase II Solidified HLW interim storage facility certifying that the Phase II IHLW and ITRU were stored in accordance with interim storage specifications.	4.2.4.1.3		Solidified HLW and TRU Storage Information
Phase II Solidified HLW and TRU Transport Mechanism	The ready-to-use cask and vehicle for onsite transport of immobilized HLW/TRU waste from the Phase II HLW immobilization facility to the interim storage facility. The transport mechanism is provided by the Interim Store Solidified HLW and TRU Waste function (4.2.4.1).	4.2.4 4.2.4.1 4.2.4.1.3	4.2.3 4.2.3.5 4.2.3.5.4	
Prepare Solidified HLW and TRU for Shipment Excess Facilities	Facilities that, having fulfilled their original purposes and completed the function/processes described in the Prepare Solidified HLW for Shipment function, are now available and appropriate for reuse or deactivation.	4.2.4.1.4		IS Solidified HLW and TRU Excess Facilities
Prepare Solidified HLW and TRU for Shipment Garbage	Ordinary nonradioactive, nonhazardous solid waste generated within the Prepare Solidified HLW for Shipment function, suitable for disposal in a sanitary landfill.	4.2.4.1.4		IS Solidified HLW and TRU Garbage
Prepare Solidified HLW and TRU for Shipment Hazardous Waste	Solid waste generated within the Prepare Solidified HLW for Shipment function that is classified as hazardous (dangerous) per EPA or State of Washington regulations.	4.2.4.1.4		IS Solidified HLW and TRU Waste Hazardous Waste

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
Prepare Solidified HLW and TRU for Shipment Prepared Solid Waste	Solid waste, generated from the Prepare Solidified HLW for Shipment function, that has been segregated, packaged, assayed, and certified for transfer to Hanford Site Function 4.3, Remedy Solid Waste, for further treatment or disposal. This includes mixed and radioactive wastes.	4.2.4.1.4		IS Solidified HLW and TRU Prepared Solid Waste
Prepare Solidified HLW and TRU for Shipment Treated Gaseous Effluents	Treated gaseous waste from functions associated with the preparation and loading of solidified HLW for shipment. Treated gaseous effluents are discharged to the atmosphere.	4.2.4.1.4		IS Solidified HLW and TRU Treated Gaseous Effluents
Prepare Solidified HLW and TRU for Shipment Treated Liquid Effluents	Liquid effluents which meet interface acceptance criteria for discharge directly to the 200 Area Treated Effluent Disposal Facility (TEDF).	4.2.4.1.4		IS Solidified HLW and TRU Treated Liquid Effluents
Prepare Solidified HLW and TRU for Shipment Untreated Liquid Effluents	Generated liquid effluents which require treatment and meet interface acceptance criteria for discharge directly to the Liquid Effluent Retention Facility (LERF) and subsequent treatment in the Effluent Treatment Facility (ETF).	4.2.4.1.4		IS Solidified HLW and TRU Untreated Liquid Effluents
Raw Materials for IS Dispositioned Cs/Sr Capsules	Chemicals, containers, utilities, replacement equipment, spare parts, supplies, etc., necessary for the interim storage of dispositioned Cs/Sr capsules.		4.2.4.1.1	Raw Materials for IS Solidified HLW and TRU
Raw Materials for IS Phase I Solidified HLW	Chemicals, containers, utilities, replacement equipment, spare parts, supplies, etc. necessary for the interim storage of Phase I solidified HLW.		4.2.4.1.2 4.2.4.1.2.6	Raw Materials for IS Solidified HLW and TRU
Raw Materials for IS Phase II Solidified HLW and TRU	Chemicals, containers, utilities, replacement equipment, spare parts, supplies, etc. necessary for the interim storage of Phase II solidified HLW.		4.2.4.1.3	Raw Materials for IS Solidified HLW and TRU
Raw Materials for IS Solidified HLW and TRU	Chemicals, containers, utilities, replacement equipment, spare parts, supplies, etc., necessary for the interim storage of solidified HLW and TRU waste.		4.2.4.1	Raw Materials for DW
Raw Materials for Prepare Solidified HLW and TRU for Shipment	Chemicals, containers, utilities, replacement equipment, spare parts, supplies, etc., necessary for the preparation and loading of solidified HLW for shipment.		4.2.4.1.4	Raw Materials for IS Solidified HLW and TRU

Table 4-1. Input and Output Descriptions. (13 sheets)

Input/Output Name	Input/Output Description	Output From Function(s)	Input To Function(s)	Child Of Input/Output
Retrieve Phase I Solidified HLW from Storage SGW	Solid, liquid, and gaseous waste generated by system operation.	4.2.4.1.2.4	4.2.4.1.2.6	
Retrieved Cesium Product	Cesium product that has been retrieved from its interim storage location and moved to the transport cask loading location.	4.2.4.1.2.4	4.2.4.1.2.5	
Retrieved Phase I IHLW	Phase I IHLW that has been retrieved from its interim storage location and moved to the transport cask loading location.	4.2.4.1.2.4	4.2.4.1.2.5	
Solidified HLW and TRU Production Information	Documentation supplied by production facilities certifying that containers comply with solidified HLW and TRU interim storage facility acceptance specifications. Those specifications will include WIPP and/or HLW geologic repository acceptance criteria where applicable.	1	4 4.2 4.2.4 4.2.4.1	
Solidified HLW and TRU Recertification Information	Documentation certifying that the solidified HLW and TRU waste containers meet the repository acceptance criteria at the time of loading into repository shipping casks.	4 4.2 4.2.4 4.2.4.1 4.2.4.1.4	1	
Solidified HLW and TRU Storage Information	Documentation supplied by the solidified HLW and TRU interim storage facilities certifying that containers were stored in accordance with interim storage specifications.	4 4.2 4.2.4 4.2.4.1	1	
Transport Phase I Solidified HLW to Interim Storage SGW	Solid, liquid, and gaseous waste generated by system operation.	4.2.4.1.2.2	4.2.4.1.2.6	

5.0 REQUIREMENTS ALLOCATION

Two types of requirements are allocated to Function 4.2.4.1, *Interim Store Solidified HLW and TRU Waste*, and its associated subfunctions, inputs, outputs, and architecture. Constraints are requirements imposed on functions, architecture, and interfaces from agencies external to the TWRS. Performance requirements are developed within TWRS and can be changed as necessary in the course of the systems engineering activity. The text of these requirements is provided in Section 7.0.

An additional type of requirements, termed proof-of-concept requirements, is applicable to Phase I of the TWRS privatization effort. Proof-of-concept requirements are applicable only to the inputs to Function 4.2.4.1. They are included in this document to fully define the input characteristics.

5.1 REQUIREMENTS ALLOCATION TO FUNCTIONS

Table 5-1 lists the constraints and performance requirements allocated to Function 4.2.4.1 and its subfunctions. There are no proof-of-concept requirements associated with these functions.

5.2 REQUIREMENTS ALLOCATED TO INPUTS AND OUTPUTS

Table 5-2 lists the constraints, performance requirements, and proof-of-concept requirements allocated to the inputs and outputs of Function 4.2.4.1 and its subfunctions.

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
4.2.4.1 Interim Store Solidified HLW and TRU Waste	40CFR264.13(a)(1) 40CFR264.171 40CFR264.173 40CFR264.175 40CFR264.177 Criticality Design Loads for Facilities DOE/RW-0351P, Rev.1, 3.2.1.2 DOE/RW-0351P, Rev.1, 3.2.1.3 DOE/RW-0351P, Rev.1, 3.2.3.2.2(C) DOE/RW-0351P, Rev.1, 3.2.3.2.3 A(2) DOE/RW-0351P, Rev.1, 3.4.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.4 DOE/RW-0351P, Rev.1, 3.7.1.2.6 DOE/RW-0351P, Rev.1, 3.7.1.2.7 DOE/RW-0351P, Rev.1, 3.7.1.2.9 DOE/RW-0351P, Rev.1, 3.7.3.2.4(B) DOE/RW-0351P, Rev.1, 3.9 DOE/WIPP-069, Rev.4, 3.3.2 DOE4330.4B DOE5480.19 DOE5480.21 DOE5480.22 DOE5480.23, Chapter 8 DOE5480.24 DOE5480.4 DOE5480.7A DOE5820.2A, Chapter I, 3.a(1)(a)	ALARA-Design Compliance Documentation DOE/RL 93-08 Hanford Mission Plan Environmental Conditions Estimated TWRS Project Schedule Human Factors Monitoring of HLW Packages Notification of Startup, Shutdown, or Other Change That May Affect Emissions Measurement Onsite Shipment of Radioactive Materials Personnel and Training Preservation of Producer-Generated Solidified HLW and TRU Waste Certification Status Quality Assurance Plan Quantity of Waste Canisters Safety Class Shielding Criteria Site Boundary Solid Radioactive Waste Transfer Solidified HLW and TRU Waste Interim Storage Design Philosophy Solidified HLW and TRU Waste Interim Storage Facility Design Life Solidified HLW and TRU Waste Interim Storage Facility Siting Solidified HLW and TRU Waste Interim Storage Schedule Solidified HLW and TRU Waste Rework Storage Capacity/Availability Untreated Liquid Effluents Waste Acceptance Process Activity Waste Designation Worker Occupational Safety

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
	DOE5820.2A, Chapter I, 3.a(1)(b) DOE5820.2A, Chapter I, 3.a(1)(c) DOE5820.2A, Chapter I, 3.b(1)(b) DOE5820.2A, Chapter I, 3.b(2)(a) DOE5820.2A, Chapter I, 3.b(2)(d) DOE5820.2A, Chapter I, 3.b(2)(f) DOE5820.2A, Chapter I, 3.b(2)(i) DOE5820.2A, Chapter I, 3.b(2)(j) DOE5820.2A, Chapter I, 3.b(3)(a) DOE5820.2A, Chapter I, 3.b(3)(b) DOE5820.2A, Chapter I, 3.b(3)(c) DOE5820.2A, Chapter I, 3.b(3)(d) DOE5820.2A, Chapter I, 3.b(3)(f) DOE5820.2A, Chapter I, 3.b(4)(a) DOE5820.2A, Chapter I, 3.b(4)(b) DOE5820.2A, Chapter I, 3.b(4)(c) DOE5820.2A, Chapter I, 3.b(4)(e) DOE5820.2A, Chapter I, 3.b(4)(f) DOE5820.2A, Chapter I, 3.b(5) DOE5820.2A, Chapter I, 3.d(1)(b) DOE5820.2A, Chapter II, 3.a(2) DOE5820.2A, Chapter II, 3.a(3) DOE5820.2A, Chapter II, 3.a(4) DOE5820.2A, Chapter II, 3.c DOE5820.2A, Chapter II, 3.e DOE5820.2A, Chapter II, 3.f DOE5820.2A, Chapter II, 3.f(1-2) DOE5820.2A, Chapter II, 3.g(1-2) DOE5820.2A, Chapter II, 3.g(4) DOE5820.2A, Chapter II, 3.g(5) DOE5820.2A, Chapter II, 3.g(7) DOE5820.2A, Chapter II, 3.g(8) DOE5820.2A, Chapter III, 3.c(1) DOE5820.2A, Chapter III, 3.c(2) DOE5820.2A, Chapter III, 3.c(3) DOE5820.2A, Chapter III, 3.c(4) DOE5820.2A, Chapter III, 3.e(1) DOE5820.2A, Chapter III, 3.e(3) DOE5820.2A, Chapter III, 3.e(4) DOE5820.2A, Chapter III, 3.g(1)	

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
	DOE5820.2A, Chapter III, 3.g(2) DOE5820.2A, Chapter III, 3.g(3) DOE5820.2A, Chapter III, 3.g(4) DOE5820.2A, Chapter III, 3.m(1) DOE5820.2A, Chapter III, 3.m(2) DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c EM-WAPS, 1.4.2 EM-WAPS, 3.7 EM-WAPS, 3.8.2 EM-WAPS, 3.9.2 SEN-35-91 WAC173-303-630(1) WAC173-303-630(6) WAC173-303-630(7) WAC173-303-630(8) WAC173-303-645(8)(a-c) WAC173-303-645(9)(a-c) WAC173-480-060 WAC173-480-070 WAC246-220-007 Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112	

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
4.2.4.1.1 Interim Store Dispositioned Cs/Sr Capsules	40CFR264.171 40CFR264.173 40CFR264.175 40CFR264.177 Criticality Design Loads for Facilities DOE/RW-0351P, Rev.1, 3.4.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.4 DOE/RW-0351P, Rev.1, 3.7.1.2.6 DOE/RW-0351P, Rev.1, 3.7.1.2.7 DOE/RW-0351P, Rev.1, 3.7.1.2.9 DOE/RW-0351P, Rev.1, 3.9 DOE4330.4B DOE5480.19 DOE5480.21 DOE5480.22 DOE5480.23, Chapter 8 DOE5480.24 DOE5480.4 DOE5480.7A DOE5820.2A, Chapter I, 3.a(1)(a) DOE5820.2A, Chapter I, 3.a(1)(b) DOE5820.2A, Chapter I, 3.a(1)(c) DOE5820.2A, Chapter I, 3.b(1)(b) DOE5820.2A, Chapter I, 3.b(2)(a) DOE5820.2A, Chapter I, 3.b(2)(d) DOE5820.2A, Chapter I, 3.b(2)(f) DOE5820.2A, Chapter I, 3.b(2)(i) DOE5820.2A, Chapter I, 3.b(2)(j) DOE5820.2A, Chapter I, 3.b(3)(a) DOE5820.2A, Chapter I, 3.b(3)(b)	ALARA - Design Compliance Environmental Conditions Human Factors Monitoring of Solidified HLW Packages Onsite Transport of Radioactive Materials Personnel and Training Preservation of Producer-Generated Solidified HLW and TRU Waste Certification Status Quality Assurance Plan Safety Class Shielding Criteria Site Location - Cs/Sr Capsules Interim Storage Solid Radioactive Waste Transfer Solidified HLW and TRU Waste Interim Storage Design Philosophy Solidified HLW and TRU Waste Interim Storage Facility Design Life Solidified HLW and TRU Waste Interim Storage Facility Siting Solidified HLW and TRU Waste Rework Storage Capacity/Availability Untreated Liquid Effluents Waste Acceptance Process Activity Waste Designation Worker Occupational Safety

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
	DOE5820.2A, Chapter I, 3.b(3)(c) DOE5820.2A, Chapter I, 3.b(3)(d) DOE5820.2A, Chapter I, 3.b(4)(a) DOE5820.2A, Chapter I, 3.b(4)(b) DOE5820.2A, Chapter I, 3.b(4)(c) DOE5820.2A, Chapter I, 3.b(4)(e) DOE5820.2A, Chapter I, 3.b(4)(f) DOE5820.2A, Chapter I, 3.b(5) DOE5820.2A, Chapter I, 3.d(1)(b) DOE5820.2A, Chapter III, 3.c(1) DOE5820.2A, Chapter III, 3.c(2) DOE5820.2A, Chapter III, 3.c(3) DOE5820.2A, Chapter III, 3.c(4) DOE5820.2A, Chapter III, 3.e(1) DOE5820.2A, Chapter III, 3.e(3) DOE5820.2A, Chapter III, 3.e(4) DOE5820.2A, Chapter III, 3.g(1) DOE5820.2A, Chapter III, 3.g(2) DOE5820.2A, Chapter III, 3.g(3) DOE5820.2A, Chapter III, 3.g(4) DOE5820.2A, Chapter III, 3.m(1) DOE5820.2A, Chapter III, 3.m(2) DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c EM-WAPS, 1.4.2 EM-WAPS, 3.7 EM-WAPS, 3.8.2 EM-WAPS, 3.9.2 SEN-35-91 WAC173-303-630(1) WAC173-303-630(6) WAC173-303-630(7) WAC173-303-630(8) WAC173-480-060 WAC173-480-070 WAC246-220-007	
	Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112	

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
4.2.4.1.2 Interim Store Phase I Solidified HLW	40CFR264.171 40CFR264.173 40CFR264.175 40CFR264.177 Criticality Design Loads for Facilities DOE/RW-0351P, Rev.1, 3.4.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.4 DOE/RW-0351P, Rev.1, 3.7.1.2.6 DOE/RW-0351P, Rev.1, 3.7.1.2.7 DOE/RW-0351P, Rev.1, 3.7.1.2.9 DOE/RW-0351P, Rev.1, 3.9 DOE4330.4B DOE5480.19 DOE5480.21 DOE5480.22 DOE5480.23, Chapter 8 DOE5480.24 DOE5480.4 Health Protection DOE5480.7A DOE5820.2A, Chapter I, 3.a(1)(a) DOE5820.2A, Chapter I, 3.a(1)(b) DOE5820.2A, Chapter I, 3.a(1)(c) DOE5820.2A, Chapter I, 3.b(1)(b) DOE5820.2A, Chapter I, 3.b(2)(a) DOE5820.2A, Chapter I, 3.b(2)(d) DOE5820.2A, Chapter I, 3.b(2)(f) DOE5820.2A, Chapter I, 3.b(2)(i) DOE5820.2A, Chapter I, 3.b(2)(j)	ALARA - Design Compliance Environmental Conditions Human Factors Monitoring of Solidified HLW Packages Onsite Transport of Radioactive Materials Personnel and Training Phase I Solidified HLW Quantity Preservation of Producer-Generated Solidified HLW and TRU Waste Certification Status Quality Assurance Plan Safety Class Shielding Criteria Solid Radioactive Waste Transfer Solidified HLW and TRU Waste Interim Storage Design Philosophy Solidified HLW and TRU Waste Interim Storage Facility Design Life Solidified HLW and TRU Waste Interim Storage Facility Siting Solidified HLW and TRU Waste Interim Storage Schedule Solidified HLW and TRU Waste Rework Storage Capacity/Availability Untreated Liquid Effluents Waste Acceptance Process Activity Waste Designation Worker Occupational Safety

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
	DOE5820.2A, Chapter I, 3.b(3)(a) DOE5820.2A, Chapter I, 3.b(3)(b) DOE5820.2A, Chapter I, 3.b(3)(c) DOE5820.2A, Chapter I, 3.b(3)(d) DOE5820.2A, Chapter I, 3.b(4)(a) DOE5820.2A, Chapter I, 3.b(4)(b) DOE5820.2A, Chapter I, 3.b(4)(c) DOE5820.2A, Chapter I, 3.b(4)(e) DOE5820.2A, Chapter I, 3.b(4)(f) DOE5820.2A, Chapter I, 3.b(5) DOE5820.2A, Chapter I, 3.d(1)(b) DOE5820.2A, Chapter III, 3.c(1) DOE5820.2A, Chapter III, 3.c(2) DOE5820.2A, Chapter III, 3.c(3) DOE5820.2A, Chapter III, 3.c(4) DOE5820.2A, Chapter III, 3.e(1) DOE5820.2A, Chapter III, 3.e(3) DOE5820.2A, Chapter III, 3.e(4) DOE5820.2A, Chapter III, 3.g(1) DOE5820.2A, Chapter III, 3.g(2) DOE5820.2A, Chapter III, 3.g(3) DOE5820.2A, Chapter III, 3.g(4) DOE5820.2A, Chapter III, 3.m(1) DOE5820.2A, Chapter III, 3.m(2) DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c EM-WAPS, 1.4.2 EM-WAPS, 3.7 EM-WAPS, 3.8.2 EM-WAPS, 3.9.2 SEN-35-91 WAC173-303-630(1) WAC173-303-630(6) WAC173-303-630(7) WAC173-303-630(8) WAC173-480-060 WAC173-480-070 WAC246-220-007	
	Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112	

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
4.2.4.1.2.1 Accept Phase I Solidified HLW from Producer	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B)	Waste Acceptance Process Activity
4.2.4.1.2.2 Transport Phase I Solidified HLW to Interim Storage		Onsite Transport of Radioactive Materials
4.2.4.1.2.3 Isolate Phase I Solidified HLW	40CFR264.171 40CFR264.173 40CFR264.175 40CFR264.177 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.4 DOE5820.2A, Chapter I, 3.b(3)(a) DOE5820.2A, Chapter I, 3.b(3)(c) DOE5820.2A, Chapter I, 3.b(3)(d)	Monitoring of Solidified HLW Packages Solidified HLW and TRU Waste Rework Waste Acceptance Process Activity
4.2.4.1.2.4 Retrieve Phase I Solidified HLW from Storage		
4.2.4.1.2.5 Deliver Phase I Solidified HLW for Shipping or Processing		Onsite Transport of Radioactive Materials
4.2.4.1.2.6 Support Storage of Phase I Solidified HLW	DOE/RW-0351P, Rev. 1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev. 1, 3.7.1.2.1.2.19.4 DOE5820.2A, Chapter III, 3.c(1) DOE5820.2A, Chapter III, 3.c(2) DOE5820.2A, Chapter III, 3.c(3) DOE5820.2A, Chapter III, 3.c(4) DOE5820.2A, Chapter III, 3.e(1) DOE5820.2A, Chapter III, 3.e(3) DOE5820.2A, Chapter III, 3.e(4) DOE5820.2A, Chapter III, 3.g(1) DOE5820.2A, Chapter III, 3.g(2) DOE5820.2A, Chapter III, 3.g(3) DOE5820.2A, Chapter III, 3.g(4) DOE5820.2A, Chapter III, 3.m(1) DOE5820.2A, Chapter III, 3.m(2) DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c	Solid Radioactive Waste Transfer Untreated Liquid Effluents Waste Acceptance Process Activity

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
4.2.4.1.3 Interim Store Phase II Solidified HLW	40CFR264.171 40CFR264.173 40CFR264.175 40CFR264.177 Criticality Design Loads for Facilities DOE/RW-0351P, Rev.1, 3.4.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.4 DOE/RW-0351P, Rev.1, 3.7.1.2.6 DOE/RW-0351P, Rev.1, 3.7.1.2.7 DOE/RW-0351P, Rev.1, 3.7.1.2.9 DOE/RW-0351P, Rev.1, 3.9 DOE/WIPP-069, Rev.4, 3.3.2 DOE4330.48 DOE5480.19 DOE5480.21 DOE5480.22 DOE5480.23, Chapter 8 DOE5480.24 DOE5480.4 DOE5480.7A DOE5820.2A, Chapter I, 3.a(1)(a) DOE5820.2A, Chapter I, 3.a(1)(b) DOE5820.2A, Chapter I, 3.a(1)(c) DOE5820.2A, Chapter I, 3.b(1)(b) DOE5820.2A, Chapter I, 3.b(2)(a) DOE5820.2A, Chapter I, 3.b(2)(d) DOE5820.2A, Chapter I, 3.b(2)(f) DOE5820.2A, Chapter I, 3.b(2)(i)	ALARA - Design Compliance Environmental Conditions Human Factors Monitoring of Solidified HLW Packages Onsite Transport of Radioactive Materials Personnel and Training Preservation of Producer-Generated Solidified HLW and TRU Waste Certification Status Quality Assurance Plan Safety Class Shielding Criteria Solid Radioactive Waste Transfer Solidified HLW and TRU Waste Interim Storage Design Philosophy Solidified HLW and TRU Waste Interim Storage Facility Design Life Solidified HLW and TRU Waste Interim Storage Facility Siting Solidified HLW and TRU Waste Interim Storage Schedule Solidified HLW and TRU Waste Rework Storage Capacity/Availability Untreated Liquid Effluents Waste Acceptance Process Activity Waste Designation Worker Occupational Safety

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
	DOE5820.2A, Chapter I, 3.b(2)(j) DOE5820.2A, Chapter I, 3.b(3)(a) DOE5820.2A, Chapter I, 3.b(3)(b) DOE5820.2A, Chapter I, 3.b(3)(c) DOE5820.2A, Chapter I, 3.b(3)(d) DOE5820.2A, Chapter I, 3.b(4)(a) DOE5820.2A, Chapter I, 3.b(4)(b) DOE5820.2A, Chapter I, 3.b(4)(c) DOE5820.2A, Chapter I, 3.b(4)(e) DOE5820.2A, Chapter I, 3.b(4)(f) DOE5820.2A, Chapter I, 3.b(5) DOE5820.2A, Chapter I, 3.d(1)(b) DOE5820.2A, Chapter II, 3.a(2) DOE5820.2A, Chapter II, 3.a(3) DOE5820.2A, Chapter II, 3.a(4) DOE5820.2A, Chapter II, 3.c DOE5820.2A, Chapter II, 3.e DOE5820.2A, Chapter II, 3.f DOE5820.2A, Chapter II, 3.f(1-2) DOE5820.2A, Chapter II, 3.g(1-2) DOE5820.2A, Chapter II, 3.g(4) DOE5820.2A, Chapter II, 3.g(5) DOE5820.2A, Chapter II, 3.g(7) DOE5820.2A, Chapter II, 3.g(8) DOE5820.2A, Chapter III, 3.c(1) DOE5820.2A, Chapter III, 3.c(2) DOE5820.2A, Chapter III, 3.c(3) DOE5820.2A, Chapter III, 3.c(4) DOE5820.2A, Chapter III, 3.e(1) DOE5820.2A, Chapter III, 3.e(3) DOE5820.2A, Chapter III, 3.e(4) DOE5820.2A, Chapter III, 3.g(1) DOE5820.2A, Chapter III, 3.g(2) DOE5820.2A, Chapter III, 3.g(3) DOE5820.2A, Chapter III, 3.g(4) DOE5820.2A, Chapter III, 3.m(1) DOE5820.2A, Chapter III, 3.m(2) DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b	

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
	DOE5820.2A, Chapter V, 3.c EM-WAPS, 1.4.2 EM-WAPS, 3.7 EM-WAPS, 3.8.2 EM-WAPS, 3.9.2 SEN-35-91 WAC 173-480-060 WAC 173-480-070 WAC173-303-630(1) WAC173-303-630(6) WAC173-303-630(7) WAC173-303-630(8) WAC246-220-007 Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112	

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
4.2.4.1.4 Prepare Solidified HLW and TRU for Shipping	Criticality Design Loads for Facilities DOE/RW-0351P, Rev.1, 3.2.3.2.3 A(2) DOE/RW-0351P, Rev.1, 3.4.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.4 DOE/RW-0351P, Rev.1, 3.7.3.2.4(B) DOE/RW-0351P, Rev.1, 3.9 DOE4330.4B DOE5480.19 DOE5480.21 DOE5480.22 DOE5480.23, Chapter 8 DOE5480.24 DOE5480.4 DOE5480.7A DOE5820.2A, Chapter I, 3.a(1)(a) DOE5820.2A, Chapter I, 3.a(1)(b) DOE5820.2A, Chapter I, 3.b(2)(j) DOE5820.2A, Chapter I, 3.b(4)(f) DOE5820.2A, Chapter III, 3.c(1) DOE5820.2A, Chapter III, 3.c(2) DOE5820.2A, Chapter III, 3.c(3) DOE5820.2A, Chapter III, 3.c(4) DOE5820.2A, Chapter III, 3.e(1) DOE5820.2A, Chapter III, 3.e(3) DOE5820.2A, Chapter III, 3.e(4) DOE5820.2A, Chapter III, 3.g(1) DOE5820.2A, Chapter III, 3.g(2) DOE5820.2A, Chapter III, 3.g(3)	ALARA - Design Compliance Environmental Conditions Human Factors Personnel and Training Preservation of Producer-Generated Solidified HLW and TRU Waste Certification Status Quality Assurance Plan Safety Class Shielding Criteria Solid Radioactive Waste Transfer Solidified HLW and TRU Waste Interim Storage Design Philosophy Solidified HLW and TRU Waste Interim Storage Facility Design Life Solidified HLW and TRU Waste Interim Storage Facility Siting Solidified HLW and TRU Waste Interim Storage Schedule Untreated Liquid Effluents Waste Acceptance Process Activity Worker Occupational Safety

Table 5-1. Requirements Allocated to Functions. (13 sheets)

Function	Constraints	Performance Requirements
	DOE5820.2A, Chapter III, 3.g(4) DOE5820.2A, Chapter III, 3.m(1) DOE5820.2A, Chapter III, 3.m(2) DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c EM-WAPS, 3.7 EM-WAPS, 3.8.2 EM-WAPS, 3.9.2 SEN-35-91 WAC 173-480-060 WAC 173-480-070 WAC246-220-007 Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Accept Phase I Solidified HLW from Producers SGW			
Accepted Cesium Product for Transport			
Accepted Phase I IHLW for Transport			
Cesium Product Acceptance Documentation			
Cesium Product for Isolation			
Cesium Product for Processing			
Cesium Product for Retrieval			
Cesium Product for Storage		Cesium Product Storage Requirements Fission Product Interim Storage HLW Constituents Limitations Product Verification	
Cesium Product Isolation Data			
Cesium Product Production Information			
Cesium Product Storage Information			
Cesium Product Transport Mechanism	DOE460.1	Onsite Shipment of Radioactive Material	
Cesium Product Transport Mechanism for Loading	DOE460.1	Onsite Shipment of Radioactive Material	
Cesium Product Transport Mechanism for Reconditioning	DOE460.1	Onsite Shipment of Radioactive Material	
Cesium Product Transport Mechanism for Reuse	DOE460.1	Onsite Shipment of Radioactive Material	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Deliver Phase I Solidified HLW for Shipping or Processing SGW			
Dispositioned Cs/Sr Capsules for Disposal			
Dispositioned Cs/Sr Capsules for Shipment	DOE/RW-0351P, Rev.1, 3.7.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.14 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.5 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.6 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.9 DOE/RW-0351P, Rev.1, 3.7.1.2.10 DOE/RW-0351P, Rev.1, 3.7.1.2.8 DOE/RW-0351P, Rev.1, 3.7.3.2.1 DOE/RW-0351P, Rev.1, 3.7.3.2.3 DOE/RW-0351P, Rev.1, 3.7.3.2.4(A) DOE/RW-0351P, Rev.1, 3.7.3.2.4(C) DOE/RW-0351P, Rev.1, 3.7.3.2.5 DOE/RW-0351P, Rev.1, 3.7.3.2.6 DOE/RW-0351P, Rev.1, 3.7.3.2.8 DOE/RW-0351P, Rev.1, 3.7.4.2.1		

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Dispositioned Cs/Sr Capsules for Storage	DOE/RW-0351P, Rev.1, 3.4.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.3 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.5 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.6 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.8 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.9 Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112	Product Verification Quantity of Packaged Capsules	
Dispositioned Cs/Sr Capsules Production Information	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.9		
Dispositioned Cs/Sr Capsules Shipping Mechanism	DOE/RW-0351P, Rev.1, 3.2.3.2.3 A(2)		

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Dispositioned Cs/Sr Capsules Storage Information	DOE/RW-0351P, Rev.1, 3.2.3.2.3 A(2) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.10 DOE/RW-0351P, Rev.1, 3.7.1.2.9 DOE/RW-0351P, Rev.1, 3.7.3.2.1 DOE/RW-0351P, Rev.1, 3.7.3.2.4(A) DOE/RW-0351P, Rev.1, 3.7.3.2.4(B) DOE/RW-0351P, Rev.1, 3.7.3.2.4(C) DOE/RW-0351P, Rev.1, 3.7.3.2.5 DOE/RW-0351P, Rev.1, 3.9 EM-WAPS, 1.4.2 EM-WAPS, 3.7		
Dispositioned Cs/Sr Capsules Transport Mechanism	DOE460.1	Onsite Shipment of Radioactive Material	
IHLW for Shipment	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(C) DOE/RW-0351P, Rev.1, 3.7.1.2.10 DOE/RW-0351P, Rev.1, 3.7.3.2.1 DOE/RW-0351P, Rev.1, 3.7.3.2.3 DOE/RW-0351P, Rev.1, 3.7.3.2.4(A) DOE/RW-0351P, Rev.1, 3.7.3.2.4(B) DOE/RW-0351P, Rev.1, 3.7.3.2.4(C) DOE/RW-0351P, Rev.1, 3.7.3.2.5 DOE/RW-0351P, Rev.1, 3.7.3.2.6 DOE/RW-0351P, Rev.1, 3.7.3.2.8 DOE/RW-0351P, Rev.1, 3.7.4.2.1 EM-WAPS, 1.1 EM-WAPS, 1.4.2 EM-WAPS, 3.1 EM-WAPS, 3.11 EM-WAPS, 3.12 EM-WAPS, 3.7		

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
IHLW for Storage	DOE/RW-0351P, Rev.1, 3.4.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.13 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.2 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.3 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.2	HLW Glass Product Rework HLW Glass Product Variability HLW Glass Waste Oxide Loading HLW Vitrification Production Capacity Product Verification Quantity of IHLW for Storage Quantity of Waste Canisters Reporting of Canister Material Removed During Decontamination Time Temperature Transformation Data	Interchangeability Lift Capability Wall Thickness Waste Loading in Glass Welding

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
IHLW for Storage (continued)	DOE/RW-0351P, rev.1, 3.7.1.2.1.2.3 DOE/RW-0351P, rev.1, 3.7.1.2.1.2.4 DOE/RW-0351P, rev.1, 3.7.1.2.1.2.5 DOE/RW-0351P, rev.1, 3.7.1.2.1.2.6 DOE/RW-0351P, rev.1, 3.7.1.2.1.2.8 DOE/RW-0351P, rev.1, 3.7.1.2.1.2.9 DOE/RW-0351P, rev.1, 3.7.1.2.8 DOE/RW-0351P, rev.1, 3.9 EM-WAPS 1.4.2 EM-WAPS 2.2 EM-WAPS 2.3.1 EM-WAPS 2.3.2 EM-WAPS 3.1 EM-WAPS 3.10 EM-WAPS 3.11 EM-WAPS 3.12 EM-WAPS 3.2 EM-WAPS 3.3 EM-WAPS 3.4 EM-WAPS 3.5 EM-WAPS 3.6 EM-WAPS 3.7 EM-WAPS 3.8.1 EM-WAPS 3.9.1 Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112		
IHLW Repository Shipping Mechanism	DOE/RW-0351P, Rev.1, 3.2.3.2.3 A(2)		
Infrastructure Support for Close Operable Units			
Infrastructure Support for Dispose ILLW			
Infrastructure Support for IS Dispositioned Cs/Sr Capsules			
Infrastructure Support for IS Phase I Solidified HLW			

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Infrastructure Support for IS Phase II Solidified HLW and TRU			
Infrastructure Support for IS Solidified HLW and TRU			
Infrastructure Support for Prepare Solidified HLW and TRU for Shipment			
IS Dispositioned Cs/Sr Capsules Excess Facilities	DOE5820.2A, Chapter V, 3.a DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c		
IS Dispositioned Cs/Sr Capsules Garbage			
IS Dispositioned Cs/Sr Capsules Hazardous Waste			
IS Dispositioned Cs/Sr Capsules Prepared Solid Waste	40CFR264.13(a)(1) DOE5820.2A, Chapter III, 3.d	Solid Radioactive Waste Transfer	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
IS Dispositioned Cs/Sr Capsules Treated Gaseous Effluents	40CFR264.1032(a)(1) 40CFR50.11(a-b) 40CFR50.12 40CFR50.4 40CFR50.5 40CFR50.6 40CFR50.8(a) 40CFR50.9 WAC173-460-010 WAC173-460-020 WAC173-460-030 WAC173-460-040 WAC173-460-050 WAC173-460-060 WAC173-460-070 WAC173-460-080 WAC173-460-090 WAC173-460-100 WAC173-460-110 WAC173-460-120 WAC173-460-130 WAC173-460-140 WAC173-460-150-Table 1 WAC173-460-150-Table 2 WAC173-460-150-Table 3 WAC173-460-160 WAC246-247-001 WAC246-247-002 WAC246-247-010 WAC246-247-020 WAC246-247-030 WAC246-247-040 WAC246-247-060 WAC246-247-065 WAC246-247-075 WAC246-247-080 WAC246-247-085 WAC246-247-100		
IS Dispositioned Cs/Sr Capsules Treated Liquid Effluents	SWDP Permit 4502 and Fact Sheet	200 Area TEDF Waste Acceptance Criteria	
IS Dispositioned Cs/Sr Capsules Untreated Liquid Effluents	Effluent Treatment Facility Influent Restrictions	Untreated Liquid Effluents	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
IS Phase I Solidified HLW Excess Facilities	DOE5820.2A, Chapter V, 3.a DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c		
IS Phase I Solidified HLW Garbage			
IS Phase I Solidified HLW Hazardous Waste			
IS Phase I Solidified HLW Prepared Solid Waste	40CFR264.13(a)(1) DOE5820.2A, Chapter III, 3.d	Solid Radioactive Waste Transfer	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
IS Phase I Solidified HLW Treated Gaseous Effluents	40CFR264.1032(a)(1) 40CFR50.11(a-b) 40CFR50.12 40CFR50.4 40CFR50.5 40CFR50.6 40CFR50.8(a) 40CFR50.9 WAC173-460-010 WAC173-460-020 WAC173-460-030 WAC173-460-040 WAC173-460-050 WAC173-460-060 WAC173-460-070 WAC173-460-080 WAC173-460-090 WAC173-460-100 WAC173-460-110 WAC173-460-120 WAC173-460-130 WAC173-460-140 WAC173-460-150-Table 1 WAC173-460-150-Table 2 WAC173-460-150-Table 3 WAC173-460-160 WAC246-247-001 WAC246-247-002 WAC246-247-010 WAC246-247-020 WAC246-247-030 WAC246-247-040 WAC246-247-060 WAC246-247-065 WAC246-247-075 WAC246-247-080 WAC246-247-085 WAC246-247-100		
IS Phase I Solidified HLW Treated Liquid Effluents	SWDP Permit 4502 and Fact Sheet	200 Area TEDF Waste Acceptance Criteria	
IS Phase I Solidified HLW Untreated Liquid Effluents	Effluent Treatment Facility Influent Restrictions	Untreated Liquid Effluents	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
IS Phase II Solidified HLW and TRU Excess Facilities	DOE5820.2A, Chapter V, 3.a DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c		
IS Phase II Solidified HLW and TRU Garbage			
IS Phase II Solidified HLW and TRU Hazardous Waste			
IS Phase II Solidified HLW and TRU Prepared Solid Waste	40CFR264.13(a)(1) DOE5820.2A, Chapter III, 3.d	Solid Radioactive Waste Transfer	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
IS Phase II Solidified HLW and TRU Treated Gaseous Effluents	40CFR264.1032(a)(1) 40CFR50.11(a-b) 40CFR50.12 40CFR50.4 40CFR50.5 40CFR50.6 40CFR50.8(a) 40CFR50.9 WAC173-460-010 WAC173-460-020 WAC173-460-030 WAC173-460-040 WAC173-460-050 WAC173-460-060 WAC173-460-070 WAC173-460-080 WAC173-460-090 WAC173-460-100 WAC173-460-110 WAC173-460-120 WAC173-460-130 WAC173-460-140 WAC173-460-150-Table 1 WAC173-460-150-Table 2 WAC173-460-150-Table 3 WAC173-460-160 WAC246-247-001 WAC246-247-002 WAC246-247-010 WAC246-247-020 WAC246-247-030 WAC246-247-040 WAC246-247-060 WAC246-247-065 WAC246-247-075 WAC246-247-080 WAC246-247-085 WAC246-247-100		
IS Phase II Solidified HLW and TRU Treated Liquid Effluents	SWDP Permit 4502 and Fact Sheet	200 Area TEDF Waste Acceptance Criteria	
IS Phase II Solidified HLW and TRU Untreated Liquid Effluents	Effluent Treatment Facility Influent Restrictions	Untreated Liquid Effluents	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
IS Solidified HLW and TRU Excess Facilities	DOE5820.2A, Chapter V, 3.a DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c		
IS Solidified HLW and TRU Garbage			
IS Solidified HLW and TRU Hazardous Waste			
IS Solidified HLW and TRU Prepared Solid Waste	40CFR264.13(a)(1) DOE5820.2A, Chapter III, 3.d	Solid Radioactive Waste Transfer	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
IS Solidified HLW and TRU Treated Gaseous Effluents	40CFR264.1032(a)(1) 40CFR50.11(a-b) 40CFR50.12 40CFR50.4 40CFR50.5 40CFR50.6 40CFR50.8(a) 40CFR50.9 WAC173-460-010 WAC173-460-020 WAC173-460-030 WAC173-460-040 WAC173-460-050 WAC173-460-060 WAC173-460-070 WAC173-460-080 WAC173-460-090 WAC173-460-100 WAC173-460-110 WAC173-460-120 WAC173-460-130 WAC173-460-140 WAC173-460-150-Table 1 WAC173-460-150-Table 2 WAC173-460-150-Table 3 WAC173-460-160 WAC246-247-001 WAC246-247-002 WAC246-247-010 WAC246-247-020 WAC246-247-030 WAC246-247-040 WAC246-247-060 WAC246-247-065 WAC246-247-075 WAC246-247-080 WAC246-247-085 WAC246-247-100		
IS Solidified HLW and TRU Treated Liquid Effluents	SWDP Permit 4502 and Fact Sheet	200 Area TEDF Waste Acceptance Criteria	
IS Solidified HLW and TRU Untreated Liquid Effluents	Effluent Treatment Facility Influent Restrictions	Untreated Liquid Effluents	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Isolate Phase I Solidified HLW SGW			
ITRU for Shipment	DOE/WIPP-069, Rev.4, 3.1.3 DOE/WIPP-069, Rev.4, 3.2 DOE/WIPP-069, Rev.4, 3.2.2.6 DOE/WIPP-069, Rev.4, 3.3.1.1 DOE/WIPP-069, Rev.4, 3.3.2 DOE/WIPP-069, Rev.4, 3.3.2.2 DOE/WIPP-069, Rev.4, 3.3.3.1 DOE/WIPP-069, Rev.4, 3.3.4.1 DOE/WIPP-069, Rev.4, 3.3.4.5 DOE/WIPP-069, Rev.4, 3.3.5 DOE/WIPP-069, Rev.4, 3.3.6 DOE/WIPP-069, Rev.4, 3.4.1 DOE/WIPP-069, Rev.4, 3.4.2 DOE/WIPP-069, Rev.4, 3.4.2(R) DOE/WIPP-069, Rev.4, 3.4.2.2 DOE/WIPP-069, Rev.4, 3.4.3 DOE/WIPP-069, Rev.4, 3.4.4 DOE/WIPP-069, Rev.4, 3.4.5 DOE/WIPP-069, Rev.4, 3.4.6 DOE/WIPP-069, Rev.4, 3.4.7 DOE/WIPP-069, Rev.4, 3.5 DOE5820.2A, Chapter II, 3.b(2) DOE5820.2A, Chapter II, 3.c DOE5820.2A, Chapter II, 3.d DOE5820.2A, Chapter II, 3.f DOE5820.2A, Chapter II, 3.f(1-2)		

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
ITRU for Storage	DOE/WIPP-069, Rev.4, 3.1.3 DOE/WIPP-069, Rev.4, 3.2 DOE/WIPP-069, Rev.4, 3.2.2.6 DOE/WIPP-069, Rev.4, 3.3.1.1 DOE/WIPP-069, Rev.4, 3.3.2 DOE/WIPP-069, Rev.4, 3.3.3.1 DOE/WIPP-069, Rev.4, 3.3.4.1 DOE/WIPP-069, Rev.4, 3.3.4.5 DOE/WIPP-069, Rev.4, 3.3.5 DOE/WIPP-069, Rev.4, 3.3.6 DOE/WIPP-069, Rev.4, 3.4.1 DOE/WIPP-069, Rev.4, 3.4.2 DOE/WIPP-069, Rev.4, 3.4.2(R) DOE/WIPP-069, Rev.4, 3.4.2.2 DOE/WIPP-069, Rev.4, 3.4.3 DOE/WIPP-069, Rev.4, 3.4.4 DOE/WIPP-069, Rev.4, 3.4.5 DOE/WIPP-069, Rev.4, 3.4.6 DOE/WIPP-069, Rev.4, 3.4.7 DOE/WIPP-069, Rev.4, 3.5	Hazardous Waste Determination Product Verification Quantity of ITRU Waste for Storage Reporting of Canister Material Removed During Decontamination Time Temperature Transformation Data TRU Waste Volume Projection	
ITRU Repository Shipping Mechanism	DOE/WIPP-069, Rev.4, 3.2.2.2		
Phase I IHLW Acceptance Documentation	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.9		
Phase I IHLW for Disposal	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18		
Phase I IHLW for Isolation			
Phase I IHLW for Retrieval			

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Phase I IHLW for Storage	DOE/RW-0351P, Rev.1, 3.4.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.13 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.2 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.3 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.2	HLW Glass Product Rework HLW Glass Product Variability HLW Glass Waste Oxide Loading HLW Vitrification Production Capacity Product Verification Quantity of IHLW for Storage Quantity of Waste Canisters Reporting of Canister Material Removed During Decontamination Time Temperature Transformation Data	Interchangeability Lift Capability Wall Thickness Waste Loading in Glass Welding

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Phase I IHLW for Storage (continued)	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.3 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.5 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.6 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.8 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.9 DOE/RW-0351P, Rev.1, 3.7.1.2.8 DOE/RW-0351P, Rev.1, 3.9 EM-WAPS 1.4.2 EM-WAPS 2.2 EM-WAPS 2.3.1 EM-WAPS 2.3.2 EM-WAPS 3.1 EM-WAPS 3.10 EM-WAPS 3.11 EM-WAPS 3.12 EM-WAPS 3.2 EM-WAPS 3.3 EM-WAPS 3.4 EM-WAPS 3.5 EM-WAPS 3.6 EM-WAPS 3.7 EM-WAPS 3.8.1 EM-WAPS 3.9.1 Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112		
Phase I IHLW Isolation Data	DOE/RW-0351P, Rev.1, 3.7.3.2.1 DOE/RW-0351P, Rev.1, 3.9 EM-WAPS 1.4.2		
Phase I IHLW Production Information	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.9		

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Phase I IHLW Storage Information	DOE/RW-0351P, Rev.1, 3.2.3.2.3 A(2) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.10 DOE/RW-0351P, Rev.1, 3.7.1.2.9 DOE/RW-0351P, Rev.1, 3.7.3.2.1 DOE/RW-0351P, Rev.1, 3.7.3.2.4(A) DOE/RW-0351P, Rev.1, 3.7.3.2.4(B) DOE/RW-0351P, Rev.1, 3.7.3.2.4(C) DOE/RW-0351P, Rev.1, 3.7.3.2.5 DOE/RW-0351P, Rev.1, 3.9 EM-WAPS 1.4.2 EM-WAPS 3.7		
Phase I IHLW Transport Mechanism	DOE460.1	Onsite Shipment of Radioactive Material	
Phase I IHLW Transport Mechanism for Loading	DOE460.1	Onsite Shipment of Radioactive Material	
Phase I IHLW Transport Mechanism for Reconditioning	DOE460.1	Onsite Shipment of Radioactive Material	
Phase I IHLW Transport Mechanism for Reuse	DOE460.1	Onsite Shipment of Radioactive Material	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Phase II IHLW for Storage	DOE/RW-0351P, Rev.1, 3.4.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(C) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.13 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.2 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.3 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.2	HLW Glass Product Rework HLW Glass Product Variability HLW Glass Waste Oxide Loading HLW Vitrification Production Capacity Product Verification Quantity of IHLW for Storage Quantity of Waste Canisters Reporting of Canister Material Removed During Decontamination Time Temperature Transformation Data	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Phase II IHLW for Storage (continued)	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.3 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.4 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.5 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.6 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.8 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.9 DOE/RW-0351P, Rev.1, 3.7.1.2.8 DOE/RW-0351P, Rev.1, 3.9 EM-WAPS 1.4.2 EM-WAPS 2.2 EM-WAPS 2.3.1 EM-WAPS 2.3.2 EM-WAPS 3.1 EM-WAPS 3.10 EM-WAPS 3.11 EM-WAPS 3.12 EM-WAPS 3.2 EM-WAPS 3.3 EM-WAPS 3.4 EM-WAPS 3.5 EM-WAPS 3.6 EM-WAPS 3.7 EM-WAPS 3.8.1 EM-WAPS 3.9.1 Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112		
Phase II Solidified HLW and TRU for Disposal	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.17 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18		
Phase II Solidified HLW and TRU Production Information	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.9		

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Phase II Solidified HLW and TRU Storage Information	DOE/RW-0351P, Rev.1, 3.2.3.2.3 A(2) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.10 DOE/RW-0351P, Rev.1, 3.7.1.2.9 DOE/RW-0351P, Rev.1, 3.7.3.2.1 DOE/RW-0351P, Rev.1, 3.7.3.2.4(A) DOE/RW-0351P, Rev.1, 3.7.3.2.4(B) DOE/RW-0351P, Rev.1, 3.7.3.2.4(C) DOE/RW-0351P, Rev.1, 3.7.3.2.5 DOE/RW-0351P, Rev.1, 3.9 EM-WAPS 1.4.2 EM-WAPS 3.7		
Phase II Solidified HLW and TRU Transport Mechanism	DOE460.1	Onsite Shipment of Radioactive Material	
Prepare Solidified HLW and TRU for Shipment Excess Facilities	DOE5820.2A, Chapter V, 3.a DOE5820.2A, Chapter V, 3.a(2) DOE5820.2A, Chapter V, 3.a(5) DOE5820.2A, Chapter V, 3.b DOE5820.2A, Chapter V, 3.c		
Prepare Solidified HLW and TRU for Shipment Garbage			
Prepare Solidified HLW and TRU for Shipment Hazardous Waste			
Prepare Solidified HLW and TRU for Shipment Prepared Solid Waste	40CFR264.13(a)(1) DOE5820.2A, Chapter III, 3.d	Solid Radioactive Waste Transfer	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Prepare Solidified HLW and TRU for Shipment Treated Gaseous Effluents	40CFR264.1032(a)(1) 40CFR50.11(a-b) 40CFR50.12 40CFR50.4 40CFR50.5 40CFR50.6 40CFR50.8(a) 40CFR50.9 WAC173-460-010 WAC173-460-020 WAC173-460-030 WAC173-460-040 WAC173-460-050 WAC173-460-060 WAC173-460-070 WAC173-460-080 WAC173-460-090 WAC173-460-100 WAC173-460-110 WAC173-460-120 WAC173-460-130 WAC173-460-140 WAC173-460-150-Table 1 WAC173-460-150-Table 2 WAC173-460-150-Table 3 WAC173-460-160 WAC246-247-001 WAC246-247-002 WAC246-247-010 WAC246-247-020 WAC246-247-030 WAC246-247-040 WAC246-247-060 WAC246-247-065 WAC246-247-075 WAC246-247-080 WAC246-247-085 WAC246-247-100		
Prepare Solidified HLW and TRU for Shipment Treated Liquid Effluents	SWDP Permit 4502 and Fact Sheet	200 Area TEDF Waste Acceptance Criteria	
Prepare Solidified HLW and TRU for Shipment Untreated Liquid Effluents	Effluent Treatment Facility Influent Restrictions	Untreated Liquid Effluents	

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Raw Materials for DW			
Raw Materials for IS Dispositioned Cs/Sr Capsules			
Raw Materials for IS Phase I Solidified HLW			
Raw Materials for IS Phase II Solidified HLW and TRU			
Raw Materials for IS Solidified HLW and TRU			
Raw Materials for Prepare Solidified HLW and TRU for Shipment			
Retrieve Phase I Solidified HLW from Storage SGW			
Retrieved Cesium Product			
Retrieved Phase I IHLW			
Solidified HLW and TRU Production Information	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.9		
Solidified HLW and TRU Recertification Information	DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.3.2.1 DOE/RW-0351P, Rev.1, 3.7.3.2.5 DOE/RW-0351P, Rev.1, 3.9 EM-WAPS 1.4.2 EM-WAPS 3.7		

Table 5-2. Requirements Allocated to Inputs/Outputs. (25 sheets)

Input/Output Name	Constraints	Performance Requirements	Proof-of-Concept Reqmts
Solidified HLW and TRU Storage Information	DOE/RW-0351P, Rev.1, 3.2.3.2.3 A(2) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.1 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.10(B) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.11(A) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.12(D) DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.18 DOE/RW-0351P, Rev.1, 3.7.1.2.1.2.19 DOE/RW-0351P, Rev.1, 3.7.1.2.10 DOE/RW-0351P, Rev.1, 3.7.1.2.9 DOE/RW-0351P, Rev.1, 3.7.3.2.1 DOE/RW-0351P, Rev.1, 3.7.3.2.4(A) DOE/RW-0351P, Rev.1, 3.7.3.2.4(B) DOE/RW-0351P, Rev.1, 3.7.3.2.4(C) DOE/RW-0351P, Rev.1, 3.7.3.2.5 DOE/RW-0351P, Rev.1, 3.9 EM-WAPS 1.4.2 EM-WAPS 3.7		
Transport Phase I Solidified HLW to Interim Storage SGW			

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6.0 ARCHITECTURE

This section identifies the architecture selected for the Solidified HLW and TRU Waste Interim Storage System, describes the alternatives considered in selecting the architecture, and identifies further analyses needed to select the next level of architecture. This section also includes the list of requirements satisfied by the selected architecture.

6.1 ARCHITECTURE IDENTIFICATION NUMBER: TO BE DETERMINED

6.2 ARCHITECTURE TITLE: SOLIDIFIED HLW AND TRU WASTE INTERIM STORAGE SYSTEM

6.3 ARCHITECTURE DEFINITION (PHASE I AND PHASE II)

Architecture includes facilities and equipment necessary for temporary onsite storage of solidified HLW and TRU waste (sealed immobilized high-level waste [IHLW] canisters, immobilized transuranic (ITRU) waste canisters, Cs product containers, and dispositioned Cs/Sr capsules). Equipment is provided for receiving solidified waste and for transporting it to the interim storage facilities. The facilities will provide features to cool solidified waste, monitor interim storage containment integrity, and load solidified waste into casks for shipment offsite or to an onsite treatment facility for further processing. The DOE-OCRWM will collect the loaded shipping casks and transport them offsite to the repository. Also included in this definition is the equipment to treat/prepare liquid and gaseous effluents, solid wastes, recyclable/reusable materials, and excess facilities to meet acceptance criteria of site dispositioning functions. Gaseous effluents will be treated to meet atmospheric release criteria.

6.4 ALTERNATIVES CONSIDERED

Inherent to the selection of an acceptable alternative is evaluation of two strategic items: the type of IHLW/ITRU interim storage facility, and the physical parameters of the IHLW/ITRU containers. The selection of the immobilize HLW/TRU waste container exerts a strong influence on the design of the interim storage facility configuration. The enabling assumptions adopted relative to container parameters are identified in Section 6.6. Based on these enabling assumptions, potential architectures for the container facility are encompassed by the following options.

- Enclosed Building Facility--Use an enclosed facility to provide weather protection, containment and shielding for the solidified HLW and TRU waste in unshielded canisters or canisters in overpacks.
- Pad Storage Facilities--Use exposed storage (e.g., pads compliant with the *Resource Conservation and Recovery Act of 1976* [RCRA]) for interim storage of solidified HLW and TRU waste canisters contained in large (10-m^3) overpack containers located within concrete vaults.

- Bore Hole Facility--Use covered bore holes (or dry wells) for interim storage of solidified HLW and TRU waste in canisters or overpacked canisters.

6.5 RATIONALE FOR SELECTION

An enclosed facility was selected for interim storage of Phase I solidified HLW (Calmus 1996). No decision has been made on a facility configuration for interim storage of Phase II solidified waste or dispositioned Cs/Sr capsules. The basis for this decision includes the following:

- TWRS optimization
- Lifecycle safety/cost benefit
- Risk (technical/funding/schedule/political).

6.6 ENABLING ASSUMPTIONS

The enabling assumptions are as follows.

1. It is assumed that only dry waste forms would be stored by the Solidified HLW and TRU Waste Interim Storage System. These forms include IHLW and ITRU canisters, dry Cs in sealed containers, and dispositioned Cs/Sr capsules.

2. It is assumed that vitrified HLW produced during Phase I would be contained in 0.61 m diameter by 3.00 m long stainless steel canisters (standard canisters). Phase I interim storage would be required for 1,190 standard canisters (1,137 standard canisters containing IHLW and 53 standard canisters containing secondary HLW).

3. It is assumed that vitrified HLW produced during Phase II would be contained in 0.61 m diameter by 4.50 m long stainless steel canisters (large canisters). Phase II interim storage would be required for 7,592 to 21,726 large canisters containing IHLW and ITRU, with the flexibility to store up to 36,444 standard canisters.

4. It is assumed that solid Cs product separated from the LLW stream by the Pretreat Supernatant process would be packaged in 0.33 m diameter by 1.37 m long stainless steel containers. Required Phase I interim storage capacity ranges from 53 Cs containers (at a heat loading of 1.5 kW per container) to 158 Cs containers (at 0.5 kW per container). It is further assumed that any solid Cs produced during Phase II would be transferred directly from the Phase II separation process to the Phase II HLW immobilization process, without requiring interim storage.

5. It is assumed that dispositioned Cs/Sr capsules would not require interim storage until the Phase II time period (i.e., no Phase I interim storage capacity is required for this material). It is assumed that for Phase II, it will be technically feasible and economically desirable to combine the interim storage of dispositioned Cs/Sr capsules with the interim storage of IHLW/ITRU in the same facility.

6. It is assumed that one or more of the waste forms requiring interim storage would be a mixed waste (containing dangerous components and radioactive components). Therefore, regulations promulgated under RCRA would be applicable to the solidified HLW interim storage facility(ies).

7. It is assumed that systems, components, and structures required solely for the repository interface (staging and loadout) are allocated to the Phase II solidified HLW and TRU waste interim storage facility. Therefore, functions related to offsite shipment to the repository will not be included in the Phase I solidified HLW interim storage facility.

6.7 REQUIRED ANALYSES

The required analyses are as follows.

1. Evaluate the results of the TWRS privatization Phase I bidding process, and later, of the Phase II bidding process, to obtain more information about the waste forms that will require interim storage during each phase.

2. Confirm the technical feasibility and economic benefit of combining the interim storage of dispositioned Cs/Sr capsules with the interim storage of Phase II IHLW/ITRU in the same facility.

3. Perform a trade study to determine which type of facility (enclosed facility, open facility, or bore holes) is the optimum interim storage facility configuration for Phase II solidified HLW and TRU waste.

6.8 REQUIREMENTS SATISFIED

6.8.1 Performance Requirements

The performance requirements are as follows:

- Storage Capacity/Availability
- Solidified HLW and TRU Waste Interim Storage Design Philosophy
- Solidified HLW and TRU Waste Interim Storage Facility Design Life
- Solidified HLW and TRU Waste Interim Storage Facility Siting
- Solidified HLW and TRU Waste Interim Storage Schedule.

6.8.2 Constraints

The constraints are as follows:

- 40CFR191.03(a)
- 40CFR264.1032
- 40CFR264.1033(a)
- 40CFR264.1033(b)
- 40CFR264.1033(c)
- 40CFR264.1033(g)
- 40CFR264.1033(h)

- 40CFR264.1033(k)
- 40CFR264.1033(l)
- 40CFR264.1054
- 40CFR264.171
- 40CFR264.173
- 40CFR264.175
- 40CFR264.177
- DOE/RW-0351P, Rev. 1, 3.2.1.3
- DOE/RW-0351P, Rev. 1, 3.2.3.2.2(c)
- DOE/RW-0351P, Rev. 1, 3.2.3.2.3 A(2)
- DOE5820.2A, Chapter II, 3.f(1-2)
- DOE5820.2A, Chapter III, 3.I(6)
- EM-WAPS 3.7
- EM-WAPS 3.8.2
- EM-WAPS 3.9.2
- WAC173-303-630(1)
- WAC173-303-630(6)
- WAC173-303-630(7)
- WAC246-247-001
- WAC246-247-002
- WAC246-247-010
- WAC246-247-020
- WAC246-247-030
- WAC246-247-040
- WAC246-247-060
- WAC246-247-065
- WAC246-247-075
- WAC246-247-080
- WAC246-247-085
- WAC246-247-100.

7.0 REQUIREMENTS DEFINITION

This section provides the descriptions of the requirements, referenced in Sections 5.0 and 6.0, that are satisfied by the architecture addressed in this document. Table 7-1 defines the constraints, Table 7-2 defines the performance requirements, and Table 7-3 defines the proof-of-concept requirements allocated to the functions, inputs, and outputs.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
40CFR191.03(a)	(a) Management and storage of spent nuclear fuel or high-level or transuranic radioactive wastes 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.
40CFR264.1032	(a) The owner or operator of a facility with process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations managing hazardous wastes with organic concentrations of at least 10 ppmw shall: (1) Reduce total organic emissions from all affected process vents at the facility below 1.4 kg/h (3 lb/h) and 2.8 Mg/yr (3.1 tons/yr), or (2) Reduce, by use of a control device, total organic emissions from all affected process vents at the facility by 95 weight percent. (b) If the owner or operator installs a closed-vent system and control device to comply with the provisions of paragraph (a) of this section the closed-vent system and control device must meet the requirements of [Section] 264.1033. (c) Determinations of vent emissions and emission reductions or total organic compound concentrations achieved by add-on control devices may be based on engineering calculations or performance tests. If performance tests are used to determine vent emissions, emission reductions, or total organic compound concentrations achieved by add-on control devices, the performance tests must conform with the requirements of [Section] 264.1034(c). (d) When an owner or operator and the Regional Administrator do not agree on determinations of vent emissions and/or emission reductions or total organic compound concentrations achieved by add-on control devices based on engineering calculations, the procedures in [Section] 264.1034(c) shall be used to resolve the disagreement.
40CFR264.1032(a)(1)	(a) The owner or operator of a facility with process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations managing hazardous wastes with organic concentrations of at least 10 ppmw shall either: (1) Reduce total organic emissions from all affected process vents at the facility below 1.4 kg/h (3 lb/h) and 2.8 Mg/yr (3.1 tons/yr)
40CFR264.1033(a)	(a)(1) Owners or operators of closed-vent systems and control devices used to comply with provisions of this part shall comply with the provisions of this section. (2) The owner or operator of an existing facility who cannot install a closed-vent system and control device to comply with the provisions of this subpart on the effective date that the facility becomes subject to the provisions of this subpart must prepare an implementation schedule that includes dates by which the closed-vent system and control device will be installed and in operation. The controls must be installed as soon as possible, but the implementation schedule may allow up to 18 months after the effective date that the facility becomes subject to this subpart for installation and startup. All units that begin operation after December 21, 1990, must comply with the rules immediately (i.e., must have control devices installed and operating on startup of the affected unit); the 2-year implementation schedule does not apply to these units.
40CFR264.1033(b)	(b) A control device involving vapor recovery (e.g., a condenser or adsorber) shall be designed and operated to recover the organic vapors vented to it with an efficiency of 95 weight percent or greater unless the total organic emission limits of [Section] 264.1032(a)(1) for all affected process vents can be attained at an efficiency less than 95 weight percent.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
40CFR264.1033(c)	(c) An enclosed combustion device (e.g., a vapor incinerator, boiler, or process heater) shall be designed and operated to reduce the organic emissions vented to it by 95 weight percent or greater; to achieve a total organic compound concentration of 20 ppmv, expressed as the sum of the actual compounds, not carbon equivalents, on a dry basis corrected to 3 percent oxygen; or to provide a minimum residence time of 0.50 s at a minimum temperature of 760 °C. If a boiler or process heater is used as the control device, then the vent stream shall be introduced into the flame zone of the boiler or process heater.
40CFR264.1033(g)	(g) An owner or operator using a carbon adsorption system such as a fixed-bed carbon adsorber that regenerates the carbon bed directly onsite in the control device shall replace the existing carbon in the control device with fresh carbon at a regular, predetermined time interval that is no longer than the carbon service life established as a requirement of [Section] 264.1035(b)(4)(iii)(F).
40CFR264.1033(h)	(h) An owner or operator using a carbon adsorption system such as a carbon canister that does not regenerate the carbon bed directly onsite in the control device shall replace the existing carbon in the control device with fresh carbon on a regular basis by using one of the following procedures: (1) Monitor the concentration level of the organic compounds in the exhaust vent stream from the carbon adsorption system on a regular schedule, and replace the existing carbon with fresh carbon immediately when carbon breakthrough is indicated. The monitoring frequency shall be daily or at an interval no greater than 20 percent of the time required to consume the total carbon working capacity established as a requirement of [Section] 264.1035(b)(4)(iii)(G), whichever is longer. (2) Replace the existing carbon with fresh carbon at a regular, predetermined time interval that is less than the design carbon replacement interval established as a requirement of [Section] 264.1035(b)(4)(iii)(G).
40CFR264.1033(k)	(k)(1) Closed-vent systems shall be designed for and operated with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background and by visual inspections, as determined by the methods specified as [Section] 264.1034(b). (2) Closed-vent systems shall be monitored to determine compliance with this section during the initial leak detection monitoring, which shall be conducted by the date that the facility becomes subject to the provisions of this section, annually, and at other times as requested by the Regional Administrator. (3) Detectable emissions, as indicated by an instrument reading greater than 500 ppm and visual inspections, shall be controlled as soon as practicable, but not later than 15 calendar days after the emission is detected. (4) A first attempt at repair shall be made no later than 5 calendar days after the emission is detected.
40CFR264.1033(l)	(l) Closed-vent systems and control devices used to comply with provisions of this subpart shall be operated at all times when emissions may be vented to them.
40CFR264.1054	(a) Except during pressure releases, each pressure relief device in gas/vapor service shall be operated with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as measured by the method specified in [Section] 264.1063(c). (b)(1) After each pressure release, the pressure relief device shall be returned to a condition of no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as soon as practicable, but no later than 5 calendar days after each pressure release, except as provided in [Section] 264.1059. (2) No later than 5 calendar days after the pressure release, the pressure relief device shall be monitored to confirm the condition of no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as measured by the method specified in [Section] 264.1063(c). (c) Any pressure relief device that is equipped with a closed- vent system capable of capturing and transporting leakage from the pressure relief device to a control device as described in [Section] 264.1060 is exempt from the requirements of paragraphs (a) and (b) of this section.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
40CFR264.13(a)(1)	(a)(1) Before an owner or operator treats, stores, or disposes of any hazardous wastes, or nonhazardous wastes if applicable under [Section] 264.113(d), he must obtain a detailed chemical and physical analysis of a representative sample of the wastes. At a minimum, the analysis must contain all the information which must be known to treat, store, or dispose of the waste in accordance with this part and part 268 of this chapter.
40CFR264.171	If a container holding hazardous waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the owner or operator must transfer the hazardous waste from this container to a container that is in good condition or manage the waste in some other way that complies with the requirements of this part.
40CFR264.173	(a) A container holding hazardous waste must always be closed during storage, except when it is necessary to add or remove waste. (b) A container holding hazardous waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak. [Comment: Reuse of containers in transportation is governed by U.S. Department of Transportation regulations including those set forth in 49 CFR 173.28.]
40CFR264.175	(a) Container storage areas must have a containment system that is designed and operated in accordance with paragraph (b) of this section, except as otherwise provided by paragraph (c) of this section. (b) A containment system must be designed and operated as follows: (1) A base must underlay the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed; (2) The base must be sloped or the containment system must be otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids; (3) The containment system must have sufficient capacity to contain 10% of the volume of containers or the volume of the largest container, whichever is greater. Containers that do not contain free liquids need not be considered in this determination; (4) Run-on into the containment system must be prevented unless the collection system has sufficient excess capacity in addition to that required in paragraph (b)(3) of this section to contain any run-on which might enter the system; and (5) Spilled or leaked waste and accumulated precipitation must be removed from the sump or collection area in as timely a manner as is necessary to prevent overflow of the collection system. [Comment: If the collected material is a hazardous waste under part 261 of this Chapter, it must be managed as a hazardous waste in accordance with all applicable requirements of parts 262 through 266 of this chapter. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of Section 402 of the Clean Water Act, as amended.] (c) Storage areas that store containers holding only wastes that do not contain free liquids need not have a containment system defined by paragraph (b) of this section, except as provided by paragraph (d) of this section or provided that: (1) The storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation, or (2) The containers are elevated or are otherwise protected from contact with accumulated liquid. (d) Storage areas that store containers holding the wastes listed below that do not contain free liquids must have a containment system defined by paragraph (b) of this section: (1) F020, F021, F022, F023, F026, and F027.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
40CFR264.177	(a) Incompatible wastes, or incompatible wastes and materials (see Appendix V for examples), must not be placed in the same container, unless [Section] 264.17(b) is complied with. (b) Hazardous waste must not be placed in an unwashed container that previously held an incompatible waste or material. [Comment: As required by [Section] 264.13, the waste analysis plan must include analyses needed to comply with [Section] 264.177. Also, [Section] 264.17(c) requires wastes analyses, trial tests or other documentation to ensure compliance with [Section] 264.17(b). As required by [Section] 264.73, the owner or operator must place the results of each waste analysis and trial test, and any documented information, in the operating record of the facility.] (c) A storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other materials or protected from them by means of a dike, berm, wall, or other device. [Comment: The purpose of this section is to prevent fires, explosions, gaseous emission, leaching, or other discharge of hazardous waste or hazardous waste constituents which could result from the mixing of incompatible wastes or materials if containers break or leak.]
40CFR50.11(a-b)	(a) The level of the national primary ambient air quality standard for nitrogen dioxide is 0.053 parts per million (100 micrograms per cubic meter), annual arithmetic mean concentration. (b) The level of national secondary ambient air quality standard for nitrogen dioxide is 0.053 parts per million (100 micrograms per cubic meter), annual arithmetic mean concentration.
40CFR50.12	National primary and secondary ambient air quality standards for lead and its compounds, measured as elemental lead by a reference method based on Appendix G to this part, or by an equivalent method, are: 1.5 micrograms per cubic meter, maximum arithmetic mean averaged over a calendar quarter.
40CFR50.4	The national primary ambient air quality standards for sulfur oxides measured as sulfur dioxide by the reference method described in Appendix A to this part, or by an equivalent method, are: (a) 80 micrograms per cubic meter (0.03 p.p.m.)--annual arithmetic mean. (b) 365 micrograms per cubic meter (0.14 p.p.m.)--Maximum 24-hour concentration not to be exceeded more than once per year.
40CFR50.5	The national secondary ambient air quality standard for sulfur oxide measured as sulfur dioxide by the reference method described in Appendix A to this part, or by any equivalent method is 1,300 micrograms per cubic meter (0.5 p.p.m.) maximum 3-hour concentration not to be exceeded more than once per year.
40CFR50.6	(a) The level of the national primary and secondary 24-hour ambient air quality standards for particulate matter is 150 micrograms per cubic meter (g/m^3), 24-hour average concentration. The standards are attained when the expected number of days per calendar year with a 24-hour average concentration above 150 g/m^3, as determined in accordance with Appendix K to this part, is equal to or less than one. (b) The level of the national primary and secondary annual standards for particulate matter is 50 micrograms per cubic meter (g/m^3), annual arithmetic mean. The standards are attained when the expected annual arithmetic mean concentration, as determined in accordance with Appendix K to this part, is less than or equal to 50 g/m^3. (c) For the purpose of determining attainment of the primary and secondary standards, particulate matter shall be measured in the ambient air as PM 10 (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers) by: (1) A reference method based on Appendix J and designated in accordance with part 53 of this chapter, or (2) An equivalent method designated in accordance with part 53 of this chapter.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
40CFR50.8(a)	(a) The national primary ambient air quality standards for carbon monoxide are: (1) 9 parts per million (10 milligrams per cubic meter) for an 8-hour average concentration not to be exceeded more than once per year and (2) 35 parts per million (40 milligrams per cubic meter) for a 1-hour average concentration not to be exceeded more than once per year.
40CFR50.9	(a) The level of the national primary and secondary ambient air quality standards for ozone measured by a reference method based on Appendix D to this part and designated in accordance with part 53 of this chapter, is 0.12 part per million (235 g/m^3). The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 part per million (235g/m^3) is equal to or less than 1, as determined by Appendix H.
Criticality	The criticality safety program defined herein applies to all storing, retrieving, processing, transfer operations, transport and storage activities and waste form operations involving fissionable material quantities in excess of 3% of a minimum critical mass. Designs shall incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible. Protection shall be provided by either (a) the control of two independent process parameters (which is the preferred approach, if practical) or (b) a system of multiple (at least two) controls of a single parameter. In all cases, no single credible failure shall result in the potential for a criticality accident. The basis for selecting one approach over another shall be fully documented. New criticality safety evaluations (CSEs) and major revisions to existing CSEs shall provide this documentation; existing CSEs are not required to be revised just to provide this documentation.
Design Loads for Facilities	The TWRS facilities and equipment shall comply with the DOE Order 5480.28, "Natural Phenomena Hazards Mitigation" policy of the DOE to design, construct, and operate DOE facilities so that workers, the general public, and the environment are protected from the impacts of natural phenomena hazards on DOE facilities. The seismic guidance of the National Earthquake Hazards Reduction Program (NEHRP) contained in the Interagency Committee of Seismic Safety in Construction (ICSSC), reports (RP-1 and RP-3), shall be used. Recent evaluations under the NEHRP studies have found that the standards used by DOE for DESIGN and evaluation of buildings to by "substantially equivalent" to the NEHRP provisions required by the Executive Order (E.O.) on Seismic Safety (E.O. 12699 dated 1-5-90) and substantially more conservative for levels of design beyond those judged acceptable for life safety.
DOE/RW-0351P, rev.1, 3.2.1.2	SNF Receipt (Purchaser/Producer) Until the SNF or HLW is accepted by WA, the Purchaser/Producer shall provide and pay the costs of interim storage for their respective sites. [NWPA Section 111(a)(5)]
DOE/RW-0351P, rev.1, 3.2.1.3	HLW Receipt (WA) WA shall begin accepting HLW for disposal at the MGDS beginning in 2015. [Derived]
DOE/RW-0351P, rev.1, 3.2.3.2.2(C)	C. (WA) WA shall not accept in excess of 300 canisters of commercial HLW and 13,200 canisters of defense HLW for disposal at the first repository. [Derived] <TBR>

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.2.3.2.3 A(2)	WA-Transportation Interface Requirements The types of interfaces between these two elements reflect transfer of both loaded and unloaded transportation cask subsystems and the documentation, reports and communications regarding loaded and unloaded transportation cask subsystems. A. (WA) In support of the following requirements, WA shall arrange for a transportation cask system(s) and necessary Transportation System services to move SNF and/or HLW from the Purchaser's/Producer's site to [the CRWMS facility. [10CFR961.11 Article IV.B.2] (2) Producers shall be provided with a rail cask for delivery of defense HLW (from-Savannah River Site and from-Hanford) to the MGDS. [Derived]
DOE/RW-0351P, rev.1, 3.4.4	Test Plans and Procedures (WA, Purchaser, Producer) Through test and evaluation, conformance of the system element's requirements shall be demonstrated as required in the verification matrix in Table 4-1. [CRD]
DOE/RW-0351P, rev.1, 3.7.1.2.1	Waste Form Criteria A. (WA, Purchase, Producer) All radioactive waste (both SNF and HLW) accepted into the CRWMS for disposal at the MGDS shall be designed to meet the following criteria. Consistent with established agreements, DOE may be responsible for ensuring that certain waste types meet this requirement. (1) (Purchaser, Producer) Radioactive waste shall be in solid form. (2) (Purchaser, Producer) Particulate waste forms shall be consolidated (for example, by incorporation into an encapsulating matrix) to limit the availability and generation of particulates. (3) (Purchaser, Producer) Combustible radioactive wastes shall be reduced to noncombustible form unless it can be demonstrated that a fire involving the waste packages containing combustibles will not adversely affect other waste packages, any structures, systems, and components important to safety, or the repository's ability for waste isolation. B. (WA, Purchaser, Producer) The waste form shall not contribute to free liquids in the waste packages to an amount that could compromise the ability of the waste package to achieve the performance objectives related to containment of the waste form or result in spillage and spread of contamination in the event of waste package perforation during the period through permanent closure. C. (WA, Purchaser, Producer) The waste form shall not contain explosive, pyrophoric, or chemically reactive materials in an amount that could compromise the repository's ability for waste isolation or the repository's ability to satisfy the performance objectives. D. (WA, Purchaser, Producer) If the waste form does not meet the criteria specified in parts A, B, and C, then the waste form shall not be accepted into the CRWMS. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2	HLW Specifications (WA) WA shall accept standard and nonstandard HLW described in sections 3.7.1.2.1.2.1 and 3.7.1.2.1.2.3, respectively. [Derived] Detailed design requirements are to be addressed in the WA Design Requirements Document.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.1	HLW Standard Form A. (Producer) The standard canistered HLW form 1 shall be borosilicate glass sealed inside an austenitic stainless steel canister(s) with a concentric neck and lifting flange. [Derived] B. (Producer) The standard canistered HLW form shall meet the following criteria: (1) (Producer) Total length shall be 3.000 meters (+0.005, -0.020 m). 2 [Derived] (2) (Producer) Diameter shall be 61.0 centimeters (+1.5, -1.0 cm). 2 [Derived] (3) (Producer) Weight shall not exceed 2500 kilograms. [Derived] (4) (Producer) Fill height shall be equivalent to at least 80% of the volume of the empty canister. [Derived] (5) (Producer) Total heat generation rate shall not exceed 1500 watts per canister at the year of shipment. [Derived] (6) (Producer) Temperature shall not have exceeded 400 °C during storage to ensure the glass transition temperature has not been exceeded. [Derived] (7) (Producer) Inert cover gas leak rate of the outermost closure shall be less than (10)-4 atm-cc/s. [Derived] (8) (Producer) Canister shall be labeled with unique alphanumeric identifier as described in Section 3.7.1.2.1.2.15. [10CFR60.135(b)(4)] NOTE: 1 Other standard HLW forms will be defined in subsequent revisions of the WA-SRD. 2 The minimum dimension may be measured prior to filling.
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.10(A)	Removable Radioactive Contamination on Canister A. (Producer) The levels of removable radioactive contamination of all external surfaces of each canistered waste form shall not exceed 220 dpm/100 cm^2 for alpha radiation and 2200 dpm/100 cm^2 for beta and gamma radiation. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.10(B)	B. (Producer) The Producer shall inspect the canistered waste form and remove visible waste glass from the exterior surface of the canister prior to shipment. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.10(C)	C. (Producer) The Producer shall report to DOE-OCRWM an estimate of the amount of canister material (particularly wall thickness) removed during decontamination of the canister surface. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.11(A)	HLW Phase Stability and Integrity A. (Producer) The Producer shall ensure the phase structure and composition of the canistered waste form are not degraded after initial cooldown by maintaining it below 400 °C to ensure the glass transition temperature is not exceeded. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.11(B)	B. (Producer) The Producer shall provide the Time Temperature Transformation diagrams and data for the canistered waste form. [Derived]

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.12(A)	Hazardous Waste Determination (WA, Producer) WA shall require the Producer to determine if the HLW is hazardous as follows: A. (Producer) The Producer shall determine, quantify, and report to DOE-OCRWM the presence of any hazardous waste listed in 40CFR261.31 through 40CFR261.33, in the waste or in any feed stream proposed for storage or disposal. The listed waste must be quantified in the WQR, or their absence must be certified in the WQR. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.12(B)	B. (Producer) If no "listed hazardous wastes" are present in the waste or in any feed stream, the Producer shall perform the "Toxicity Characteristics Leaching Procedure" (TCLP) as described in 55 Federal Register 26986, 6/29/90, and other RCRA characteristics test(s) described in 40CFR261.20 through 261.24 as appropriate, using samples from production runs or prototypical specimens. Any modifications must have prior DOE-OCRWM approval. The method to be used must be described in the WCP and results documented in the WQR.
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.12(C)	C. (Producer) Based on the results of A and B above, the Producer shall verify in the WQR whether or not the waste is hazardous. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.12(D)	D. (Producer) For hazardous wastes, the Producer shall prepare "Hazardous Waste Manifest" logs as required by 40CFR262. These logs must be included in the Production Records and must accompany waste during shipment. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.13	Consistency Test A. (Producer) The Producer shall demonstrate control of waste form production by comparing (either directly or indirectly) melter batch production samples to the Environmental Assessment (EA) benchmark glass using the Product Consistency Test (PCT) or equivalent. [Derived] <TBR> B. (Producer) For acceptance, the concentrations of lithium, sodium, and boron in the leachate, after normalization for the concentrations in the glass, shall be less than those of the benchmark glass. [Derived] <TBR>
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.14	Canister Impact Characteristics (Producer) The canistered HLW shall be capable of withstanding a drop of 7 meters onto a flat, essentially unyielding surface without breaching or dispersing radionuclides. The test results shall include information on the measured canister leak rates and canister deformation after the drop test. [Derived] <TBR>
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.17	Dose Rate at Shipment (Producer) The canistered waste form shall not exceed a maximum surface gamma dose rate of 10E5 rem/hr and a maximum neutron dose rate of 10 rem/hr, at the year of shipment to the MGDS. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.18	HLW Condition at Delivery (Producer) At time of delivery, the HLW shall stand upright without support on a flat horizontal surface and properly fit into a right-circular, cylindrical cavity (64 cm diameter and 3.01 m length). [Derived]

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.19	Records (WA, Producer) WA shall require the Producer to submit documentation to DOE-OCRWM to demonstrate compliance of the HLW form with this WA-SRD in accordance with the requirements of OCRWM QARD section 17. DOE-EM, as the cognizant organization within DOE for HLW form production, shall produce waste form production specifications, which describe the form and content of this document. As a minimum, this documentation will include a Waste Form Compliance Plan, a Waste Form Qualification Record, Production Records, and Storage and Shipping Records. [DOE/RW-0333P]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.19.1	Waste Form Compliance Plan (WCP) (Producer) The WCP shall describe the Producer plan for demonstrating compliance with each requirement in the WA-SRD, including tests, analyses, and process controls to be performed by the Producer. The WCP will also identify records that will be provided as evidence of compliance. [DOE/RW-0333P]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.19.2	Waste Form Qualification Report (WQR) (Producer) The WQR shall compile the results from waste form testing and analysis to demonstrate the ability of the Producer to comply with the WA-SRD. [DOE/RW-0333P]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.19.3	Production Record (Producer) The Production Records shall describe the actual canistered waste form. [DOE/RW-0333P]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.19.4	Storage and Shipping Record (Producer) The Storage and Shipping Record shall describe the physical attributes of each canistered waste form and identify any unexpected events, such as thermal excursions, which have occurred during storage. [DOE/RW-0333P]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.2	HLW Nonconforming Form (Producer) The nonconforming canistered HLW form shall be any HLW that does not conform with the HLW characteristics in Sections 3.7.1.2.1.2.1 and 3.7.1.2.1.2.4 through 3.7.1.2.1.2.18. [Derived] The procedures for acceptance of nonconforming canistered HLW are described in Sections 3.7.1.2.8 and 3.9.
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.3	HLW Nonstandard Form (Producer) The nonstandard canistered HLW form shall be any HLW with nonconforming conditions that have been reviewed and deemed acceptable into the CRWMS. Nonstandard canistered HLW may also be in a condition which requires special handling. [Derived] The procedure for acceptance of nonstandard HLW is described in Section 3.7.1.2.8A.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.4	Criticality Safety for HLW (Producer) The Producer shall design a waste form to ensure that a nuclear criticality accident is not possible unless at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety. The waste form shall be designed for criticality safety under normal and accident conditions. The calculated effective multiplication factor (Keff) shall be sufficiently below unity to show at least a 5% margin, after allowance for the bias in the method of calculation, the uncertainty in the experiments used to validate the method of calculation.
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.5	Waste Form - Material Compatibility (Producer) The contents of the canistered waste form shall not lead to internal corrosion of the canister such that there will be an adverse effect on normal handling during storage, and an abnormal occurrence such as a canister drop accident after exposure to temperatures up to the glass transition temperature. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.6	Chemical Composition A. (Producer) The Producer shall report to DOE-OCRWM the chemical composition and crystalline phase projections for the waste form. [Derived] B. (Producer) The Producer shall report to DOE-OCRWM the oxide composition of the waste form for the oxides of elements present in concentrations greater than 0.5% by weight and the estimate of the error of the composition. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.8	Radionuclide Inventory (Producer) The Producer shall report to DOE-OCRWM the estimated total and individual canister inventory of radionuclides (in Curies) that have half-lives longer than 10 years and that are or will be present in concentrations greater than 0.05% of the total radioactive inventory. The estimates shall be indexed to the year 2015. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.1.2.9	Canister After Closure (Producer) After closure, the canistered waste form shall not contain: A. Free gas other than air, cover, and radiogenic gases with an immediate internal gas pressure no to exceed 150 kPa (22 psia) at 25\202\C. Cover gases shall be helium, argon, or other inert gases. [Derived] B. Detectable amounts of organic materials. [Derived]
DOE/RW-0351P, rev.1, 3.7.1.2.10	Final Description of Waste (Purchaser, Producer) Except as otherwise agreed to by DOE, the Purchaser/Producer shall describe in writing the material in each shipping lot 60 days prior to the scheduled DOE transportation of that shipping lot. [10CFR961.11 Article IV.A.2(b)]

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.7.1.2.6	Delivery Commitment Schedules A. (Purchaser) Beginning January 1, 1992, the Purchasers shall submit to DOE the delivery commitment schedules (DCS) for all SNF the Purchasers wish to deliver to DOE beginning 63 months thereafter. The DCS should be in the format set forth in Appendix C of 10CFR961 as provided in OMB approved form number 1901-0260. [10CFR961.11 Article V.B.1] B. (DOE/RW) DOE shall approve or disapprove of the Purchaser DCS within 3 months after receipt, and must notify the Purchaser in writing of the reasons for disapproval. DOE must request the Purchaser to submit a revised DCS within 30 days after receipt of DOE's disapproval. [10CFR961.11 Article V.B.1] C. (DOE/RW) DOE shall approve or disapprove the Purchaser revised DCS within 60 days after receipt. In the event of disapproval, DOE must advise the Purchaser in writing of the reasons and proposed schedules, and if the reasons and proposed schedules are not acceptable to the Purchaser, the parties must promptly try to negotiate mutually acceptable schedule(s). [10CFR961.11 Article V.B.2] D. (DOE/RW, Purchaser) The Purchaser shall have the right to adjust the quantities of SNF and/or HLW plus or minus 20%, and the delivery schedule up to 2 months, until the submission of the final delivery schedule. [10CFR961.11 Article V.B.2] E. (DOE/RW) If the Purchaser fails to provide the annual forecast discussed in Section 3.7.1.2.1.1.4A, DOE may, at its sole discretion, require a rescheduling of any DCS then in effect. [10CFR961.11 Article IV.A.1(c)]
DOE/RW-0351P, rev.1, 3.7.1.2.7	Exchange Requests A. (Purchaser) Not less than 6 months prior to the delivery date specified in the Purchaser approved DCS, the Purchaser shall be allowed to submit to DOE an exchange request as specified in 10CFR961.11 Article V.E. [10CFR961.11 Article V.E] B. (DOE/RW) DOE shall approve or disapprove the proposed exchange request within 30 days after receipt. In the event of disapproval, DOE must advise the Purchaser in writing of the reasons. [10CFR961.11 Article V.E]
DOE/RW-0351P, rev.1, 3.7.1.2.8	Request for Nonstandard or Nonconforming Waste Delivery A. (DOE/RW, Purchaser, Producer) Purchaser/Producer shall obtain delivery and procedure confirmation from DOE prior to delivery of other-than-standard waste (failed SNF and nonstandard SNF/HLW). DOE shall advise Purchaser/Producer within 60 days after receipt of confirmation request as to the technical feasibility of accepting of the other-than-standard waste on the currently agreed to schedule, and any schedule adjustment for such services. [10CFR961.11 Article VI.A.2(b)] B. (Producer) Producer shall submit action plan for correction or disposition of nonconforming waste for verification and documented approval. The action plan must adequately identify and describe the nonconformance and any action to change or correct the existing nonconformance. The action plan must be signed by authorized personnel/organization. [DOE/RW-0333P]

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.7.1.2.9	Final Delivery Schedules A. (Purchaser) The Purchaser shall submit to DOE, not less than 12 months prior to delivery, final delivery schedule(s) (FDS) as specified in 10CFR961.11 Appendix D. [10CFR961.11 Article V.C] B. (DOE/RW, Purchaser) DOE shall approve or disapprove a FDS within 45 days after receipt. In the event of disapproval, DOE must advise the Purchaser in writing of the reasons, and request a revised schedule. The Purchaser shall submit the revised schedule within 30 days after receipt of DOE's notice of disapproval. [10CFR961.11 Article V.C] C. (DOE/RW) DOE shall approve or disapprove the revised FDS submitted by the Purchaser within 60 days after receipt If DOE disapproves the revised schedule, the reasons for disapproval must be provided in writing to the Purchaser, along with DOE's proposed schedule. If these are not acceptable to the Purchaser, the parties must promptly seek to negotiate mutually acceptable schedules. [10CFR961.11 Article V.C]
DOE/RW-0351P, rev.1, 3.7.1.2.9	Final Delivery Schedules A. (Purchaser) The Purchaser shall submit to DOE, not less than 12 months prior to delivery, final delivery schedule(s) (FDS) as specified in 10CFR961.11 Appendix D. [10CFR961.11 Article V.C] B. (DOE/RW, Purchaser) DOE shall approve or disapprove a FDS within 45 days after receipt. In the event of disapproval, DOE must advise the Purchaser in writing of the reasons, and request a revised schedule. The Purchaser shall submit the revised schedule within 30 days after receipt of DOE's notice of disapproval. [10CFR961.11 Article V.C] C. (DOE/RW) DOE shall approve or disapprove the revised FDS submitted by the Purchaser within 60 days after receipt If DOE disapproves the revised schedule, the reasons for disapproval must be provided in writing to the Purchaser, along with DOE's proposed schedule. If these are not acceptable to the Purchaser, the parties must promptly seek to negotiate mutually acceptable schedules. [10CFR961.11 Article V.C]

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.7.3.2.1	Shipping Records (Purchaser, Producer) The Purchaser/Producer shall provide written documentation and certification: A. (Purchaser, Producer) Of cask conditions and contents (including but not limited to SNF matrixed to the unique MPC identifier) prior to transfer to the receiving party in accordance with 10CFR961.11 Article VI.B.2. [10CFR71.5a] [10CFR961.11 Article VI.B.2] B. (Purchaser, Producer) That the transportation cask subsystem (including the MPC, if applicable) has been packaged to meet DOE, DOT, and NRC requirements, and to transfer care, custody and control of the shipment. [10CFR40.13(c)(6)] [10CFR71.5a] [10CFR961.11 Article VI.B.2] [10CFR961.11 Appendix E.B.6(c)] [49CFR172.204(a)] C. (Purchaser, Producer) Of the name of each radionuclide that is listed in 49CFR173.435, in order of decreasing radiotoxicity, whose activity comprises 1% or greater of the total activity at the time of shipment. [Derived] D. (Producer only) That the standard HLW form did not exceed 400 °C to ensure the glass transition temperature was not exceeded. [Derived] E. (Producer only) Of the hazardous waste classification for land disposal. [40CFR262] F. (Purchaser) Of the sealing and inspection of the MPC welds. [10CFR60.135(a)]
DOE/RW-0351P, rev.1, 3.7.3.2.3	Routine Determinations (Purchaser, Producer) Prior to each shipment of licensed material, the Purchaser/Producer shall ensure the transportation cask with its contents satisfies the applicable requirements of 10CFR71.87. [10CFR71.87]
DOE/RW-0351P, rev.1, 3.7.3.2.4(A)	Title Transfer A. (DOE/RW) Delivery and acceptance in writing by DOE of any SNF and/or HLW at a DOE facility shall constitute a transfer of title to DOE of the SNF and/or HLW. [NWPA Section 123] [10CFR961.11 Article I-101] [10CFR961.11 Article II]
DOE/RW-0351P, rev.1, 3.7.3.2.4(B)	B. (DOE/RW, Producer) DOE-OCRWM shall accept HLW at a designated loading facility adjacent to the Producer's HLW facility. [DHLW: MOA between DP and RW, 1986] [CHLW: Derived] <TBR>
DOE/RW-0351P, rev.1, 3.7.3.2.4(C)	C. (DOE/RW, Purchaser, Producer) Title to SNF and/or HLW shall transfer to DOE at the Purchaser/Producer site. DOE shall be solely responsible for control of all I material upon transfer of title. DOE has the right to dispose, as it sees fit, of any SNF and/or HLW to which it has taken title. Purchasers/Producers shall have no claim against DOE or the Government for such SNF or HLW, nor shall the Government be obligated to compensate the Purchaser/Producer for such material. [Purchaser: 10CFR961.11 Article VII] [Producer: Derived]

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.7.3.2.5	Observation by DOE A. (DOE/RW, Purchaser, Producer) DOE-OCRWM may designate a representative(s) to observe the preparatory activities conducted at the Purchaser/Producer site. The Purchaser/Producer shall allow the designated representative(s) access to the site. [Purchaser: 10CFR961.11 Article IV.A.2(a)] [Producer: Derived] B. (DOE/RW, Purchaser, Producer) DOE-OCRWM shall verify the description of the SNF and/or HLW during MPC and transportation cask loading and prior to acceptance, in accordance with 10CFR961.11 Appendices E and F. [10CFR961.11 Article VI.B.2] C. (WA) WA shall have the capability to inspect, verify, and record the identification numbers, description, and characteristics of: (1) SNF prior to loading into an MPC or a transportation cask (2) HLW prior to loading into a transportation cask (3) Loaded MPC prior to loading into a transportation cask. [10CFR961.11 Article VI.B.21 [CRD 3.2.1.1.A]
DOE/RW-0351P, rev.1, 3.7.3.2.6	Notification of Improperly Described Waste Prior to Acceptance into CRWMS (WA, Purchaser, Producer) If SNF and/or HLW is determined by WA to be improperly described prior to acceptance by DOE-OCRWM at the Purchaser/Producer site, WA shall promptly notify the Purchaser/Producer in writing. DOE-OCRWM reserves the right to refuse to accept improperly described waste. The Purchaser/Producer must not transfer title of improperly described SNF and/or HLW unless DOE-OCRWM agrees to accept title under other arrangements agreed to in writing by the parties. [Purchaser: 10CFR961.11 Article VI.B.3(a)] [Producer: DOE/RW-0333P]
DOE/RW-0351P, rev.1, 3.7.3.2.8	Initial Inventory Reporting (WA, Purchaser) A Material Balance Report (DOE/NRC Form-742) shall be completed and distributed reporting initial inventory. [10CFR72.76] [10CFR75.31] [10CFR75.32] [CRD 3.3.8.2C]
DOE/RW-0351P, rev.1, 3.7.4.2.1	Resolution of Improperly Described Waste After Acceptance into CRWMS (WA, Purchaser, Producer) If subsequent to its acceptance, WA finds SNF and/or HLW is improperly described, WA shall promptly notify the Purchaser/Producer in writing of such a finding. In this event, the Purchaser/Producer must provide WA with a proper description within 30 days. In the event that the Purchaser/Producer fails to provide the proper description, DOE may hold in abeyance any and all further deliveries scheduled. [10CFR961.11 Article VI.B.3(b)] [DOE/RW-0333P]

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/RW-0351P, rev.1, 3.9	QUALIFICATION/QUALITY ASSURANCE (WA, Purchaser, Producer) WA shall require the following of the Purchaser/Producer: A. (Producer) The Producer shall establish, maintain, and execute a quality assurance program satisfying each of the applicable criteria of the DOE OCRWM Quality Assurance Requirements and Description (QARD), and satisfying any specific provisions which are applicable to WA activities. [DOE/RW-0333P] B. (Producer) The Producer quality assurance program shall cover the activities from the time of waste form production through waste acceptance. [DOE/RW-0333P] C. (Producer) The Producer shall prepare and maintain documentation sufficient to demonstrate canistered waste form compliance with the WA-SRD, WCP, and WQR as lifetime QA records. Copies of these records must be made available to the Federal Repository Operator at the time the repository is ready to begin accepting canistered waste forms from the Producer. Other documentation generated during preparation and implementation of the WCP and WQR must be collected and maintained as nonpermanent records. [DOE/RW-0333P] D. (Purchaser, Producer) The Purchaser/Producer shall handle notification and disposition of other-than-standard SNF and canisters of HLW in accordance with section 3.7.1.2.8. [10CFR961.11 Article VI.A.2(b)] [DOE/RW-0333P] E. (Purchaser) The Purchaser shall have a quality assurance program approved by the Nuclear Regulatory Commission that satisfies the criteria in 10CFR50 Appendix B or other appropriate regulation. [10CFR50 Appendix B]
DOE/WIPP-069, rev.4, 3.1.3	The RCRA regulations, as they apply to the WIPP, include Standards for the Owners/Operators of Treatment, Storage, or Disposal (TSD) facilities that are codified in 40 CFR Parts 264 and 265. These require the owner/operator to obtain a chemical and physical characterization of the waste, and ensure that the waste shipped to the facility is the waste specified on the shipping manifest. These RCRA requirements for the WIPP facility will be satisfied at the generator sites before transport of waste to the WIPP. Sites may use process knowledge and/or sampling and analysis to characterize the hazardous component of their wastes. In addition, each site must characterize a statistically representative sample of its waste to demonstrate that it meets the requirements of the NMD. Sampling and analysis activities shall be detailed in the site Quality Assurance Project Plans, (QAPP). Waste generator and/or storage sites have the responsibility for collecting data that will be used to comply with the NMD. Headspace gas samples shall be collected and analyzed for total volatile organic compounds (VOC) and toxic metals specified in the WAP contained in the WIPP RCRA Part B Permit Application. For the waste generated or retrieved from storage during but not part of the test phase, the following criteria must be satisfied for a statistical population of packages: \183\ Real-time radiography or equivalent examination \183\ Radionuclide assay for total alpha activity \183\ Headspace analysis for inorganic and organic gases \183\ Visual examination of the waste \183\ Analysis of sludges for pH and major cations and anions.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.2	Waste containers for emplacement in the WIPP shall be noncombustible and meet all applicable requirements of 49 CFR/173.412 (Reference 14) for Type A packaging. Waste containers of various sizes, shown to meet Department of Transportation (DOT) Type A requirements by methods detailed in MLM 3245 (Reference 30) are acceptable at the WIPP. In addition, waste containers shall be used, handled and stored in a manner that is expected to maintain their Type A packaging specification from the time of certification to emplacement in the WIPP. Remote-handled TRU waste containers shall be noncombustible and meet, as a minimum, the structural requirements and design conditions for Type A packaging as contained in 49 CFR/173.412. In addition, all RH-TRU waste containers shall be certified to the WIPP-approved specifications and shall be used, handled and stored in a manner that is expected to maintain their Type A packaging specification from the time of certification to emplacement in the WIPP.
DOE/WIPP-069, rev.4, 3.2.2.2	TRANSPORTATION: WASTE PACKAGE REQUIREMENTS TRUPACT-II Requirements Standard 55-gallon metal drums in two seven-pack configurations or two SWBs are the only currently authorized loading configurations for shipment in TRUPACT-II. An experimental bin or up to four drums may be overpacked in an SWB. If only one seven-pack or SWB of waste is scheduled for shipment in TRUPACT-II, a dunnage seven-pack or SWB must be added to the TRUPACT-II for transport. RH Cask Requirements RH canister.
DOE/WIPP-069, rev.4, 3.2.2.6	The maximum size of CH-TRU waste packages in the WIPP is limited by aces to the waste hoist and the size of the waste hoist cage. Existing packages of CH-TRU waste that meet the criterion in Section 3.2.2.1 are: \183\ Standard 55-gal. (208-L) metal drum (DOT Spec. 17C and 17H) \183\ Standard 55-gal. (208-L) metal drum (DOT Spec. 6M) \183\ Rectangular metal box (74.4 X 50.5 X 38.5 in. LWH) \183\ Rectangular metal box (68 X 54 X 38.5 in. LWH) \183\ Rectangular metal box (88 X 54 X 54 in. LWH) \183\ Rectangular metal box (71 X 57 X 52.5 in. LWH) \183\ Rectangular metal box (50.4 X 58.4 X 72.4 in. LWH) \183\ Rectangular metal box (4 X 4 X 7 ft. LWH) \183\ Standard waste box (37 in. high X 71 in. long OD/54.25 in. short OD X 45.06 in. side). The TRUPACT-II limits the CH-TRU waste containers to 55-gallon drums, or SWBs. Other acceptable waste containers may be added in the future. The RH-TRU waste package size is based on the handling of an overpacked RH canister in the WIPP transfer cask.
DOE/WIPP-069, rev.4, 3.3.1.1	Powders, ashes, and similar particulate waste materials shall be immobilized if more than 1 weight percent of the waste matrix in each package is in the form of particulate below 10 microns in diameter, or if more than 15 weight percent is in the form of particles below 200 microns in diameter.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.3.2	Liquid waste will not be placed in the WIPP. TRU waste for emplacement in the WIPP shall contain as little residual liquid as is reasonably achievable. All internal containers (e.g., bottles, cans, etc.) must be well-drained, but may contain residual liquids. As a guideline, residual liquid in well-drained containers will be restricted to approximately one percent of the volume of the internal container. In no case shall the total liquid equal or exceed one volume percent of the waste container (e.g., drum or SWB). Retrievably-Stored Waste Real-Time Radiography (RTR) or visual examination shall be used at DOE facilities to determine the presence and quantity of liquids in TRU wastes. Although some differences exist between the RTR equipment sensitivity at DOE sites, all facilities shall be able to certify TRU waste using RTR in accordance with the less than one volume percent liquid criterion for the external waste container. The RTR records shall include a description of the location of any liquid that is detected (e.g., between rigid liner and 55-gallon poly bag liner or within one gallon poly bottle) and an estimate of its volume.
DOE/WIPP-069, rev.4, 3.3.2.2	Waste for shipment in TRUPACT-II shall contain less than 1 volume percent of the waste container as liquids. Same as TRUPACT-II requirements. (This requirement is anticipated based on initial negotiations with the NRC, but will not be finalized until review is complete and a C of C is issued.)
DOE/WIPP-069, rev.4, 3.3.3.1	WIPP OPERATIONS AND SAFETY CRITERIA Contact-Handled and Remote Handled Wastes Pyrophoric materials, other than radionuclides, shall be rendered safe by mixing them with chemically stable materials (e.g., concrete, glass) or shall be processed to remove their hazardous properties. Not more than one percent by weight of the waste in each waste container may be pyrophoric forms of radionuclides, and these shall be generally dispersed in the waste.
DOE/WIPP-069, rev.4, 3.3.4.1	Transuranic waste shall contain no explosives or compressed gases. 49 CFR Part 173 Subpart C (Reference 14) defines explosives and 49 CFR Part 173 Subpart G defines compressed gases.
DOE/WIPP-069, rev.4, 3.3.4.5	Documented procedures or RTR verifications are used to ensure that individual waste packages contain no pressurized vessels. Documented procedures are also used to exclude explosive items, compounds, or combination of materials that could form explosive compounds within the waste package. If such materials are present, they must be treated or diluted such that a detonation is not possible.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.3.5.1-2*	3.3.5 TRU MIXED WASTES 3.3.5.1 WIPP OPERATIONS AND SAFETY CRITERIA Contact-Handled Waste Transuranic wastes shall contain no hazardous wastes unless they exist as co-contaminants with transuranics. Waste packages containing hazardous waste shall be identified with the appropriate DOT label. All TRU-contaminated corrosive, inactive, and ignitable materials shall be treated to remove the hazardous characteristic. Hazardous wastes to be reported are listed in 40 CFR 261, Subparts C and D (Reference 18). Remote-Handled Waste Transuranic wastes shall contain no hazardous wastes unless they exist as co-contaminants with transuranics. All TRU-contaminated corrosive, reactive, and ignitable materials shall be neutralized and rendered nonhazardous. Hazardous waste to be reported are listed in 40 CFR 261, Subparts C and D (Reference 18). 3.3.5.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS TRUPACT-II Requirements Aqueous materials which have a pH less than 2 or more than 12.5 per 40 CFR 261.22(a)(1) are prohibited from the wastes (Reference 18). RH Cask Requirements Aqueous materials which have a pH less than 2 or more than 12.5 per 40 CFR 261.22(a)(1) (Reference 18) are prohibited from the wastes. (These are preliminary requirements based on meetings with the NRC and the SARP to be submitted for approval.)

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.3.5.3(1)*	3.3.5.3 RCRA REQUIREMENTS RCRA - Waste Determination Generators of TRU waste must determine whether their waste is regulated by RCRA as a hazardous waste. The determination is based on whether representative samples or process knowledge of the solid waste indicates that it is specifically identified or listed in 40 CFR Part 261 (Reference 18). Each hazardous waste must be assigned one or more of the applicable EPA hazardous waste codes. Only those waste codes included in the WIPP RCRA Part A Permit Application (Reference 19) can be managed at the WIPP. Wastes that exhibit the characteristics of Ignitability (D001), Corrosivity (D002), or Reactivity (D003), as defined in 40 CFR 261 (Reference 18), will not be accepted at the WIPP. WIPP RCRA Permit Application Requirements and QAPPs The WAP included in the WIPP RCRA Part B Permit Application (Reference 20) specifies the waste analysis requirements applicable to the TRU mixed wastes to be shipped to WIPP. These include the specific sampling and analysis requirements specified in the NMD issued by the EPA. The QAPP (Reference 8) addresses analysis and sampling requirements to show compliance with the NMD criteria. The QAPP establishes site-specific procedures for sampling and analytical protocols and QA/QC guidances for the WIPP Test Phase. The additional information required by 40 CFR 265.13 and 264.13 (Reference 18), such as test methods, sampling methods, frequency, and accuracy, are required to be addressed in the site-specific QAPPs. Waste generator and/or storage sites have the responsibility for sampling and analyzing headspace gases to demonstrate compliance with the waste characterization requirements in the NMD. The headspace gas samples shall be collected and analyzed in accordance with procedures specific in each site's QAPP. The QAPP (Reference 8) contains a more detailed explanation of responsibilities for various organizations involved in the waste characterization program. The waste characterization requirements of the NMD (Reference 23) are: Headspace Gases Flammability See Section 3.4.7.3 for requirements.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.3.5.3(2)*	Nonflammable VOCs (Comparability) The NMD (Reference 23) mandates that any waste package that is sent to the WIPP must meet the requirement that the headspace concentration within a package does not exceed two times (2X) the maximum concentration for five nonflammable VOCS. This requirement is designed to ensure that the wastes to be emplaced in the WIPP are in fact similar to the wastes described in the NM-VP (Reference 22). The five nonflammable VOCs are: Carbon Tetrachloride Methviene Chloride 1,1,1-Trichioroethane Trichloroethylene 1,1,2-Trichioro-1,2,2-trilluoroethane. The five nonflammable compounds and their 2X maximum concentration limits are reported in the NMD (Reference 23) and the WAP in the WIPP RCRA Part B Permit Application (Reference 20), and the methodology for demonstrating compliance is presented in the QAPP (Reference 8). Nonflammable VOCs (No-Migration Demonstration) The NMD (Reference 23) mandates that any waste package that is sent to the WIPP must meet the requirement that the headspace concentration within a package does not exceed ten times (10X) the average concentration of three nonflammable VOCS. (TWO of the five compounds listed above do not have to meet this requirement) The three nonflammable VOCs that must meet the requirement are: Carbon Tetrachloride Metbyiene Chloride Trichloroethylene. The three nonflammable compounds and their 10X average concentration are reported in the NMD (Reference 23) and the WAP in the WIPP RCRA Part B Permit Application (Reference 20), and the methodology for demonstrating compliance is presented in the QAPP (Reference 8).

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.3.5.3(3) - 3.3.5.6*	Sludges In addition to the headspace analyses specified above, sludges shall be analyzed for total VOCs and toxic metals specified in the WAP for the WIPP RCRA Part B Permit Application (Reference 20). Sampling and analysis procedures for VOCs and toxic metals in TRU sludges are being developed and, when completed, the requirements will be included in the QAPP (Reference 8). 3.3.5.4 PERFORMANCE ASSESSMENT CRITERIA No additional requirements. 3.3.5.5 COMPLIANCE The types and quantities of hazardous wastes must be entered in the data package (Section 3.5.1.1). This information must be consistent with the acceptable EPA hazardous waste codes for WIPP as specified in the RCRA Part A Permit Application (Reference 19). The basis for the identification of the hazardous wastes will be process knowledge supplemented with sampling. 3.3.5.6 TECHNICAL JUSTIFICATION Transuranic mixed waste is defined as TRU waste that contains constituents considered hazardous in accordance with 40 CFR Part 261 (Reference 18). Because of the presence of hazardous constituents, the waste is subject to dual regulation under the AEA (Reference 21) and the RCRA (Reference 18). Dual regulation has made it necessary to make a RCRA hazardous waste determination for the purposes of manifesting for transportation, for reporting waste management activities, and for ensuring adequate health and safety programs. The DOE Order 5400.3 (Reference 33) requires the implementation of and compliance with the RCRA regulations. Waste characterization data or other determinations made about the disposition of the waste shall be maintained for necessary audits.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.3.6.1 - 3.3.6.3*	3.3.6 SPECIFIC ACTIVITY OF WASTE 3.3.6.1 WIPP OPERATIONS AND SAFETY CRITERIA Contact-Handled Waste For purposes of TRU waste certification, the lower limit of > 100 nanocuries/gram (nCi/g) of TRU radionuclides in the waste shall be interpreted as > 100 nCi per gram of waste matrix. The weight of added external shielding and the waste containers (including any rigid liners) shall be subtracted prior to performing the nCi/g calculation. This is also applicable to wastes managed as TRU under the provisions of DOE Order 5820.2A (e.g., U-233 and Ra-226) (Reference 13). Remote-Handled Waste For purposes of TRU waste certification, the lower limit of > 100 nCi/g of TRU radionuclides in the waste shall be interpreted as > 100 nCi/g of waste matrix. The weight of added external shielding and the waste containers (including any rigid liners) shall be subtracted prior to performing the nCi/g calculation. The maximum activity concentration for a RH-TRU waste package shall not exceed 23 curies/liter. The concentration may be averaged over the waste container. 3.3.6.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS TRUPACT-II Requirements Same as WIPP Operations And Safety Criteria. Section 3.3.6.1. RH Cask Requirements Same as WIPP Operations And Safety Criteria, Section 3.3.6.1. 3.3.6.3 RCRA REQUIREMENTS None.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.3.6.4 - 3.3.6.6*	3.3.6.4 PERFORMANCE ASSESSMENT CRITERIA Same as WIPP Operations And Safety Criteria, Section 3.3.6.1. 3.3.6.5 COMPLIANCE Documented evidence shall exist to show that the specific activity of any TRU waste package is greater than 100 nCi/g of waste and that the activity of RH-TRU waste does not exceed 23 Ci/L. 3.3.6.6 TECHNICAL JUSTIFICATION The DOE Order 5820.2A "Radioactive Waste Management," Chapter II.3.a.(2), (Reference 13) states: "The lower concentration limit for transuranic waste (> 100 nCi/g of waste) shall apply to the contents of any single waste package at the time of assay. The mass of the waste container including shielding shall not be used in calculating specific activity of the waste." The upper limit of RH-TRU waste activity arises from the WIPP Final Environmental Impact Statement (Reference 34).

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.4.1.1 - 3.4.1.3*	3.4.1 WASTE PACKAGE WEIGHT 3.4.1.1 WIPP OPERATIONS AND SAFETY CRITERIA Contact-Handled Waste All CH-TRU waste packages or package assemblies shall weigh no more than 21,000 pounds. Remote-Handled Waste All RH-TRU waste packages shall weigh no more than 8,000 pounds. 3.4.1.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS TRUPACT-II Requirements The following weight limits shall apply for waste package assemblies transported in the TRUPACT-II package: 1,000 lbs per drum 1,450 lbs per drum overpacked in a SWB 4,000 lbs per SWB 7,265 lbs per TRUPACT-II payload 19,250 lbs per TRUPACT-II payload, including the weight of the TRUPACT-II. Recent enhancements in the TRUPACT-II design have resulted in an average payload weight of approximately 6,200 lbs. The total weight of the top seven-pack of drums or SWB including error shall be less than or equal to the total weight including error of the lower seven-pack of drums or SWB. The DOT limit of 80,000 lbs gross vehicle weight (GVW) must also be met. RH Cask Requirements To be determined. 3.4.1.3 RCRA REQUIREMENTS None.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.4.1.4 - 3.4.1.6*	3.4.1.4 PERFORMANCE ASSESSMENT CRITERIA None. 3.4.1.5 COMPLIANCE For CH-TRU waste packages, documented evidence shall exist that the waste package has been weighed and the weight of the waste package or package assembly meets the requirements. The weight of the waste package cannot exceed the weight for which the waste package has been certified in accordance with 49 CFR 173.463 (Reference 14). For RH-TRU waste, the canister weight may be calculated based on the weight of the empty canister plus the weight of waste that will be placed in the canister. The weight of the canister cannot exceed the weight for which the waste package has been certified in accordance with 49 CFR 173.463 (Reference 14). 3.4.1.6 TECHNICAL JUSTIFICATION The CH-TRU waste handling system of the WIPP is limited by the capacity of the fork trucks that will transfer the CH-TRU waste materials on and off the waste hoist. These fork trucks have a rated lift capacity of 26,000 pounds. As this rated capacity must include an allowance for pallets and overpacks, estimated to be 5,000 pounds, a CH-TRU waste package may weigh a maximum of 21,000 pounds. The WIPP has established a RH-TRU overpack gross weight limit of 10,000 pounds. It is estimated that a RH-TRU overpack may weigh 2,000 pounds, leaving a maximum gross weight of 8,000 pounds for the loaded RH canister. The TRUPACT-II weight limits are based on the provisions of the TRUPACT-II SARP (Reference 9).
DOE/WIPP-069, rev.4, 3.4.2	Contact-Handled Waste The fissile or fissionable radionuclide content of CH-TRU waste packages shall be no greater than the following values, in Pu-239 fissile-gram equivalent: \183\ 200 g per 55-gallon (0.21 m^3) drum \183\ 500 g per DOT 6M container \183\ 5 g per ft^3 (0.028 m^3) in boxes, up to 350 g maximum. The Pu-239 FGE shall be calculated using the methods detailed in Appendix 1.3.7 of the TRUPACT-II SARP (Reference 9).
DOE/WIPP-069, rev.4, 3.4.2.2	The fissile or fissionable radionuclide content of CH-TRU waste in the TRUPACT-II, including two times the measurement error, shall be less than 200 grams for a 55-gallon drum or less than 325 grams for a SWB. The sum of the fissile equivalents of all waste packages in the entire payload quantity including two times the error may not exceed 325 grams. See the calculational methods detailed in Appendix 1.3.7 of the TRUPACT-II SARP for details.
DOE/WIPP-069, rev.4, 3.4.2(R)	Remote-Handled Waste The fissile or fissionable radionuclide content of RH-TRU waste packages shall not exceed 600 g total (in Pu-239 FGE).
DOE/WIPP-069, rev.4, 3.4.3	Waste Packages shall not exceed 1000 Ci of Pu-239 equivalent activity (PE-Ci).

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.4.4	All RH-TRU waste packages shall have a surface dose rate at any point no greater than 1000 rem/hr. Neutron contributions are limited to 270 mrem/hr. Neutron contributions of greater than 20 mrem/hr. to the total waste package dose rate shall be reported in the data package. At least 95% of the RH canisters must have dose rates of <=100 rem/hr, and no more than 5% of the RH canisters are allowed to have but <=1000 rem/hr may be shipped to the WIPP.
DOE/WIPP-069, rev.4, 3.4.5	Removable surface contamination on waste packages or package assemblies to be emplaced in WIPP shall not be greater than 50 picocuries per 100 sq. cm for alpha-emitting radionuclides and 450 picocuries per 200 sq. cm for beta-gamma-emitting radionuclides. Fixation of surface contamination to meet the above criterion is not permitted.
DOE/WIPP-069, rev.4, 3.4.6	The thermal power generated by waste materials in any RH-TRU waste package shall not exceed 300 watts.
DOE/WIPP-069, rev.4, 3.4.7	Waste containers with waste that could potentially generate gases shall be vented.
DOE/WIPP-069, rev.4, 3.5.1.1*	A data package with certification attesting to the fact that the waste package meets the requirements of these criteria shall be transmitted to the WIPP operator in advance of shipment. This data package/certification shall be based upon a QA program subject to audit and verification and shall proved information on the items specified below: \183\ Package identification number \183\ Package assemble identification number (if applicable) \183\ Date of waste package certification \183\ WAC exception number (if applicable) \183\ Waste generation site \183\ Date of package closure \183\ Maximum surface dose rate in mrem/hr and specific neutron dose rate if greater than 20 mrem/hr \183\ Weight (in kg) \183\ Container type \183\ Physical description of waste form (content code) \183\ Assay information, including PE-Ci, alpha Ci, and Pu-239 FGE content \183\ Radionuclide information including radionuclide symbol, quantity, and measure (in grams or Curies) \183\ Radioactive mixed waste (identity and quantity of listed wastes and those that exhibit the characteristics of a hazardous waste) \183\ Weight and volume percent of organic materials content \183\ Measured or calculated thermal power (if over 0.1 watt/ft^3) \183\ Shipment number \183\ Date of shipment \183\ Vehicle type \183\ TRUPACT-II number(s) (CH-TRU waste), or cask number (RH-TRU waste) \183\ Other information considered significant by the generator \183\ Name of certifying official who approved the waste package \183\ Name of person who certifies that the shipment meets the TRUPACT-II TRAMPAC A hard copy of the signed and dated Certification Statement, certifying that the waste content and packaging are in accordance with the WIPP WAC and that the waste is unclassified, shall be maintained on file at each site for WACCC audits. The specific data format for the transmittal of this information is contained in Appendix B of this document.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE/WIPP-069, rev.4, 3.5.1.2 - 3.5.1.3*	3.5.1.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS TRUPACT-II Requirements The documentation required for the certification of an individual waste package or a group of waste packages for an individual TRUPACT-II is given in Section 13.0 of Appendix 1.3.7 of the TRUPACT-II SARP. The format of these tables is not mandatory, however, all listed parameters must be included in any site documentation. This documentation may be computer generated based on the site's waste database. RH Cask Requirements To be determined. 3.5.1.3 RCRA REQUIREMENTS A generator must prepare a specific hazardous waste manifest in accordance with the EPA requirements of 40 CFR/262.20 through 262.23. A generator must also sign the certification on the manifest that indicates that the generator has a program in place to reduce the volume and toxicity of the waste generated. Identification numbers that link each RCRA-regulated waste container and its waste data package must also accompany the manifest. The identification numbers must be attached to the waste profile documentation. The Land Disposal Restriction (LDR) Certification required by the 40 CFR 268 must also accompany the manifest and data package.
DOE4330.4B Maintenance Management Program	The Maintenance management program for all DOE property be consistent with this Order and that all DOE property be maintained in a manner which promotes operational safety, worker health, environmental protection and compliance, property preservation, and cost-effectiveness while meeting the programmatic mission. Structures, systems, and components that are important to safe operation shall be subject to a maintenance program in order to meet or exceed their design requirements throughout their life. Periodic inspection of structures, systems, components, and equipment be performed to determine deterioration or technical obsolescence which threaten performance and/or safety.
DOE460.1	Packaging and Transportation Safety Onsite hazardous materials transfers shall comply with the Hazardous Materials Regulations, or the site- or facility-specific cognizant Operations or Field Office approved Transportation Safety Document that describes the methodology and compliance process to meet equivalent safety for any deviation from the Hazardous Materials Regulations. For multiple-tenant DOE sites, safety documents for several contractor organizations may be combined into a single document. DOE-operated sites (specifically, Morgantown and Pittsburgh Energy Technology Centers) may approve their own Transportation Safety Documents. Approved Transportation Safety Documents shall be in effect no later than 1 year from incorporation of this Order into the contractor's contracts.
DOE5480.19	Conduct of Operations Requirements for DOE Facilities It is the policy of the Department that the conduct of operations at DOE facilities be managed with a consistent and auditable set of requirements, standards, and responsibilities.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5480.21, Unreviewed Safety Questions	In accordance with this Order, a contractor authorized to operate DOE nuclear facilities shall: 1) Perform all safety evaluations required by paragraph (b) of this section to determine whether a situation involves USQ; 2) Prior to implementation of a proposed action, obtain PSO approval for situations determined to involve a USQ or a Technical Safety Requirements (TSR) change; and 3) Develop and implement procedures to govern the need for, and the performance of, safety evaluations under this section.
DOE5480.22, Technical Safety Requirements	In accordance with this Order, a contractor responsible for the operation of a DOE nuclear facility shall: 1) prepare Technical Safety Requirements for the facility; 2) submit the Technical Safety Requirements to the PSO for approval; and 3) operate the facility in accordance with the Technical Safety Requirements as approved by the PSO including any modification by the PSO.
DOE5480.23, 8a. Perform Safety Analysis*	8. REQUIREMENTS. A contractor, as designated in writing by the PSO, who is responsible for the design, construction, or operation of DOE nuclear facilities shall be required to perform a safety analysis that develops and evaluates the adequacy of the safety basis for each such facility. The safety basis to be analyzed shall include management, design, construction, operation, and engineering characteristics necessary to protect the public, workers, and the environment from the safety and health hazards posed by the nuclear facility or nonfacility nuclear operations. All contractors shall be held responsible for adhering to assumptions and commitments set forth in the safety analysis. Contractors shall be required to prepare, and shall submit to DOE for its approval, SARs documenting safety analyses for each DOE nuclear facility under their cognizance. Contractors responsible for conducting one or more nonfacility nuclear operations are required to maintain up to date analyses of the safety of such operations and analyses documented in a form that is auditable by DOE. Attachment I provides guidance in greater detail than the requirements of this Order. a. Graded Approach for the Level of Analysis. (1) Justification for the level of analyses and documentation for each hazard considered shall be provided as part of the plan and schedule submitted in accordance with paragraph 9(b)(2) of this Order. The level of analysis and documentation for each facility must be commensurate with: (a) The magnitude of the hazards being addressed; (b) The complexity of the facility and/or systems being relied on to maintain an acceptable level of risk; and (c) The stage or stages of the facility life cycle for which DOE approval is sought. (2) This application of the graded approach is specific for the SAR.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5480.23, 8b. Perform Safety Analysis*	b. Scope and Content of Safety Analysis Reports. (1) SARs shall define the safety basis, document the logic of its derivation, demonstrate adherence to the safety basis, and justify its adequacy. (2) Each SAR required by this Order shall include thorough documentation of the assumptions employed in the safety analysis. (3) A SAR shall include the results of the safety analysis that identifies the dominant contributors to the risk of the facility so that these vulnerabilities can be better managed. The safety analysis report shall address the following topics: (a) Executive summary; (b) Applicable statutes, rules, regulations and Departmental Orders; (c) Site characteristics; (d) Facility description and operation, including design of principal structures, components, all systems, engineered safety features, and processes; (e) Hazard analysis and classification of the facility; (f) Principal health and safety criteria; (g) Radioactive and hazardous material waste management; (h) Inadvertent criticality protection; (i) Radiation protection; (j) Hazardous material protection; (k) Analysis of normal, abnormal, and accident conditions, including design basis accidents; assessment of risks; consideration of natural and manmade external events; assessment of contributory and casual events, mechanisms, and phenomena; and evaluation of the need for an analysis of beyond-design-basis accidents; however, the SAR is to exclude acts of sabotage and other malevolent acts since these actions are covered under security protection of the facility. (l) Management, organization, and institutional safety provisions; (m) Procedures and training; (n) Human factors; (o) Initial testing, inservice surveillance, and maintenance; (p) Derivation of TSRs; (q) Operational safety; (r) Quality assurance; (s) Emergency preparedness; (t) Provisions for decontamination and decommissioning; and (u) Applicable Facility design codes and standards.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5480.23, 8c. Perform Safety Analysis*	c. Hazard Classification for Nuclear Facilities and Operations. Contractors shall be required to perform a hazard analysis of their nuclear activities and classify their processes, operations, or activities in accordance with the following requirements: (1) Classification Categories. The consequences of unmitigated releases of radioactive and/or hazardous material shall be evaluated and classified by the following hazard categories: (a) Category 1 Hazard. The hazard analysis shows the potential for significant offsite consequences. (b) Category 2 Hazard. The hazard analysis shows the potential for significant onsite consequences. (c) Category 3 Hazard. The hazard analysis shows the potential for only significant localized consequences. (2) Inventory of Hazardous Materials. The hazard analysis shall be based on an inventory enveloping all radioactive and nonradioactive hazardous materials that are stored, utilized, or may be formed within a nuclear facility. (3) Evaluation of Potential Releases. The hazard analysis shall identify energy sources or processes that might contribute to the generation or uncontrolled release of hazardous materials. The hazard analysis shall estimate the consequences of accidents in which the facility or process and/or materials in the inventory are assumed to interact, react, or be released in a manner to produce a threat or challenge to the health and safety of individuals on site and off site. (4) Submission of Hazard Analysis to DOE. The hazard analysis shall be submitted to DOE for approval in accordance with the safety analysis plan and schedule required by paragraph 9(b)(2) of this Order.
DOE5480.23, 8d. Perform Safety Analysis*	d. Document Control. Contractors with the primary responsibility for the design, construction, operation, or decommissioning of DOE nuclear facilities must maintain such document control as may be necessary to ensure that all users of SARs and their supporting documentation designated by DOE or the contractor as authorized users, including DOE line management and the Department's safety oversight groups, have current editions.
DOE5480.24, Nuclear Criticality Safety	The contractor criticality safety program for nuclear facilities shall include the requirements of, and be in accordance with, this Order.
DOE5480.4, Environmental Protection, Safety and Health Protection	The Purpose of this Order is to specify and provide requirements for the application of the mandatory environmental protection, safety, and health (ES&H) standards applicable to all Department of Energy (DOE) and DOE contractor operations, to provide a listing of reference ES&H standards; and to identify the sources of the mandatory and reference ES&H standards. This Order shall be followed during facility design, construction, operation, modification, and decommissioning.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5480.7A, Fire Protection	In accordance with this Order and, as required by the PSO or the Heads of Field Organizations and directed by the Contracting Officer, contractors shall be required to: 1) Provide and maintain a level of fire protection to meet the objectives of paragraph 4, and the criteria of paragraph 9. 2) Provide and maintain a system to ensure that the requirements of the DOE fire protection program are documented and incorporated in the plans and specifications for all new facilities and for major modifications of existing facilities. This includes review and comment by a qualified fire protection engineer of plans, specifications and test procedures and results for fire protection features. 3) Assist DOE in coordinating fire safety assessments at those facilities included in the survey program, establish action plans for compliance with recommendations resulting from the assessments, and forward compliance plans, exemption requests, and other requested data to DOE field organizations. 4) Establish and maintain a list of facilities for which the contractor has fire protection assessment responsibility. 5) Conduct fire protection assessments of facilities according to the scope and frequency established by this Order. 6) Provide fire protection technical assistance to DOE. 7) Submit requests for exemptions and fire safety equivalencies to the Head of the Field Organization for those facilities where compliance with specific program elements is not attainable and where an acceptable level of safety has been achieved. 8) Maintain or have access to an adequate fire protection staff, including a qualified fire protection engineer(s). Continuing education and training should be provided to maintain and enhance the level of competency of the fire protection staff.
DOE5820.2A, Chapter I, 3.a(1)(a)	(a) Design objectives for new facilities will ensure protection of the public and operating personnel from hazards associated with normal high-level waste operations, accident conditions, and the effects of natural phenomena. Other objectives are compliance with DOE policies regarding nuclear safety, quality assurance, fire protection, pollution control, and safeguards and security protection for high-level waste and protection of essential operations from the effects of potential accidents.
DOE5820.2A, Chapter I, 3.a(1)(b)	(b) Designs for new storage and treatment facilities shall meet the requirements of DOE 6430.1, applicable EM Orders and 40 CFR 264.
DOE5820.2A, Chapter I, 3.a(1)(c)	(c) Designs for new storage facilities shall incorporate features to facilitate retrieval capability.
DOE5820.2A, Chapter I, 3.b(1)(b)	(b) Waste characteristics and compatibility information shall be documented in a safety analysis report (see DOE 5481.1B) and be used as a basis for designing new facilities.
DOE5820.2A, Chapter I, 3.b(2)(a)	(b)(2)(a) All new high-level waste handling, transfer, and storage facilities (e.g., tanks, bins, pipelines, and capsules) shall be doubly contained.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter I, 3.b(2)(d)	(b)(2)(d) Secondary containment systems shall be capable of containing liquids that leak into them from the primary system and shall be equipped with transfer capability to retrieve the leaked liquid. Secondary containment systems for solidified high-level waste shall provide for physical isolation of the waste from the environment.
DOE5820.2A, Chapter I, 3.b(2)(f)	(b)(2)(f) Where required, ventilation and filtration systems shall be provided to maintain radionuclide releases within the guidelines specified in DOE 5481.1B and applicable EM Orders. Ventilation systems shall be provided where the possibility exists for generating flammable and explosive mixtures of gases (e.g., hydrogen/air or organic/air).
DOE5820.2A, Chapter I, 3.b(2)(i)	(b)(2)(i) Nuclear criticality safety considerations and controls shall be evaluated for normal operations and, before any significant operational changes are made, to protect against an uncontrolled nuclear criticality incident (e.g., dissolution of sludges for removal from tank).
DOE5820.2A, Chapter I, 3.b(2)(j)	(b)(2)(j) Each facility shall utilize remote maintenance features and other appropriate techniques to minimize personnel radiation exposure in accordance with DOE 5481.1B.
DOE5820.2A, Chapter I, 3.b(3)(a)	b(3)(a) Monitoring and leak detection capability shall be incorporated in the engineering systems (e.g., liquid level sensing devices and alarms for high-level waste liquid systems) to provide rapid identification of failed containment, and measurement of abnormal temperatures. The following, at a minimum, shall be monitored; temperature; pressure; radioactivity in ventilation exhaust; and liquid effluent streams associated with high-level waste facilities. Where the possibility exists for the generation of flammable and explosive mixtures of gases, monitoring shall be conducted. For facilities storing liquid high-level waste, the following should also be monitored: liquid levels; sludge volume; tank chemistry; condensate and cooling water.
DOE5820.2A, Chapter I, 3.b(3)(b)	b(3)(b) Leak detection systems (e.g., conductivity probes) shall be designed and operated so that they will detect the failure of the primary containment boundary, the occurrence of waste release, or accumulated liquid in the secondary containment system.
DOE5820.2A, Chapter I, 3.b(3)(c)	b(3)(c) A method for periodically assessing waste storage system integrity (e.g., coupons for corrosion testing, photographic and periscopic inspections, leak detectors, liquid level devices) shall be established, documented, and reported as required in the Waste Management Plan.
DOE5820.2A, Chapter I, 3.b(3)(d)	b(3)(d) Electrical monitoring and leak detection devices essential to safe operations shall be provided with backup power, as appropriate, to ensure operability under emergency conditions.
DOE5820.2A, Chapter I, 3.b(3)(f)	b(3)(f) A system of ground water or vadose zone monitoring wells meeting the Resource Conservation and Recovery Act requirements per 40 CFR 264 shall be installed, as a minimum, around clusters of liquid waste storage tanks.
DOE5820.2A, Chapter I, 3.b(4)(a)	(4) Contingency Actions. (a) A tank or secondary containment system from which there has been a leak or a spill to the surrounding soil, or which is otherwise unfit for use, shall be removed from service until conditions can be evaluated fully.
DOE5820.2A, Chapter I, 3.b(4)(b)	(b) Upon detection of released radioactive materials, steps shall be taken to prevent further migration of the release to soil or surface water. Major contamination in the soil shall be removed or stabilized unless compliance with this requirement would cause greater harm to human health or the environment.
DOE5820.2A, Chapter I, 3.b(4)(c)	(c) If a release results from a spill and the integrity of the system is not damaged, the system may be returned to service as soon as action to correct the condition is completed.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter I, 3.b(4)(e)	(e) A schedule and procedure shall be developed for monitoring, surveillance, and calibration checks. The frequency of these activities shall be based on the potential rate of equipment deterioration and the possibility of an environmental or human health incident, assuming that a malfunction from equipment failure or human error is not detected between checks. Schedules, procedures, and performance requirements shall be documented in the operating and maintenance documentation.
DOE5820.2A, Chapter I, 3.b(4)(f)	(f) Each high-level waste facility shall have response procedures for credible emergencies, as identified in the Safety Analysis Reports.
DOE5820.2A, Chapter I, 3.b(5)	b. Storage Operations - Doubly Contained Systems. (5) Training. (a) Operator training and qualification standards shall be developed and an up-to-date record of training status shall be maintained. (b) Worker safety training must comply with the requirements of DOE 5480.1B and applicable EM Orders.
DOE5820.2A, Chapter I, 3.d(1)(b)	(d)(1)(b) Interim storage for solidified high-level waste awaiting transport to the designated geologic repository shall comply with applicable requirements in paragraph 3b.
DOE5820.2A, Chapter II, 3.a(2)	(a)(2) The lower concentration limit for transuranic waste (>100 nCi/g of waste) shall apply to the contents of any single waste package at the time of assay. The mass of the waste container including shielding shall not be used in calculating the specific activity of the waste.
DOE5820.2A, Chapter II, 3.a(3)	(a)(3) Radioactive wastes with quantities of transuranic radionuclides in concentrations of 100 nCi/g of waste or less shall be considered to be low-level waste, and shall be managed according to the requirements of Chapter III of this Order.
DOE5820.2A, Chapter II, 3.a(4)	(a)(4) Mixed transuranic waste: (a) Mixed transuranic waste meeting the requirements of the Waste Isolation Pilot Plant-Waste Acceptance Criteria shall be sent to the Waste Isolation Pilot Plant. (b) The Data Package prepared by the generators for the Waste Isolation Pilot Plant shall include information on the kinds and quantities of hazardous components contained in a waste package in accordance with applicable Resource Conservation and Recovery Act regulations. (c) The determination whether the transuranic waste exhibits any hazardous characteristics or contains listed hazardous components may be based on knowledge of the waste generating process when the performance of a chemical analysis would significantly increase the radiation hazard to personnel.
DOE5820.2A, Chapter II, 3.b(2)	(b)(2) Transuranic waste shall be assayed or otherwise evaluated to determine the kinds and quantities of transuranic radionuclides present prior to storage. Additionally, hazardous waste components shall be estimated or analyzed, whichever is appropriate.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter II, 3.c (1-5)*	(c) Transuranic Waste Certification. (1) Transuranic waste shall be certified, pursuant to the Waste Isolation Pilot Plant-Waste Acceptance Criteria, placed in interim storage, and sent to the Waste Isolation Pilot Plant when it becomes operational. (2) Uncertified transuranic waste shall not be sent to the Waste Isolation Pilot Plant except by special permission granted in response to a formal, documented request to the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee and the Waste Isolation Pilot Plant Waste Operations. (3) All transuranic waste certification sites shall prepare a certification plan which describes how the waste meets each waste acceptance criterion described in the WIPP-DOE-069 (see Attachment 1, page 3, paragraph 18). (4) Each certification plan shall define controls and other measures to ensure that each element of the certification plan is performed adequately as described. Requirements for these quality assurance activities are described in the WIPP-DOE-120 (see Attachment 1, page 2, paragraph 19). (5) Certification plans, including associated quality assurance plans, shall be submitted for review, comment, and approval by the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee.
DOE5820.2A, Chapter II, 3.c (6-11)*	(6) The Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee shall submit certification and associated quality assurance plans to the state of New Mexico's Environmental Evaluation Group for review and comment prior to granting formal approval of such plans. (7) The Environmental Evaluation Groups's comments on certification and associated quality assurance plans shall be resolved between the affected site and the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee prior to granting formal approval of the plans. (8) Approved certification and associated quality assurance plans shall be implemented by the generating sites using specific, written operational procedures. (9) Certification activities conducted under approved plans and procedures shall be audited periodically, in accordance with a written audit program plan on a continuing basis by the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee. An Environmental Evaluation Group representative may accompany the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee audit team as an observer during site audits. The Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee may grant certifying authority to the site following successful completion of an audit. (10) The Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee shall issue a formal audit report to the responsible field organization following the completion of an audit. The audit report shall describe the activities of the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee audit team and include a record of any findings, observations, and recommendations. Corrective actions taken as a result of a finding shall be verified on subsequent audits. The Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee shall institute a tracking system to ensure timely resolution of findings, observations, recommendations, and the resultant corrective actions. (11) Failure to resolve and close out previous audit findings and recommendations or sending noncomplying waste to the Waste Isolation Pilot Plant when judged by the Waste Acceptance Criteria Certification Committee to be a serious violation, shall result in suspension of certifying authority, pending satisfactory resolution.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter II, 3.d	(d)(1) Newly generated transuranic waste shall be placed in noncombustible packaging that meets DOT requirements. (2) All Type A transuranic waste containers shall be equipped with a method to prevent pressure buildup. Acceptable pressure-relief devices include permeable gaskets, vent clips, and filtered vents. (3) The waste packages shall be marked, labeled, and sealed in accordance with the Waste Isolation Pilot Plant-Waste Acceptance Criteria, EPA, and DOT requirements, as defined in the WIPP-DOE-069, 40 CFR 262, Subpart C, and 49 CFR 172, Subparts D, E, and 49 CFR 173, Subpart I, where applicable, prior to shipping.
DOE5820.2A, Chapter II, 3.e	(e) Temporary Storage at Generating Sites. The following activities shall be performed to ensure the safe storage of transuranic wastes consistent with the requirements of applicable Resource Conservation and Recovery Act regulations: (1) Transuranic waste shall be segregated or otherwise clearly identified to avoid the commingling of transuranic waste streams with high-level waste or low-level waste. (2) Certified transuranic waste shall not be commingled with noncertified transuranic waste and shall be stored in a manner unlikely to alter its certification status. (3) Transuranic waste in storage areas shall be protected from unauthorized access. (4) Transuranic wastes in storage shall be monitored periodically to ensure that the wastes are not releasing their radioactive and/or hazardous constituents. (5) Transuranic waste storage facilities shall be designed, constructed, maintained, and operated to minimize the possibility of fire, explosion, or accidental release of radioactive and/or hazardous components of the waste to the environment. (6) Facilities which store transuranic waste shall have a contingency plan designed to minimize the adverse impacts of fire, explosion, or accidental release of hazardous components of the waste to the environment. (7) Transuranic waste shall be stored in such a way so as to maintain radiation exposures as low as reasonably achievable.
DOE5820.2A, Chapter II, 3.f(1-2)	(f)(1) Transuranic waste shipments shall comply with the provisions of DOE and DOE regulations, pursuant to DOE 1540.1. (2) Transuranic waste shipments by truck shall be by a DOE-controlled carrier system. All transuranic waste shall be transported in certified Type B packaging.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter II, 3.f(1-7)*	(f) Transportation/Shipping to the Waste Isolation Pilot Plant. (1) Transuranic waste shipments shall comply with the provisions of DOE and DOE regulations, pursuant to DOE 1540.1. (2) Transuranic waste shipments by truck shall be by a DOE-controlled carrier system. All transuranic waste shall be transported in certified Type B packaging. (3) Shipping papers shall provide the information required by DOT (49 CFR 172, Subpart C), the Waste Isolation Pilot Plant Data Package (WIPP DOE-157), and, as necessary, the manifest required by EPA (40 CFR 261, and 262). (4) Distribution of the shipping papers shall be as follows: (a) Shipper - one copy (or more); (b) Carrier - one copy; and (c) Waste Isolation Pilot Plant - two copies. A copy of the papers will be returned by the Waste Isolation Pilot Plant to the shipper after emplacement of the waste at the Waste Isolation Pilot Plant. (5) Appropriate EPA and State authorizations/permits shall be obtained for the transport system, as applicable. (6) Placarding of shipments shall be carried out, as required by the regulations of DOT (contained in 49 CFR 172, Subpart F). (7) All shipments of transuranic waste shall be in or on "exclusive use" vehicles, as defined in 49 CFR 173. Shipments shall be made as expeditiously as possible and shall be tracked from origin to destination using a real-time tracking communications system. Deviations from "preferred routes," delays and other irregularities detected by the system shall be investigated by the responsible traffic manager and a report sent to the Waste Isolation Pilot Plant within 90 days.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter II, 3.f(8)*	(8) The Albuquerque Operations Office shall develop a transuranic waste transportation management and operations plan which addresses, but is not limited to, the following considerations: (a) Communication between transport vehicle and traffic management; (b) Shipment tracking in transit; (c) Security; (d) Emergency notification/response; (e) Shipment routing; (f) Shipment notification as appropriate; (g) Driver training and qualifications; (h) Vehicle maintenance and inspection; (i) State surveillance and inspection; and (j) Inspection and recertification of transport packagings.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter II, 3.g(1-2)	1 (g) (1-2) Interim Storage. (1) Interim storage sites have been designated for storage of: (a) Waste certified by off site generators; (b) Waste certified by on site generators; (c) Waste certified by interim storage personnel; and (d) Uncertified waste received from on site and/or off site generators that is awaiting processing and certification. (2) New interim storage facilities shall be sited, designed, constructed, and operated consistent with the requirements of applicable Resource Conservation and Recovery Act regulations and in a manner which satisfactorily addresses the following considerations at a minimum: (a) Proximity to ground water and areas of seismic activity or flood plains shall be identified, and potential impacts shall be evaluated. (b) The facility shall be designed and operated to minimize the run on and run off of precipitation. The run off control system shall provide for collecting and sampling run off, which may come in contact with the waste packages, prior to releasing the water for discharge. (c) An environmental monitoring system shall be provided to detect any release and migration of major radioactive and hazardous components. Background levels of primary radioactive and hazardous waste components shall be determined. (d) The storage facility design shall minimize the possibility for the unauthorized entry of persons. (e) Incompatible wastes types shall be placed in separate packages and stored in segregated areas to prevent accidental ignition or chemical reaction. (f) Waste storage facilities shall be designed and operated to minimize the exposure of personnel to radiation and chemicals. (g) The storage facility operator shall inspect or verify routinely the condition of waste packages at the storage site for deterioration that may threaten human health or cause release of hazardous or radioactive components to the environment. (h) The storage facility operator shall prepare plans that identify and describe how the site will be closed at the end of its active life. These plans shall address sampling, testing, and monitoring for major radioactive and hazardous waste components in soil and groundwater. (i) Sites that use underground storage tanks for the storage of transuranic waste shall comply with the requirements of the Resource Conservation and Recovery Act, as applicable. (j) Permits shall be acquired, as necessary, from appropriate regulatory entities for all the interim storage facility activities listed above.
DOE5820.2A, Chapter II, 3.g(4)	(g)(4) Certified waste shall be stored in a manner unlikely to alter the certification of the waste package.
DOE5820.2A, Chapter II, 3.g(5)	(g)(5) Operators of interim storage facilities shall receive data package information (see Attachment 1, page 2, paragraphs 18 and 20) for each waste package from the generator. The operator shall store the waste generator's data and shall use the data to prepare a new Data Package at the time of shipment to the Waste Isolation Pilot Plant.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter II, 3.g(7)	(g)(7) Waste that has been certified by a generator and shipped to an interim storage site shall be reshipped to the Waste Isolation Pilot Plant by the interim storage site in the following manner: (a) The generator/certifier shall be identified as the generator/certifier and shipping originator. (b) The interim storage site shall be identified as the reshipper. (c) The shipping originator is responsible for certifiability of the waste form, waste package content, waste container procurement documentation, related Data Package information, and proper marking, labeling and placarding of the shipment. The shipping originator is responsible for any problems or discrepancies relating to the above-mentioned items that may occur during shipment to or emplacement at the Waste Isolation Pilot Plant. (d) The reshipper is responsible for complete data package assembly, transmittal, proper marking, labeling, placarding, verifying the adequacy of the exterior condition of the container (e.g., no significant deterioration, bulging) and for proper shipment loading. The reshipper shall perform radiation dose rate and contamination surveys on each package. The reshipper is responsible for any problems or discrepancies involving the items mentioned above.
DOE5820.2A, Chapter II, 3.g(8)	(g)(8) The interim storage site is the shipping originator for stored waste certified at that site. Agreements may need to be developed between offsite waste generators and interim storage site operators/certifiers to define clearly their respective responsibilities.
DOE5820.2A, Chapter III, 3.c(1)	c(1) Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal. Waste reduction efforts shall include consideration of process modification, process optimization, materials substitution and decontamination.
DOE5820.2A, Chapter III, 3.c(2)	c(2) Waste Generation Reduction. All DOE-low-level waste generators shall establish auditable programs (goals, incentives, procedures, and reports) to ensure that the amount of low-level waste generated and/or shipped for disposal is minimized.
DOE5820.2A, Chapter III, 3.c(3)	c(3) Waste Segregation. Each DOE-low-level waste generator shall separate uncontaminated waste from low-level waste to facilitate cost effective treatment and disposal.
DOE5820.2A, Chapter III, 3.c(4)	c(4) Waste Minimization. Each DOE-low-level waste generator preparing a design for a new process or process change shall incorporate principles into the design that will minimize the generation of low-level waste.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter III, 3.d	d(1) Low-level waste shall be characterized with sufficient accuracy to permit proper segregation, treatment, storage, and disposal. This characterization shall ensure that, upon generation and after processing, the actual physical and chemical characteristics and major radionuclide content are recorded and known during all stages of the waste management process. (2) Waste characterization data shall be recorded on a waste manifest, as required by paragraph 3m, and shall include: (a) The physical and chemical characteristics of the waste. (b) Volume of the waste (total of waste and any solidification or absorbent media). (c) Weight of the waste (total of waste and any solidification or absorbent media). (d) Major radionuclides and their concentrations. (e) Packaging date, package weight, and external volume. (3) The concentration of a radionuclide may be determined by direct methods or by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements.
DOE5820.2A, Chapter III, 3.e(1)	e(1) Waste shipped from one field organization to another for treatment, storage or disposal shall be done in accordance with the requirements established by the operations office having responsibility for operations of the receiving facility.
DOE5820.2A, Chapter III, 3.e(2)	e(2) Waste acceptance criteria shall be established for each low-level waste treatment, storage, and disposal facility, and submitted to the cognizant field organization.
DOE5820.2A, Chapter III, 3.e(3)	e(3) Generators of waste shall implement a low-level waste certification program to provide assurance that the waste acceptance criteria for any low-level waste treatment, storage, or disposal facility used by the generator are met. Generators and facilities receiving the waste are jointly responsible for ensuring compliance with waste acceptance criteria. Generators are financially responsible for actions required due to nonconformance.
DOE5820.2A, Chapter III, 3.e(4)	e(4) Generator low-level waste certification programs shall be subject to a periodic audit by operators facilities to which the waste is sent by the generator.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter III, 3.e(5)	e(5) The waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: (a) Allowable quantities/concentrations of specific radioisotopes to be handled, processed, stored or disposed of; (b) Criticality safety requirements (waste forms and geometries); (c) Restrictions regarding low-level waste classified for security reasons; (d) External radiation and internal heat generation; (e) Restrictions on the generation of harmful gases, vapors, or liquids in waste; (f) Chemical and structural stability of waste packages, radiation effects, microbial activity, chemical reactions, and moisture; (g) Restrictions for chelating and complexing agents having the potential for mobilizing radionuclides; and (h) Quantity of free liquids.
DOE5820.2A, Chapter III, 3.g(1)	g(1) The volume of waste and number of shipments of low-level waste shall be minimized and the shipments will be conducted based on plans developed by field organizations. Off site shipment of low-level waste shall be in compliance with DOE 1540.1.
DOE5820.2A, Chapter III, 3.g(2)	g(2) Generators shall provide an annual forecast in the third quarter of the fiscal year to the field organizations managing the off-site disposal facility to which the waste is to be shipped.
DOE5820.2A, Chapter III, 3.g(3)	g(3) Generators must receive advance approval from the receiving facility and shall certify prior to shipment that waste meets the receiving facility waste acceptance criteria. The certification program shall be auditable and able to withstand independent review.
DOE5820.2A, Chapter III, 3.g(4)	g(4) Each package of waste must comply with the labeling requirements of DOE 1540.1.
DOE5820.2A, Chapter III, 3.i(6)	(i)(6) Waste containing amounts of radionuclides below regulatory concern, as defined by Federal regulations, may be disposed without regard to radioactivity content.
DOE5820.2A, Chapter III, 3.m(1)	m(1) Each field organization shall develop and maintain a record keeping system that records the following: a historical record of waste generated, treated, stored, shipped, disposed of, or both, at the facilities under its cognizance. The data maintained shall include all data necessary to show that the waste was properly classified, treated, stored, shipped, and/or disposed of. The data maintained in the system shall be based on the data recorded on waste manifests.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter III, 3.m(2)	m(2) Waste Manifest. Records shall be kept and accompany each waste package from generator through final disposal. The manifest shall contain data necessary to document the proper classification, and assist in determining proper treatment, storage, and disposal of the waste. Waste manifests will be kept as permanent records. At a minimum, the following data will be included: (a) Waste physical and chemical characteristics, (b) Quantity of each major radionuclide present, (c) Weight of the waste (total of waste and any solidification or absorbent media), (d) Volume of the waste (total of waste and any solidification or absorbent media), and (e) Other data necessary to demonstrate compliance with waste acceptance criteria.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter V, 3.a	3. REQUIREMENTS. DOE organizations shall develop and document their programs to provide for the surveillance, maintenance, and decommissioning of contaminated facilities. The decommissioning programs shall be implemented as follows: a. General. (1) Each field organization shall prepare and maintain a complete list of contaminated facilities both operational and excess under its jurisdiction. A continuous record of jurisdictional program responsibility for all contaminated facilities shall be maintained by the cognizant field organization for use in assigning decommissioning responsibility. (2) Operational records (e.g., facility design drawings and modifications, characterization data on contamination levels, prior decontamination activities, and incident reports required by DOE Orders) for all contaminated facilities shall be maintained by the cognizant field organization for use in preparing decommissioning plans. (3) Planning for facility decommissioning shall be initiated during the design phase for new facilities and prior to termination of operations for existing operational facilities. Such plans shall consider the 2-year budget cycle to ensure adequate funding availability. (4) Program offices shall be responsible for placing the facility in a safe storage condition, providing surveillance and maintenance, and decommissioning the facilities under their jurisdiction when they become excess to programmatic needs, or for finding another programmatic sponsor for them. For multiple user facilities, the program office shall determine decommissioning liability for user program offices based on each program's overall contribution to the contamination or some other mutually acceptable basis. This cost sharing formula may be applied when the facility is placed in safe storage or during surveillance and maintenance, when appropriate. (5) Responsibility for contaminated facilities may be transferred from one program organization to another by mutual agreement of the programs involved. The program organization to which a facility is transferred shall accept full responsibility for surveillance, maintenance, and decommissioning of the facility according to the requirements of this Order. Agreements to transfer facilities for functional purposes shall be in writing and shall identify explicitly the concurrent transfer of responsibility for surveillance, maintenance, and decommissioning. (6) The DP and NE decommissioning programs exist for the primary purpose of managing and decommissioning the contaminated facilities currently assigned to them. Other contaminated facilities that have no programmatic sponsor, or that are excess to program needs and have a current sponsor, shall be assigned to the DP and NE programs for management and decommissioning with the approval of the program secretarial officers involved or their designees. (7) Decommissioning expertise gained by DOE and its contractors is available at most major DOE facilities, and should be utilized by DOE programs. A computerized Decommissioning Technology database is maintained at the Richland Operations Office. Published reports on nuclear facility decommissioning may be obtained from the Remedial Action Program Information Center at Oak Ridge National Laboratory.
DOE5820.2A, Chapter V, 3.a(2)	a(2) Operational records (e.g., facility design drawings and modifications, characterization data on contamination levels, prior decontamination activities, and incident reports required by DOE Orders) for all contaminated facilities shall be maintained by the cognizant field organization for use in preparing decommissioning plans.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
DOE5820.2A, Chapter V, 3.a(5)	a(5) Responsibility for contaminated facilities may be transferred from one program organization to another by mutual agreement of the programs involved. The program organization to which a facility is transferred shall accept full responsibility for surveillance, maintenance, and decommissioning of the facility according to the requirements of this Order. Agreements to transfer facilities for functional purposes shall be in writing and shall identify explicitly the concurrent transfer of responsibility for surveillance, maintenance, and decommissioning.
DOE5820.2A, Chapter V, 3.b	Facilities in which radioactive or hazardous materials are utilized shall be designed to simplify decontamination and decommissioning and/or increase the potential for reuse. Features and procedures that simplify and facilitate decommissioning shall be identified during the planning and design phase based upon a proposed decommissioning method or conversion to other use.
DOE5820.2A, Chapter V, 3.c	c. Post-Operational Activities. (1) DOE Program organizations shall identify contaminated facilities under their jurisdiction, document the potential for reuse and recovery of materials and equipment, and develop schedules for decommissioning them. Projects consisting of one or more facilities shall be identified as appropriate, and priorities shall be developed based on: (a) Maintaining employee and public health and safety, (b) Protection of the environment, (c) Compliance with the National Environmental Policy Act, the Resource Conservation and Recovery Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Superfund Amendments and Reauthorization Act, and other contractual or legal requirements, (d) Cost effective program management (e.g., maintaining manpower pools, selecting economical decommissioning alternatives), and (e) Future site plans. (2) Program organizations shall ensure that, prior to initiation of decommissioning activities, adequate surveillance and maintenance is performed for their surplus facilities to meet applicable radiation protection (DOE 5480.1B), hazardous chemical and safety standards, to maintain physical safety and security, and to reduce potential public and environmental hazards. All high-level waste and stored hazardous materials should be removed by the operator as part of the last operational activities prior to entering into the decommissioning phase.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
Effluent Treatment Facility Influent Restrictions	Discharge of ETF effluent is permitted for discharge to the SALDS infiltration gallery only for ETF treatment of 242-A Evaporator process condensate. The discharge of ETF effluent to SALDS for any other ETF influent stream is prohibited unless (Washington Department of) Ecology has provided the Permittee with written approval to allow an alternative ETF influent source(s). If the Permittee proposes to run a different influent source(s) (other than 242-A evaporator condensate) through ETF, a characterization study must be sent to Ecology for approval, which includes: 1. A listing of all chemical constituents of concern which exist in the proposed influent source(s), along with expected range of concentration of each component. 2. Engineering study results which show that ETF can adequately process the proposed influent source(s) such that violation of this permit will not occur and water quality violations related to any constituents not listed in the original permit will not occur. 3. Information indicating acceptance of the proposed influent stream relating to RCRA and State Hazardous Waste Law and all other applicable authorities' acceptance of the proposed source(s). 4. A demonstration that the ETF treatment process constitutes BAT/AKART for the proposed influent source(s).
EM-WAPS 1.1	The waste form is borosilicate waste glass. NOTE: This specification is in conflict with TWRS baseline requirements. The TWRS baseline considers the possible use of other glass compositions, e.g., aluminosilicate glass. (See 4.2 04 Issue 1.)
EM-WAPS 1.4.2	At the time of shipment, the producer shall certify that after the initial cool-down, the waste form temperature has not exceeded 400 °C. The producer shall describe the method of compliance in the WCP.
EM-WAPS 2.2	The canister fabrication and closure methods shall be identified in the WCP. The outermost closure shall be leaktight to 1x10-4 atm-cc/s helium. The method for demonstrating compliance shall be described by the producer in the WCP. The WQR shall provide evidence that the canister fabrication and closure methods are capable of complying with the leaktightness criterion. Compliance during production shall be documented in the Production Records.
EM-WAPS 2.3.1	The producer shall assign a unique alphanumeric identifier to label each outermost canister that is produced. This label shall appear on the canistered waste form and on all documentation pertinent to that particular canistered waste form.
EM-WAPS 2.3.2	Each canister shall be labeled in two locations: one visible from the top and one from the side of the canister. The identification code shall be printed in a type size of at least 92 points using a sans serif type face. A proposed layout shall be provided in the WCP. Labels shall be applied to the exterior of the outermost canister and shall not cause the dimensional limits (Specification 3.11) to be exceeded. The label shall be designed to be legible after filling and storage at the producers facility and shipment to the repository. The label shall be an integral part of the canister and shall not impair the integrity of the canister.
EM-WAPS 3.1	The producer shall ensure that the canistered waste form does not contain detectable amounts of free liquids. The producer shall describe the method of compliance in the WCP and provide documentation of the ability to comply, and of the detection limits, in the WQR.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
EM-WAPS 3.10	The producer shall design a waste form to ensure that, under normal and accident conditions, 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. The calculated effective neutron multiplication factor, keff, must be shown to be less than 0.90 after allowing for bias in the method of calculation and the uncertainty in the experiments used to validate the method of calculation. The producer shall describe the method of demonstrating compliance in the WCP and provide supporting documentation in the WQR. The WQR shall also include sufficient information on the nuclear characteristics, such as fissile density, of the canistered waste form to enable subcriticality to be confirmed under transportation, storage and disposal conditions.
EM-WAPS 3.11	The configuration, dimensions, and weight of the canistered waste form shall not exceed the maximum size and weight which can be received, handled, and emplaced in the repository. These parameters shall be controlled as indicated below and shall be documented at the time of shipment. The producer shall describe the method of compliance in the WCP and the basis for compliance in the WQR.
EM-WAPS 3.12	The canistered waste form shall be capable of withstanding a 7 meter drop onto a flat, essentially unyielding surface without breaching (leak rate < 1x10-4 atm·cc/s helium). The producer shall describe the method of compliance in the WCP and provide test results and any supporting analyses in the WQR. The test results shall include information on measured canister leak rates and canister deformation after the drop.
EM-WAPS 3.2	The producer shall ensure that the canistered waste form does not contain detectable amounts of free gas other than air, the residuals of air, noble and radiogenic gases. The internal gas pressure immediately after closure shall not exceed 150 kPa (22 psia) at 25\202C. The producer shall describe the method of compliance in the WCP and provide documentation of the ability to comply with this specification, and of the detection limits, in the WQR. The producer shall also document in the WQR the quantities and compositions of any gases that might accumulate inside the canister from radiogenic decay or after the canister has been subjected to temperatures up to 500\202\C.
EM-WAPS 3.3	The producer shall ensure that the canistered waste form does not contain detectable amounts of explosive, pyrophoric, or combustible materials. The producer shall describe the method of compliance in the WCP and provide documentation of, the detection limits, and the ability to comply with this specification for the range of waste types, in the WQR. The producer shall document in the WQR that the canistered waste forms remain nonexplosive, nonpyrophoric, and noncombustible after having been subjected to temperatures up to 500\202\C.
EM-WAPS 3.4	The producer shall ensure that the canistered waste form does not contain detectable amounts of organic materials. The producer shall describe the method for complying with this specification in the WCP and provide documentation of the ability to comply, and of the detection limits, in the WQR.
EM-WAPS 3.5	The producer shall ensure that the contents of the canistered waste form do not cause internal corrosion of the canister which could adversely affect normal handling during storage, or during an abnormal occurrence such as a canister drop accident. The producer shall describe the method of demonstrating compliance in the WCP. Interactions between the canister and its contents, including any reaction products generated within the canistered waste form after exposure to temperatures up to 500 °C, shall be discussed in the WQR.
EM-WAPS 3.6	The producer shall fill the canister to a height equivalent to at least 80% of the volume of the empty canister. The producer shall report this height in the Production Records and describe the method of compliance in the WCP. Documentation supporting the selected method of compliance shall be provided in the WQR.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
EM-WAPS 3.7	The level of removable radioactive contamination on all external surfaces of each canistered waste form shall not exceed the following limits at the time of shipment: Alpha radiation: 220 dpm/100 cm^2 Beta and Gamma radiation: 2200 dpm/100 cm^2 In addition, the producer shall visually inspect each canistered waste form and remove visible waste glass from the exterior before shipment. The producer shall describe the method of compliance in the WCP and provide contamination level results in the Storage and Shipping Records.
EM-WAPS 3.8.1	The producer shall document in the WQR the expected thermal output of the canistered waste forms and the range of expected variation for each waste type, indexed to the year 2015. The method to be used for demonstrating compliance shall be described by the producer in the WCP. Projections for compositions not available for reporting in the initial WQR shall be included in an addendum to the WQR.
EM-WAPS 3.8.2	The producer shall report in the Storage and Shipping Records the estimated heat generation rate for each canistered waste form. The producer shall describe the method for compliance in the WCP.
EM-WAPS 3.9.1	The producer shall report in the WQR the expected values and the range of expected variation for both gamma and neutron dose rates indexed to the year 2015. The producer shall describe the method for demonstrating compliance in the WCP.
EM-WAPS 3.9.2	The producer shall provide in the Storage and Shipping Records either the calculated or measured values for both gamma and neutron dose rates at the time of shipment for each canistered waste form. The producer shall describe the method of compliance in the WCP.
SEN-35-91	DOE facilities will be designed, constructed, operated, and decommissioned to ensure the protection of the public, workers, and the environment. DOE has adopted two quantitative safety goals to limit the risks of fatalities associated with its nuclear operations. These goals are the same as those established for nuclear powerplants by the Nuclear Regulatory Commission (NRC) and, like the NRC goals, should be viewed as aiming points for performance. The goals are: The risk to an average individual in the vicinity of a DOE nuclear facility for prompt fatalities that might result from accidents should not exceed one tenth of one percent (0.1%) of the sum of prompt fatalities resulting from other accidents to which members of the population are generally exposed. For evaluation purposes, individuals are assumed to be located within one mile of the site boundary. The risk to the population in the area of a DOE nuclear facility for cancer fatalities that might result from operations should not exceed one tenth of one percent (0.1%) of the sum of all cancer fatality risks resulting from all other causes. For evaluation purposes, individuals are assumed to be located within 10 miles of the site boundary. In striving to reach these goals, DOE nuclear facilities and activities shall be designed, constructed, operated, and decommissioned with: a) appropriate barriers to prevent or minimize potential radioactive releases; b) engineered safety features to minimize potential releases; and c) procedural controls to mitigate the effects of potential releases. These goals shall be addressed for both new and existing facilities. Proposed modifications to existing facilities to achieve these goals shall be prioritized along with other proposed modifications based on their safety significance. DOE shall pursue the evolution of additional potential safety goals for plant and co located workers to support enhanced safe operations of its facilities.
SWDP Permit 4502 and Fact Sheet	Comply with the requirements of the State Waste Discharge Permit #ST 4502 for 200 Area Treated Effluent Disposal Facility.
WAC173-303-630(1)	(1) The regulations in this section apply to owners and operators of all dangerous waste facilities that store containers of dangerous waste.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-303-630(6)	(6) At least weekly, the owner or operator must inspect areas where containers are stored, looking for leaking containers and for deterioration of containers and the containment system caused by corrosion, deterioration, or other factors.
WAC173-303-630(7)	(7)(a) Container storage areas must have a containment system that is capable of collecting and holding spills and leaks. In addition to the necessary leak containment capacity, uncovered storage areas must be capable of holding the additional volume that would result from the precipitation of a maximum twenty-five year storm of twenty-four hours duration. The containment system must: (i) Have a base underlying the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated rainfall until the collected material is detected and removed. The base must be sloped or the containment system must be otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids; (ii) Be designed for positive drainage control (such as a locked drainage valve) to prevent release of contaminated liquids and so that uncontaminated precipitation can be drained promptly for convenience of operation. Spilled or leaked waste and accumulated precipitation must be removed from the containment system in as timely a manner as is necessary to prevent overflow; and (iii) Have sufficient capacity to contain ten percent of the volume of all containers or the volume of the largest container, whichever is greater. Only containers holding free liquids, or holding wastes designated as F020, F021, F022, F023, F026, or F027 need to be considered in this determination. (b) Run-on into the containment system must be prevented, unless the department waives this requirement in the permit after determining that the collection system has sufficient excess capacity in addition to that required in (a)(iii) of this subsection to accommodate any run-on which might enter the system. (c) Storage areas that store containers holding only wastes that do not contain free liquids, do not exhibit either the characteristic of ignitability or reactivity as described in WAC 173-303-090 (5) or (7), and are not designated as F020, F021, F022, F023, F026, or F027, need not have a containment system as described in this subsection: Provided, That: (i) The storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation; or (ii) The containers are elevated or are otherwise protected from contact with accumulated liquids. (d) EHW in containers must be protected from the elements by means of a building or other protective covering that otherwise allows adequate inspection under subsection (6) of this section.
WAC173-303-630(8)	(8)(a) Containers holding reactive waste exhibiting a characteristic specified in WAC 173-303-090 (7)(a)(vi), (vii) or (viii) must be stored in a manner equivalent to the Uniform Fire Code's "American Table of Distances for Storage of Explosives," Table 77-201, 1979 edition or the version adopted by the local fire district. (b) The owner or operator shall design, operate, and maintain ignitable waste and reactive waste (other than a reactive waste which must meet (a) of this subsection) container storage in a manner equivalent with the Uniform Fire Code. Where no specific standard or requirements are specified in the Uniform Fire Code, or in existing state or local fire codes, applicable sections of the NFPA Pamphlet # 30, "Flammable and Combustible Liquids Code," shall be used. The owner/operator shall also comply with the requirements of WAC 173-303-395 (1)(d).

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-303-645(8)(a-c)	(8) The owner or operator must comply with the requirements of this subsection for any ground water monitoring program developed to satisfy Subsections (9), (10), or (11) of this section. (a) The ground water monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield ground water samples from the uppermost aquifer that: (i) Represent the quality of background water that has not been affected by leakage from a regulated unit; (A) A determination of background quality may include sampling of wells that are not hydraulically upgradient of the waste management area where: (I) Hydrogeologic conditions do not allow the owner or operator to determine what wells are hydraulically upgradient; and (II) Sampling at other wells will provide an indication of background ground water quality that is representative or more representative than that provided by the upgradient wells; and (ii) Represent the quality of ground water passing the point of compliance. (iii) Allow for the detection of contamination when dangerous waste or dangerous constituents have migrated from the waste management area to the uppermost aquifer. (b) If a facility contains more than one regulated unit, separate ground water monitoring systems are not required for each regulated unit, provided that provisions for sampling the ground water in the uppermost aquifer will enable detection and measurement at the compliance point of dangerous constituents from the regulated units that have entered the ground water in the uppermost aquifer. (c) All monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing must allow collection of representative ground water samples. Wells must be constructed in such a manner as to prevent contamination of the samples, the sampled strata, and between aquifers and water bearing strata. Wells must meet the requirements set forth in Parts 1 and 3 of chapter 173-160 WAC, "Minimum standards for construction and maintenance of wells."
WAC173-303-645(9)(a-c)	(9)(a) The owner or operator must monitor for indicator parameters (e.g., pH, specific conductance, total organic carbon (TOC), total organic halogen (TOX), or heavy metals), waste constituents, or reaction products that provide a reliable indication of the presence of dangerous constituents in ground water. The department will specify the parameters or constituents to be monitored in the facility permit, after considering the following factors: (i) The types, quantities, and concentrations of constituents in wastes managed at the regulated unit; (ii) The mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone beneath the waste management area; (iii) The detectability of indicator parameters, waste constituents, and reaction products in ground water; and (iv) The concentrations or values and coefficients of variation of proposed monitoring parameters or constituents in the ground water background. (b) The owner or operator must install a ground water monitoring system at the compliance point, as specified under Subsection (6) of this section. The ground water monitoring system must comply with Subsection (8)(a)(ii), (b), and (c) of this section. (c) The owner or operator must conduct a ground water monitoring program for each chemical parameter and dangerous constituent specified in the permit pursuant to (a) of this subsection in accordance with Subsection (8)(g) of this section. The owner or operator must maintain a record of ground water analytical data as measured and in a form necessary for the determination of statistical significance under Subsection (8)(h) of this section.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-010	WAC 173-460-010 Purpose. (1) Pursuant to chapter 70.94 RCW, Washington Clean Air Act, the purpose of this chapter is to establish the systematic control of new sources emitting toxic air pollutants (TAPs) in order to prevent air pollution, reduce emissions to the extent reasonably possible, and maintain such levels of air quality as will protect human health and safety. Toxic air pollutants include carcinogens and noncarcinogens listed in WAC <D<12266>> 173-460-150 </D> and <D<12267>> 173-460-160 </D>. (2) This chapter establishes three major requirements: (a) Best available control technology for toxics; (b) Toxic air pollutant emission quantification; (c) Human health and safety protection demonstration. (3) Policy. It is the policy of ecology to reduce, avoid, or eliminate toxic air pollutants prior to their generation whenever economically and technicalty practicable.
WAC173-460-020 (1 - 7)*	WAC 173-460-020 Definitions. The definitions of terms contained in chapter <D<11981>> 173-400 </D> WAC are incorporated into this chapter by reference. In the event of a conflict between the definitions provided in chapter <D<11981>> 173-400 </D> WAC and the definitions provided in this section, the definitions in this section shall govern. Unless a different meaning is clearly required by context, the following words and phrases as used in this chapter shall have the following meanings. NOTE: For copies of the above mentioned rule and any other rule cited in this chapter, contact the Department of Ecology, Records Section, P.O. Box 47600, Olympia, WA 98504-7600. (1) "Acceptable source impact analysis" means a procedure for demonstrating compliance with WAC <D<12258>> 173-460-070 </D> and <D<12259>> 173-460-080 </D>, that compares maximum incremental ambient air impacts with applicable acceptable source impact levels (ASIL). (2) "Acceptable source impact level (ASIL)" means a concentration of a toxic air pollutant in the outdoor atmosphere in any area which does not have restricted or controlled public access that is used to evaluate the air quality impacts of a single source. There are three types of acceptable source impact levels: Risk-based, threshold-based, and special. Concentrations for these three types of ASILs are determined as provided in WAC <D<12262>> 173-460-110 </D>. ASILs are listed in WAC <D<12266>> 173-460-150 </D> and <D<12267>> 173-460-160 </D>. (3) "Authority" means an air pollution control authority activated pursuant to chapter 70.94 RCW that has jurisdiction over the subject source. Ecology is the authority if an air pollution control authority has not been activated or if ecology has jurisdiction over the source pursuant to RCW 70.94.395. (4) "Best available control technology for toxics (T-BACT)" applies to each toxic air pollutant (TAP) discharged or mixture of TAPs, taking in account the potency quantity and toxicity of each toxic air pollutant or mixture of TAPs discharged in addition to the meaning given in WAC <D<11984>> 173-400-030 </D>(10). (5) "Carcinogenic potency factor" means the upper 95th percentile confidence limit of the slope of the dose-response curve and is expressed in units of (mg/ kg-day)-1. (6) "Class A toxic air pollutant (Class A TAP)" means a substance or group of substances listed in WAC <D<12266>> 173-460-150 </D>. (7) "Class B toxic air pollutant (Class B TAP)" means any substance that is not a simple asphyxiant or nuisance particulate and that is listed in WAC <D<12267>> 173-460-160 </D>.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-020 (16 - 21)*	(16) "Second Tier Analysis" means an optional procedure used after T-BACT and acceptable source impact analysis for demonstrating compliance with WAC <D<12258>> 173-460-070 </D>. The second tier analysis uses a health impact assessment as provided in WAC <D<12260>> 173-460-090 </D>, instead of an acceptable source impact level. (17) "Simple asphyxiant" means a physiologically inert gas or vapor that acts primarily by diluting atmospheric oxygen below the level required to maintain proper levels of oxygen in the blood. Examples of simple asphyxiants are given in Appendix X of the TLV Booklet referred to in Subsection (19) of this section and incorporated by reference. (18) "Threshold limit value-time weighted average (TLV-TWA)" means a concentration limit recommended by the American Conference of Governmental Industrial Hygienists (ACGIH) for a normal eight-hour workday and forty-hour workweek. (19) "TLV Booklet" means "TLVs, Threshold Limit Values and Biological Exposure Indices for 1991-92," published by the American Conference of Governmental Industrial Hygienists and is hereby incorporated by reference. (20) "Toxic air pollutant (TAP)" or "toxic air contaminant" means any Class A or Class B toxic air pollutant listed in WAC <D<12266>> 173-460-150 </D> and <D<12267>> 173-460-160 </D>. The term toxic air pollutant may include particulate matter and volatile organic compounds if an individual substance or a group of substances within either of these classes is listed in WAC <D<12266>> 173-460-150 </D> and/or <D<12267>> 173-460-160 </D>. The term toxic air pollutant does not include particulate matter and volatile organic compounds as generic classes of compounds. (21) "Upper bound unit risk factor" means the 95 percent upper confidence limit of an estimate of the extra risk of cancer associated with a continuous 70 year exposure to 1 ug/m^3 of a Class A toxic air pollutant.
WAC173-460-020 (8 - 15)*	(8) "EPA's Dispersion Modeling Guidelines" means the United States Environmental Protection Agency Guideline on Air Quality Models, EPA (Revised) 40 CFR Part 51 Appendix W, and is hereby incorporated by reference. (9) "EPA's Risk Assessment Guidelines" means the United States Environmental Protection Agency's Guidelines for Carcinogenic Risk Assessment, 51 FR 33992 (September 24, 1986) and is hereby incorporated by reference. (10) "Increased cancer risk of one in one hundred thousand" means the 95th percent upper bound on the estimated risk of one additional cancer above the background cancer rate per one hundred thousand individuals continuously exposed to a Class A toxic air pollutant at a given average dose for a specified time. (11) "Increased cancer risk of one in one million" means the 95th percent upper bound on the estimated risk of one additional cancer above the background cancer rate per one million individuals continually exposed to a Class A toxic air pollutant at a given average dose for a specified time. (12) "Inhalation Reference Concentration (Inhalation RfC)" means a reference concentration published in the United States Environmental Protection Agency Integrated Risk Information System (IRIS). (13) "Mixture" means a combination of two or more substances mixed in arbitrary proportions. (14) "Modification" means any physical change in, or change in the method of operation of, a stationary source that increases the amount of any air contaminant emitted by such source or that results in the emission of any air contaminant not previously emitted. The term modification shall be construed consistent with the definition of modification in Section 7411, Title 42, United States Code, and with rules implementing that section. For purposes of this chapter, the term "air contaminant" shall mean "toxic air contaminant" or "toxic air pollutant" as defined in Subsection (20) of this section. (15) "New toxic air pollutant source" means: (a) The construction or modification of a stationary source that increases the amount of any toxic air pollutant emitted by such source or that results in the emission of any toxic air pollutant not previously emitted; and (b) Any other project that constitutes a new source under Section 112 of the Federal Clean Air Act.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-030 (1)*	WAC 173-460-030 Requirements, applicability and exemptions. (1) Applicability. (a) The provisions of this chapter shall apply state-wide. The authority shall enforce WAC <D<12252>> 173-460-010 </D>, <D<12253>> 173-460-020 </D>, <D<12254>> 173-460-030 </D>, <D<12255>> 173-460-040 </D>, <D<12256>> 173-460-050 </D>, <D<12257>> 173-460-060 </D>, <D<12258>> 173-460-070 </D>, <D<12259>> 173-460-080 </D>, <D<12264>> 173-460-130 </D>, <D<12265>> 173-460-140 </D>, <D<12266>> 173-460-150 </D>, and <D<12267>> 173-460-160 </D>. (b) Except as provided in this chapter, any new toxic air pollutant source listed in (b)(i), (ii), or (iii) of this subsection that may emit a Class A or Class B TAP into the ambient air is subject to these regulations: (i) Standard industrial classifications: (A) Major group 10-Metal mining. (B) Major group 12-Bituminous coal and lignite mining. (C) Major group 13-Oil and gas extraction. (D) Manufacturing industries major groups 20-39. (E) Major group 49-Electric, gas, and sanitary services except 4971 irrigation systems. (F) Dry cleaning plants, 7216. (G) General medical surgical hospitals, 8062. (H) Specialty hospitals, 8069. (I) National security, 9711. (ii) Any source or source category listed in WAC <D<11993>> 173-400-100 </D>, <D<12001>> 173-400-115 </D>(2), or <D<12311>> 173-490-030 </D>(1) except WAC <D<12311>> 173-490-030 </D> (1)(e) gasoline dispensing facilities. (iii) Any of the following sources: (A) Landfills. (B) Sites subject to chapter <D<11807>> 173-340 </D> WAC Model Toxics Control Act--Cleanup regulation.
WAC173-460-030 (2)*	(2) Exempt sources. (a) Containers such as tanks, barrels, drums, cans, and buckets are exempt from the requirements of this chapter unless equipped with a vent other than those required solely as safety pressure release devices. (b) Nonprocess fugitive emissions of toxic air pollutants from stationary sources, such as construction sites, unpaved roads, coal piles, waste piles, and fuel and ash handling operations are exempt from WAC <D<12257>> 173-460-060 </D>. (c) The following sources are generally exempt from the requirements of WAC <D<12256>> 173-460-050 </D>, <D<12258>> 173-460-070 </D>, <D<12259>> 173-460-080 </D>, and <D<12260>> 173-460-090 </D>. However, the authority may on a case-by-case basis, require compliance with these sections if the authority determines that the amount of emissions, nature of pollutant, or source location indicate that the ambient impact should be evaluated. (i) Perchloroethylene dry cleaners (ii) Petroleum solvent dry cleaning systems (iii) Solvent metal cleaners (iv) Chromic acid plating and anodizing (v) Abrasive blasting (d) Demolition and renovation projects involving asbestos removal and disposal are exempt from the requirements of this chapter. (e) Process vents subject to 40 CFR Parts 264 and 265, Subpart AA are exempt from the requirements of this chapter.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-040 (1 - 3)*	WAC 173-460-040 New source review. (1) Applicability. This chapter supplements the new source review requirements of WAC <D<11997>> 173-400-110 </D> by adding additional new source review requirements for toxic air pollutant sources. If a notice of construction is required under both chapter <D<11981>> 173-400 </D> WAC and this chapter, the written applications shall be combined. A notice of construction is a written application to permit construction of a new source. (a) The owner or operator of a new toxic air pollutant source listed in WAC <D<12254>> 173-460-030 </D>(1) shall notify the authority prior to the construction, installation, or establishment of a new toxic air pollutant source and shall file a notice of construction application with the authority for the proposed emission unit(s). Notification and notice of construction are not required if the source is an exempt source listed in WAC <D<12254>> 173-460-030 </D>(2) or Subsection (2) of this section. (b) The notice of construction and new source review applies only to the affected emission unit(s) and the contaminants emitted from the emission unit(s). (c) New source review of a modification shall be limited to the emission unit or units proposed to be modified and the toxic air contaminants whose emissions would increase as a result of the modification. (2) The owner or operator of a new toxic air pollutant source listed in WAC <D<12254>> 173-460-030 </D> (1) is not required to notify or file a notice of construction with the authority if any of the following conditions are met: (a) Routine maintenance or repair requires equivalent replacement of air pollution control equipment; or (b) The new source is a minor process change that does not increase capacity and total toxic air pollutant emissions do not exceed the emission rates specified in small quantity emission rate tables in WAC <D<12259>> 173-460-080 </D>; or (c) The new source is the result of minor changes in raw material composition and the total toxic air pollutant emissions do not exceed the emission rates specified in the small quantity emission rate tables in WAC <D<12259>> 173-460-080 </D>. (3) Additional information. Within thirty days of receipt of a notice of construction, the authority may require the submission of additional plans, specifications, and other information necessary for the review of the proposed new or modified source.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-040 (4 - 8)*	(4) Requirements for new toxic air pollutant sources. The authority shall review notice(s) of construction, plans, specifications, and other associated information to determine that: (a) The source will be in accord with applicable federal, state, and authority air pollution control rules and regulations; (b) The source will use T-BACT for emissions control for the toxic air pollutants which are likely to increase; and (c) Sources required to use T-BACT for emission control demonstrate compliance with WAC <D<12258>> 173-460-070 </D> by using the procedures established in WAC <D<12259>> 173-460-080 </D> or, failing that, demonstrates compliance, by using the additional procedures in WAC <D<12260>> 173-460-090 </D> and/or <D<12261>> 173-460-100 </D>. (5) Preliminary determination. Within thirty days after receipt of all information required, the authority shall: (a) Make preliminary determinations on the matters set forth in this section; and (b) Initiate compliance with the provisions of WAC <D<12009>> 173-400-171 </D> relating to public notice and public comment, as applicable. (6) Final determination. If, after review of all information received including public comment, the authority finds that all the conditions in this section are satisfied, the authority shall issue a regulatory order to approve the notice of construction for the proposed new source or modification. If the authority finds that the conditions in this section are not satisfied, the authority shall issue an order for the prevention of construction, installation, or establishment of the toxic air pollution source(s). Where ecology has jurisdiction, it will endeavor to make final determinations as promptly as possible. (7) Appeal of decision. A final notice of construction decision may be appealed to the pollution control hearings board pursuant to chapter 43.21B RCW. (8) Commencement of construction. The owner(s) or operator(s) of the new source shall not commence construction until the applicable notice of construction has been approved.
WAC173-460-040 (9 - 10)*	(9) Operation and maintenance plan. As a condition of notice of construction approval, prior to start up, the authority may require a plan for the operation and maintenance of all equipment and procedures to ensure continuous compliance with this chapter. (a) A copy of the plan shall be filed with the authority upon request. (b) The plan shall reflect good industrial practice and may include operating parameters and maintenance procedures, and shall be updated to reflect any changes in good industrial practice. (c) Submittal of all plans should coincide with the authorities reporting requirements where applicable. (10) Jurisdiction. Emission of toxic air pollutants that exceed the acceptable source impact levels listed in WAC <D<12266>> 173-460-150 </D> and <D<12267>> 173-460-160 </D> requires ecology and, if applicable, authority approval as specified in WAC <D<12260>> 173-460-090 </D> and <D<12261>> 173-460-100 </D>.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-050 (1 - 3)*	WAC 173-460-050 Requirement to quantify emissions. (1) New sources. (a) When applying for a notice of construction, an owner or operator of a new toxic air pollution source shall quantify those emissions of each TAP or combination of TAPs that: (i) Will be used for the modeling procedures in WAC <D<12259>> 173-460-080 </D>; and (ii) That may be discharged after applying required control technology. The information shall be submitted to the authority. (b) Emissions shall be quantified in sufficient detail to determine whether the source complies with the requirements of this chapter. (2) Small quantity sources. Sources that choose to use small quantity emission rate tables instead of using dispersion modeling shall quantify emissions as required under WAC <D<12259>> 173-460-080 </D>, in sufficient detail to demonstrate to the satisfaction of the authority that the emissions are less than the applicable emission rates listed in WAC <D<12259>> 173-460-080 </D>. (3) Level of detail. An acceptable source impact level analysis under WAC <D<12259>> 173-460-080 </D>, may be based on a conservative estimate of emissions that represents good engineering judgment. If compliance with WAC <D<12258>> 173-460-070 </D> and <D<12259>> 173-460-080 </D> cannot be demonstrated, more precise emission estimates shall be used to demonstrate compliance with WAC <D<12260>> 173-460-090 </D>.
WAC173-460-050 (4a - 4c)*	(4) Mixtures of toxic air pollutants. (a) An owner or operator of a source that may discharge more than one toxic air pollutant may demonstrate compliance with WAC <D<12258>> 173-460-070 </D> and <D<12259>> 173-460-080 </D> by: (i) Quantifying emissions and performing modeling for each TAP individually; or (ii) Calculating the sum of all TAP emissions and performing modeling for the total TAP emissions and comparing maximum ambient levels to the smallest ASIL; or (iii) Equivalent procedures may be used if approved by ecology. (b) Dioxin and furan emissions shall be considered together as one TAP and expressed as an equivalent emission of 2,3,7,8 TCDD based on the relative potency of the isomers in accordance with United States Environmental Protection Agency (EPA) guidelines. NOTE: Copies of EPA "Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and dibenzofurans (CDDs and CDFs). 1989 Update" are available by requesting EPA /625/3-89/016, March 1989 from ORD Publications (513) 684-7562. (c) Polyaromatic hydrocarbon (PAH) emissions. The owner or operator of a source that may emit a mixture of polyaromatic hydrocarbon emissions shall quantify the following PAHs and shall consider them together as one TAP equivalent in potency to benzo(a)pyrene: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indenol(1,2,3-cd)pyrene, benzo(a)pyrene. The acceptable source impact analysis shall be conducted using the polyaromatic hydrocarbon emission ASIL contained in WAC <D<12266>> 173-460-150 </D>(3).

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-050 (4d)*	(d) Uncontrolled roof vent emissions from primary aluminum smelters. The owner or operator of a primary aluminum smelter that may emit a mixture of polyaromatic hydrocarbons from uncontrolled roof vents shall quantify PAH emissions using either of the following methods: (i) Quantify PAH emissions using the procedures in (c) of this subsection; or (ii) Multiply the total particulate emission mass from the uncontrolled roof vents by the percent of the particulate that is extractable organic matter. The percent extractable organic matter shall be considered one percent of total particulate matter unless ecology determines that there is compelling scientific data which demonstrates that the use of this value is inappropriate. The acceptable source impact analysis shall be conducted using the primary aluminum smelter uncontrolled roof vent PAH emission ASIL contained in WAC <D<12266>> 173-460-150 </D>(3). NOTE: For example, 100 grams of particulate air emission mass times one percent yields one gram of PAH emissions.
WAC173-460-060 (1 - 2)*	WAC 173-460-060 Control technology requirements. Except as provided for in WAC <D<12255>> 173-460-040 </D>, a person shall not establish, operate, or cause to be established or operated any new toxic air pollutant source which is likely to increase TAP emissions without installing and operating T-BACT. Satisfaction of the performance requirements listed below fulfill the T-BACT requirement for those particular sources. Local air pollution authorities may develop and require performance requirements in lieu of T-BACT provided that ecology approves the performance requirements as equivalent to T-BACT. (1) Perchloroethylene dry cleaners. The entire dryer exhaust shall be vented through a control device which will reduce VOC emissions to 5 kg or less per 100 kg dry weight of cleaned articles. (a) The control device shall meet one of the following conditions: (i) The exhaust from a carbon adsorber shall contain less than 100 ppm perchloroethylene as measured over a period of one minute before dilution; or (ii) The air temperature at the outlet of a refrigerated condenser shall reach seven degrees centigrade or less during the cool-down period. A temperature gauge with a minimum range from negative thirty-two to seventy-five degrees centigrade shall be installed and maintained on the condenser outlet duct; or (iii) The demonstrated control efficiency for any other control device shall be ninety percent or greater by weight, prior to the discharge to the atmosphere measured over a complete control cycle. (b) The operation of any perchloroethylene dry cleaner shall meet all of the following conditions: (i) All leaking components shall be repaired immediately; and (ii) All filtration cartridges shall be drained in the filter housing or other enclosed container before discarding the cartridges. (2) Petroleum solvent dry cleaning systems. A petroleum solvent dry cleaning system shall include the following: (a) All cleaned articles are dried in a solvent recovery dryer or the entire dryer exhaust is vented through a properly functioning control device which will reduce emissions to no more than 3.5 kg of VOC per 100 kg dry weight of cleaned articles; and (b) All cartridge filtration systems are drained in their sealed housing or other enclosed container before discarding the cartridges; and (c) All leaking components shall be repaired immediately.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-060 (3 - 4)*	(3) Chromic acid plating and anodizing. The facility-wide uncontrolled hexavalent chromium emissions from plating or anodizing tanks shall be reduced by at least ninety-five percent using either of the following control techniques: (a) An antimist additive or other equally effective control method approved by ecology or authority; or (b) The tank is equipped with: (i) A capture system which represents good engineering practice and which shall be in place and in operation at all times electrical current is applied to the tank; and (ii) An emission control system which limits hexavalent chromium emissions to no more than 0.15 milligrams per ampere-hour of electrical charge applied to the tank or uncontrolled emissions shall be reduced by ninety-five percent. (4) Chromic acid plating and anodizing (greater than 1 kilogram). If the facility-wide hexavalent chromium emissions from chromic acid plating and anodizing are greater than 1 kilogram per year after the application of control techniques required by Subsection (3) of this section, the facility-wide hexavalent chromium emissions shall be reduced by at least ninety-nine percent using either of the following control techniques: (a) An antimist additive or other equally effective control method approved by ecology or authority; or (b) The tank is equipped with: (i) A capture system which represents good engineering practice and which shall be in place and in operation at all times electrical current is applied to the tank; and (ii) An emissions control system which limits hexavalent chromium emissions to no more than 0.03 milligrams per ampere-hour of electrical charge applied to the tank or uncontrolled emissions shall be reduced by ninety-nine percent.
WAC173-460-060 (5a - 5b)*	(5) Solvent metal cleaners. (a) Any solvent metal cleaner shall include all of the following equipment: (i) A cover for the solvent tank which shall be closed at all times except when processing work in the degreaser. However, the cover shall be closed to the maximum extent possible when parts are being degreased; (ii) A facility for draining cleaned parts such that the drained solvent is returned to the solvent tank; (iii) For cold solvent cleaners, a freeboard ratio greater than or equal to 0.75; (iv) Vapor degreasers shall have: (A) A high vapor cutoff thermostat with manual reset; and (B) For degreasers with spray devices, a vapor-up thermostat which will allow spray operation only after the vapor zone has risen to the design level; and (C) Either a freeboard ratio greater than or equal to 1.00 or a refrigerated freeboard chiller; and (v) Conveyorized vapor degreasers shall have: (A) A drying tunnel or a rotating basket sufficient to prevent cleaned parts from carrying liquid solvent out of the degreaser; and (B) A high vapor cutoff thermostat with manual reset; and (C) A vapor-up thermostat which will allow conveyor movement only after the vapor zone has risen to the design vapor level. (b) The operation of any solvent metal cleaner shall meet the following requirements: (i) Solvent shall not leak from any portion of the degreasing equipment; (ii) Solvent, including waste solvent, shall be stored in closed containers and shall be disposed of in such a manner as to prevent its evaporation into the atmosphere; (iii) For cold cleaners, cleaned parts shall be drained until dripping ceases; and (iv) Degreasers shall be constructed to allow liquid solvent from cleaned parts to drain into a trough or equivalent device and return to the solvent tank.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-060 (5c - 6)*	(c) For open-top vapor degreasers, solvent drag-out shall be minimized by the following measures: (i) Racked parts shall be allowed to drain fully; (ii) The work load shall be degreased in the vapor zone until condensation ceases; (iii) Spraying operations shall be done within the vapor layer; (iv) When using a powered hoist, the vertical speed of parts in and out of the vapor zone shall be less than three meters per minute (ten feet per minute); (v) When the cover is open, the lip of the degreaser shall not be exposed to steady drafts greater than 15.3 meters per minute (fifty feet per minute); and (vi) When equipped with a lip exhaust, the fan shall be turned off when the cover is closed. (d) For conveyorized vapor degreasers, solvent drag-out shall be minimized by the following measures: (i) Racked parts shall be allowed to drain fully; and (ii) Vertical conveyor speed shall be maintained at less than three meters per minute (ten feet per minute). (6) Abrasive blasting. (a) Abrasive blasting shall be performed inside a booth or hangar designed to capture the blast grit or overspray. (b) Outdoor blasting of structures or items too large to be reasonably handled indoors shall employ control measures such as curtailment during windy periods and enclosure of the area being blasted with tarps. (c) Outdoor blasting shall be performed with either steel shot or an abrasive containing less than one percent (by mass) which would pass through a No. 200 sieve. (d) All abrasive blasting with sand shall be performed inside a blasting booth or cabinet.
WAC173-460-070	WAC 173-460-070 Ambient impact requirement. When applying for a notice of construction under WAC <D<12255>> 173-460-040 </D>, the owner or operator of a new toxic air pollutant source which is likely to increase TAP emissions shall demonstrate that emissions from the source are sufficiently low to protect human health and safety from potential carcinogenic and/or other toxic effects. Compliance shall be demonstrated in any area which does not have restricted or controlled public access. The source shall demonstrate compliance by using procedures established in this chapter after complying with the control technology requirements in WAC <D<12257>> 173-460-060 </D>.
WAC173-460-080 (1)*	WAC 173-460-080 Demonstrating ambient impact compliance. (1) When applying for a notice of construction under WAC <D<12255>> 173-460-040 </D>, the owner or operator of a new toxic air pollutant source which is likely to increase TAP emissions shall complete an acceptable source impact level analysis for Class A and Class B TAPs. The authority may complete this analysis.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-080 (2a - 2d)*	(2) Acceptable source impact analysis. (a) Carcinogenic effects. The owner or operator shall use dispersion modeling to estimate the maximum incremental ambient impact of each Class A TAP from the source and compare the estimated incremental ambient values to the Class A acceptable source impact levels in WAC <D<12266>> 173-460-150 </D>. If applicable, the source may use the small quantity emission rate tables in (e) of this subsection. (b) Other toxic effects. The owner or operator shall use dispersion modeling to estimate the maximum incremental ambient impact of each Class B TAP from the source and compare the estimated ambient values to the Class B acceptable source impact levels in WAC <D<12267>> 173-460-160 </D>. If applicable, the source may use the small quantity emission rate tables in (e) of this subsection. (c) Dispersion modeling. The owner or operator shall use dispersion modeling techniques in accordance with EPA guidelines. If concentrations predicted by dispersion screening models exceed applicable acceptable source impact levels, more refined modeling and/or emission estimation techniques shall be used. Refined modeling techniques shall be approved by ecology and the authority. (NOTE: EPA's Guideline on Air Quality Models, EPA 450/2-78-027R, can be obtained through NTIS (703) 487-4650 or can be downloaded from the OAQPS Technology Transfer Network electronic bulletin board system). (d) Averaging times. The owner or operator shall use the averaging times in (d)(i), (ii), (iii) of this subsection unless alternate averaging times are approved by ecology. Ecology may allow the use of an alternate averaging time if it determines that the operating procedures of the source may cause a high concentration of a TAP for a short period and that consideration of potential health effects due to peak exposures may be warranted for the TAP. (i) An annual average shall be used for Class A TAPs listed in WAC <D<12266>> 173-460-150 </D>(2). (ii) The averaging times specified in WAC <D<12266>> 173-460-150 </D>(3) shall be used for Class A TAPs listed in WAC <D<12266>> 173-460-150 </D>(3). (iii) A twenty-four-hour averaging time shall be used for Class B TAPs listed in WAC <D<12267>> 173-460-160 </D>.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-080 (2e)*	(e) Small quantity emission rates. Instead of using dispersion modeling to show compliance with ambient impact demonstration requirements in WAC <D<12259>> 173-460-080 </D> and <D<12260>> 173-460-090 </D>, a source may use the small quantity emission rate tables for all toxic air pollutants with acceptable source impact levels equal to or greater than 0.001 ug/m^3. A source must first meet control technology and emission quantification requirements of WAC <D<12256>> 173-460-050 </D> and <D<12257>> 173-460-060 </D>, then demonstrate that the source emission rate does not exceed the rates specified in the appropriate table below. SMALL QUANTITY EMISSION RATES CLASS A TOXIC AIR POLLUTANTS Acceptable Source Impact Level (Annual ug/m^3) / TAP Emissions Pounds per Year (10 meter stack and downwash) 0.001 to 0.0099 — 0.5 0.01 to 0.06 — 10 0.07 to 0.12 — 20 0.13 to 0.99 — 50 1.0 to 10 — 500 SMALL QUANTITY EMISSION RATES CLASS B TOXIC AIR POLLUTANTS Acceptable Source Impact TAP Emissions Level (24 hour ug/m^3) / Pounds per Year / Pounds per Hour Less than 1 — 175 — 0.02 1 to 9.9 — 175 — 0.02 10 to 29.9 — 1,750 — 0.20 30 to 59.9 — 5,250 — 0.60 60 to 99.9 — 10,500 — 1.20 100 to 129.9 — 17,500 — 2.0 130 to 250 — 22,750 — 2.6 Greater than 250 — 43,748 — 5.0
WAC173-460-080 (3)*	(3) Criteria for compliance. Compliance with WAC <D<12258>> 173-460-070 </D> is demonstrated if the authority determines that, on the basis of the acceptable source impact analysis, the source's maximum incremental ambient air impact levels do not exceed the Class A or Class B acceptable source impact levels in WAC <D<12266>> 173-460-150 </D> and <D<12267>> 173-460-160 </D>; or, if applicable, the source TAP emission rates do not exceed the rates specified in Subsection (2)(e) of this section.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-090 (1)*	WAC 173-460-090 Second tier analysis. (1) Applicability. (a) The owner or operator who cannot demonstrate class A or class B TAP source compliance with WAC <D<12258>> 173-460-070 </D> and <D<12259>> 173-460-080 </D> using an acceptable source impact level analysis as provided in WAC <D<12259>> 173-460-080 </D>(2), may submit a petition requesting ecology perform a second tier analysis evaluation to determine a means of compliance with WAC <D<12258>> 173-460-070 </D> and <D<12259>> 173-460-080 </D> by establishing allowable emissions for the source. Petitions for second tier analysis evaluation shall be submitted to the local authority or ecology if ecology has jurisdiction over the source. Petitions received by local authorities shall be submitted to ecology within ten days of receipt. A second tier analysis evaluation may be requested when a source wishes to more accurately characterize risks, to justify risks greater than acceptable source impact levels, or to otherwise modify assumptions to more accurately represent risks. Risks may be more accurately characterized by utilizing updated EPA unit risk factors, inhalation reference concentrations, or other EPA recognized or approved methods. Ecology shall specify the maximum allowable emissions of any class A or class B TAP source based on ecology's second tier analysis evaluation. (b) Ecology shall evaluate a source's second tier analysis only if: (i) The authority has advised ecology that other conditions for processing the notice of construction have been met; and (ii) Emission controls contained in the conditional notice of construction represent at least T-BACT; and (iii) Ambient concentrations exceed acceptable source impact levels after using more refined emission quantification and air dispersion modeling techniques. (c) Ecology shall determine whether the conditions in (b)(i), (ii), and (iii) of this subsection for a second tier analysis have been satisfied within ten working days of receipt of all information needed to make the determination. The matter shall be returned to the authority if ecology finds the conditions for a second tier analysis evaluation have not been met.
WAC173-460-090 (2)*	(2) Jurisdiction. (a) Any second tier analysis application submitted by a source wishing to emit toxic air pollutants at levels greater than the acceptable source impact level contained in WAC <D<12266>> 173-460-150 </D> or <D<12267>> 173-460-160 </D> shall be approved or rejected by ecology. (b) Any new emission limits approved by ecology as a result of the second tier analysis evaluation shall be enforced by the authority provided the authority approves the new emission limits.
WAC173-460-090 (3)*	(3) Approval criteria. (a) Based on the second tier analysis, ecology may approve the emissions of TAPs from a source where ambient concentrations exceed acceptable source impact levels only if it determines that emission controls represent at least T-BACT and the source demonstrates that emissions of Class A TAPs are not likely to result in an increased cancer risk of more than one in one hundred thousand. The emission of Class A TAPs at levels likely to result in an increased cancer risk of more than one in one hundred thousand requires the approval of the director after complying with WAC <D<12261>> 173-460-100 </D>. (b) Ecology shall consider the second tier analysis and other information submitted by the applicant as well as department of health comments. (i) Comments from other agencies and universities with appropriate expertise may also be considered in the decision to approve emissions that exceed acceptable source impact levels. (ii) Public comments shall be considered if the source applies for a risk management decision under WAC <D<12261>> 173-460-100 </D>.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-090 (4)*	(4) Contents of the second tier analysis. (a) The second tier analysis consists of a health impact assessment. The applicant shall complete and submit a health impact assessment to ecology which includes the following information. Ecology may approve the submittal of less information if it determines that such information is sufficient to perform the second tier analysis evaluation. The health impact assessment shall be prepared in accordance with EPA's risk assessment guidelines as defined in WAC <D<12253>> 173-460-020 </D>(9). (i) Demographics such as population size, growth, and sensitive subgroups; (ii) Toxicological profiles of all toxic air pollutants that exceed the ASIL; (iii) Characterization of existing pathways and total daily intake for toxic air pollutants that exceed the ASIL; (iv) Contribution of the proposed source toward total daily intake for toxic air pollutants that exceed the ASIL; (v) Using existing data, characterization of risk from current exposure to the toxic air pollutants that exceed the ASIL. This includes existing TAP sources in the area, and anticipated risk from the new source; (vi) Additive cancer risk for all Class A toxic air pollutants which may be emitted by the source; (vii) Other information requested by ecology and pertinent to ecology's decision to approve the second tier application; (viii) Uncertainty in the data; and (ix) Length of exposure and persistence in the environment. (b) The health assessment shall utilize current scientific information. New scientific information on the toxicological characteristics of toxic air pollutants may be used to justify modifications of upper bound unit risk factors used to calculate ASILs in WAC <D<12266>> 173-460-150 </D> and/or absorption rates of individual toxic air pollutants if ecology determines there is compelling scientific data which demonstrates that the use of EPA recognized or approved methods are inappropriate.
WAC173-460-090 (5)*	(5) Additional information. (a) If approved by ecology, newly discovered scientific information which was unavailable at the time of the original submission of the health assessment may be used to justify modifications of the original health assessment. Ecology may approve the additional information if the source exercised due diligence at the time of original submission. (b) Within thirty days after receipt of the second tier analysis and all supporting data and documentation, ecology may require the submission of additional information needed to evaluate the second tier analysis.
WAC173-460-090 (6)*	(6) Determination. (a) If the second tier analysis is approved by ecology, ecology will return the petition to the authority and the authority may approve the notice of construction. (b) The authority shall specify allowable emissions consistent with ecology's second tier analysis evaluation determination expressed in weight of pollutant per unit time for each emissions unit involved in the application. The notice of construction shall also include all requirements necessary to ensure that conditions of this chapter and chapter <D<11981>> 173-400 </D> WAC are satisfied. (7) Public notification requirements. Ecology decisions regarding second tier analysis or decisions under WAC <D<12261>> 173-460-100 </D> shall comply with public notification requirements contained in WAC <D<12009>> 173-400-171 </D>.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-100	WAC 173-460-100 Request for risk management decision. (1) Applicability. The owner or operator of a source that emits Class A TAPs that are likely to result in an increased cancer risk of more than one in one hundred thousand may request that ecology establish allowable emissions for the source. (2) Contents of the application. The applicant shall meet the submittal requirements of WAC <D<12260>> 173-460-090 </D>(1) and submit all materials required under WAC <D<12260>> 173-460-090 </D> (4) and (5). The applicant may submit the request for a risk management decision concurrently with the second tier analysis application. Prior denial of the second tier analysis application under WAC <D<12260>> 173-460-090 </D>(6) is not required. (3) Criteria for approval. Ecology may approve the emissions of TAPs from a source where ambient concentrations are likely to result in an increased cancer risk of more than one in one hundred thousand only if the source first demonstrates the following: (a) Proposed emission controls represent all known available and reasonable technology; and (b) Application of all known available toxic air pollution prevention methods to reduce, avoid, or eliminate toxic air pollutants prior to their generation including recycling, chemical substitution, and efforts to redesign processes; and (c) The proposed changes will result in a greater benefit to the environment as a whole. (4) Additional methods to reduce toxic air pollutants. In addition to the requirements in Subsection (3) of this section, the owner or operator may propose and ecology may consider measures that would reduce community exposure, especially exposure of that portion of the community subject to the greatest additional risk, to comparable toxic air pollutants provided that such measures are not already required. (5) Public involvement. Ecology will initiate public notice and comment within thirty days of receipt of a completed risk management decision application. In addition to the public notice and comment requirements of WAC <D<12009>> 173-400-171 </D>, the owner or operator shall hold a public hearing to: (a) Present the results of the second tier analysis, the proposed emission controls, pollution prevention methods, additional proposed measures, and remaining risks; and (b) Participate in discussions and answer questions. (6) Time limitation. The owner or operator shall commence construction within eighteen months of the director's approval.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-110	WAC 173-460-110 Acceptable source impact levels. There are three types of acceptable source impact levels: Risk-based, threshold-based, and special acceptable source impact levels. They are computed as follows: (1) Risk-based acceptable source impact levels for Class A TAPs. Risk-based acceptable source impact levels means the annual average concentration, in micrograms per cubic meter, that may cause an increased cancer risk of one in one million. Ecology shall calculate the risk-based acceptable source impact levels for Class A TAPs in WAC <D<12266>> 173-460-150 </D>(2) using the following equation: Risk based ASIL (ug/m^3) = RISK / URF *Where: RISK = Cancer risk level (1 in 1,000,000) URF = Upper bound unit risk factor as published in IRIS database or other appropriate sources ($(ug/m^3)^{-1}$). (2) Threshold-based acceptable source impact levels for Class B TAPs. Threshold-based acceptable source impact levels in WAC <D<12267>> 173-460-160 </D> shall be determined as follows: (a) If a Class B TAP has an Environmental Protection Agency Inhalation Reference Concentration, the inhalation reference concentration and specified averaging time shall be used. (b) Other Class B TAP acceptable source impact levels shall be determined by dividing the TLV-TWA by three hundred to calculate a twenty-four hour TWA acceptable source impact level. (3) Special acceptable source impact levels. (a) Ecology may establish special acceptable source impact levels for TAPs for which upper bound risk factors or TLVs have not been established, or for mixtures of compounds if it determines that the above acceptable source impact level methods are not appropriate, do not adequately protect human health or are overly stringent. (b) The averaging times for special ASILs are listed in WAC <D<12266>> 173-460-150 </D>(3).
WAC173-460-120	WAC 173-460-120 Scientific review and amendment of acceptable source impact levels and lists. (1) Ongoing scientific review. (a) To use the best available scientific information, ecology shall conduct an ongoing review of information concerning whether to add or delete toxic air pollutants to WAC <D<12266>> 173-460-150 </D> or <D<12267>> 173-460-160 </D>, what acceptable source impact levels should be used to review emissions of TAPs, source applicability and exemptions. (b) A complete review shall be made at least once every three years at which time ecology shall consider scientific information developed by the E.P.A., Washington department of health, other states or other scientific organizations, scientific information provided by any person, and results of second tier analyses evaluations. (2) Criteria for listing as Class A or Class B TAP. (a) Ecology shall list a substance or group of substances as Class A or Class B TAPs if the department has reason to believe that the compound or group of compounds are likely to be emitted to the air from an air pollution source and the air emission of such compound or compounds could impact public health. The compounds shall be removed from the list if ecology determines that these conditions no longer exist. (b) Ecology may list mixtures of compounds as Class A and/or Class B TAPs if ecology determines that the health impact of the emission mixture is likely to be different from the known individual chemical impacts. (3) Acceptable source impact level (ASIL). Ecology may adopt an ASIL only if ecology determines that concentrations at that level will not unreasonably endanger human health.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-130	WAC 173-460-130 Fees. (1) Pursuant to RCW 70.94.152, ecology or the authority may charge a fee for the review of notices of construction. (2) The fee imposed under this section may not exceed the cost of reviewing plans, specifications, and other information and administering such notice.
WAC173-460-140	WAC 173-460-140 Remedies. Violations of this chapter are subject to the penalty provisions and/or other remedies provided in chapter 70.94 RCW.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-150-Table 1 (part 1)*	WAC 173-460-150 Class A toxic air pollutants: Known, probable and potential human carcinogens and acceptable source impact levels. (1) TABLE I CLASS A TOXIC AIR POLLUTANTS Known and Probable Carcinogens CAS # SUBSTANCE 75-07-0 Acetaldehyde 53-96-3 2-Acetylaminofluorene 79-06-1 Acrylamide 107-13-1 Acrylonitrile 309-00-2 Aldrin Aluminum smelter polyaromatic hydrocarbon emissions 117-79-3 2-Aminoanthraquinone 97-56-3 o-Aminoazotoluene 92-67-1 4-Aminobiphenyl 61-82-5 Amitrole 62-53-3 Aniline 90-04-0 o-Anisidine C7440-38-2 Arsenic and inorganic arsenic compounds 1332-21-4 Asbestos 2465-27-2 Auramine (technical grade) 71-43-2 Benzene 92-87-5 Benzidine and its salts 56-55-3 Benzo(a)anthracene 50-32-8 Benzo(a)pyrene 205-99-2 Benzo(b)fluoranthene 205-82-3 Benzo(j)fluoranthene 207-08-9 Benzo(k)fluoranthene 1694-09-3 Benzyl violet 4b 7440-41-7 Beryllium and compounds 111-44-4 Bis(2-chloroethyl)ether 117-81-7 Bis(2-ethylhexyl)phthalate (DEHP) 542-88-1 Bis(chloromethyl)ether 75-25-2 Bromoform 106-99-0 1,3-Butadiene 3068-88-0 B-Butyrolactone 7440-43-9 Cadmium and compounds

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description	
WAC173-460-150-Table 1 (part 2)*	56-23-5	Carbon tetrachloride
	57-74-9	Chlordane
	510-15-6	Chlorobenzilate 67-66-3 Chloroform
	107-30-2	Chloromethyl methyl ether (technical-grade)
	108-43-0	Chlorophenols
	126-99-8	Chloroprene
	C7440-47-3	Chromium, hexavalent metal and compounds
		Coke oven emissions
	8001-58-9	Creosote
	135-20-6	Cupferron
	94-75-7	2,4-D and esters
	3547-04-4	DDE (p,p'-Dichlorodiphenyldichloroethylene)
	50-29-3	DDT (1,1,1 Trichloro-2,2-Bis(p-chlorophenyl)-ethane)
	613-35-4	N,N-Diacetylbenzidine
	101-80-4	4,4'-Diaminodiphenyl ether
	226-36-8	Dibenz(a,h)acridine
	53-70-3	Dibenz(a,h)anthracene
	224-42-0	Dibenz(a,j)acridine
	132-64-9	Dibenzofurans
	189-64-0	Dibenzo(a,h)pyrene
	191-30-0	Dibenzo(a,l)pyrene
	189-55-9	1,2,7,8-Dibenzopyrene (dibenzo(a,i)pyrene)
	192-65-4	Dibenzo(a,e)pyrene
	764-41-0	1,4-Dichloro-2-butene
	28434-86-8	3,3'-Dichloro-4,4'-diaminodiphenyl ether
	106-46-7	1,4-Dichlorobenzene
	91-94-1	3,3'-Dichlorobenzidine
	107-06-2	1,2-Dichloroethane (ethylene chloride)
	75-09-2	Dichloromethane (methylene chloride)
	696-28-6	Dichlorophenylarsine (arsenic group)
	78-87-5	1,2-Dichloropropane
	60-57-1	Dieldrin
	1615-80-1	1,2-Diethylhydrazine
	101-90-6	Diglycidyl resorcinol ether
	119-90-4	3,3'-Dimethoxybenzidine (ortol-dianisidine)
	119-93-7	3,3-Dimethyl benzidine
	77-78-1	Dimethyl sulfate
	540-73-8	1,2-Dimethylhydrazine
	123-91-1	1,4-Dioxane
		Dioxins and furans
	122-66-7	1,2-Diphenylhydrazine
	106-89-8	Epichlorohydrin
	106-93-4	Ethylene dibromide (dibromethane)

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description	
WAC173-460-150-Table 1 (part 3)*	75-21-8	Ethylene oxide
	96-45-7	Ethylene thiourea
	50-00-0	Formaldehyde 67-45-8 Furazolidone
		Furium (nitrofuran group)
	765-34-4	Glyciadaldehyde
	76-44-8	Heptachlor
	118-74-1	Hexachlorobenzene
	319-84-6	Hexachlorocyclohexane (Lindane) Alpha BHC
	319-85-7	Hexachlorocyclohexane (Lindane) Beta BHC
	58-89-9	Hexachlorocyclohexane (Lindane) Gamma BHC
	680-31-9	Hexamethylphosphoramide
	302-01-2	Hydrazine
	193-39-5	Indeno(1,2,3-cd)pyrene
		Isopropyl oils
		Lead compounds
	301-04-2	Lead acetate
	7446-27-7	Lead phosphate
	129-15-7	2-Methyl-1-nitroanthraquinone
	592-62-1	Methyl azoxymethyl acetate
	3697-24-3	5-Methylchrysene
	101-14-4	4,4'-Methylenebis(2-chloroaniline) (MBOCA)
	838-88-0	4,4'-Methylenebis(2-methylaniline)
	101-77-9	4,4-Methylene dianiline
	13552-44-8	4,4-Methylenedianiline dihydrochloride
	64091-91-4	4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanone
	2385-85-5	Mirex
	139-91-3	5-(Morpholinomethyl)-3-amino)-2-oxazolidinone (furaltudone)
	134-32-7	1-Napthylamine
	C7440-02-0	Nickel and compounds (as nickel subsulfide or nickel refinery dust)
	531-82-8	N-(4-(5-Nitro-2-furyl)-2-thiazolyl)acetamide
	602-87-9	5-Nitroacenaphthene
	1836-75-5	Nitrofen
		Nitrofurans
	59-87-0	Nitrofurazone
	555-84-9	1-(5-Nitrofurfurylidene)amino)-2-imidazolidinone
	126-85-2	Nitrogen mustard N-oxide
	302-70-5	Nitrogen mustard N-oxide hydrochloride
	79-46-9	2-Nitropropane
	924-16-3	N-Nitrosodi-n-butylamine
	759-73-9	N-Nitroso-N-ethylurea (NEU)
	615-53-2	N-Nitroso-N-methylurethane

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description	
WAC173-460-150-Table 1 (part 4)*	621-64-1	N-Nitrosodi-n-propylamine
	10595-95-6	N-Nitrosomethylethylamine
	59-89-2	N-Nitrosomorpholine
	86-30-6	N-Nitrosodiphenylamine
	55-18-5	N-Nitrosodiethylamine (diethylnitrosoamine) (DEN)
	62-75-9	N-Nitrosodimethylamine
	2646-17-5	Oil orange SS
	794-93-4	Panfuran S (dihydroxymethylfuratrizine)
	87-86-5	Pentachlorophenol
	127-18-4	Perchloroethylene (tetrachloroethylene)
	63-92-3	Phenoxybenzamine hydrochloride
		N-Phenyl-2-napthylamine
		Polyaromatic hydrocarbons (PAH)
	1336-36-3	Polychlorinated biphenyls (PCBs)
	3761-53-3	Ponceau MX
		P(p)(alpha, alpha, alpha)-Tetra-chlorotoluene
	1120-71-4	1,3-Propane sultone
	75-56-9	Propylene oxide
	1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)
	139-65-1	4,4'-Thiodianiline
	1314-20-1	Thorium dioxide
	95-80-7	2,4-Toluene diamine
	584-84-9	2,4-Toluene diisocyanate
	95-53-4	o-Toluidine
	636-21-5	o-Toluidine hydrochloride
	8001-35-2	Toxaphene
	55738-54-0	Trans-2((Dimethylamino)methylimino)-5-(2-(5-nitro-2-furyl) vinyl-1,3,4-oxadiazole
	79-01-6	Trichloroethylene
	88-06-2	2,4,6-Trichlorophenol
	75-01-4	Vinyl chloride

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-150-Table 2 (part 1)*	WAC 173-460-150 Class A toxic air pollutants: Known, probable and potential human carcinogens and acceptable source impact levels. (2) TABLE II CLASS A TOXIC AIR POLLUTANTS WITH ESTABLISHED ACCEPTABLE SOURCE IMPACT LEVELS

10-6 RISK ASIL	MICROGRAMS/M^3	ANNUAL AVERAGE
75-07-0	Acetaldehyde	0.4500000
79-06-1	Acrylamide	0.0007700
107-13-1	Acrylonitrile	0.0150000
309-00-2	Aldrin	0.0002000
62-53-3	Aniline	6.3000000
C7440-38-2	Arsenic and inorganic arsenic compounds	0.0002300
1332-21-4	Asbestos (NOTE: fibers/ml)	0.0000044
71-43-2	Benzene	0.1200000
92-87-5	Benzidine and its salts	0.0000150
50-32-8	Benzo(a)pyrene	0.0004800
7440-41-7	Beryllium and compounds	0.0004200
111-44-4	Bis(2-chloroethyl)ether	0.0030000
117-81-7	Bis(2-ethylhexyl)phthalate (DEHP)	2.5000000
542-88-1	Bis(chloromethyl)ether	0.0000160
75-25-2	Bromoform	0.9100000
106-99-0	1,3-Butadiene	0.0036000
7440-43-9	Cadmium and compounds	0.0005600
56-23-5	Carbon tetrachloride	0.0670000
57-74-9	Chlordane	0.0027000
510-15-6	Chlorobenzilate	0.2000000
67-66-3	Chloroform	0.0430000
108-43-0	Chlorophenols	0.1800000
C7440-47-3	Chromium, hexavalent metal and compounds	0.0000830
	Coke oven emissions	0.0016000
3547-04-4	DDE (p,p'-dichlorodiphenyl-dichloroethylene)	0.1000000

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-150-Table 2 (part 2)*	50-29-3	DDT (1,1,1 Trichloro-2,2-Bis-(p-chlorophenyl)-ethane)	0.0100000
	764-41-0	1,4-Dichloro-2-butene	0.0003800
	106-46-7	1,4-Dichlorobenzene	1.5000000
	91-94-1	3,3'-Dichlorobenzidine	0.0770000
	107-06-2	1,2-Dichloroethane (ethylene chloride)	0.0380000
	75-09-2	Dichloromethane (methylene chloride)	0.5600000
	60-57-1	Dieldrin	0.0002200
	119-93-7	3,3-Dimethyl benzidine	0.0038000
	123-91-1	1,4-Dioxane	0.0320000
	122-66-7	1,2-Diphenylhydrazine	0.0045000
	106-89-8	Epichlorohydrin	0.8300000
	106-93-4	Ethylene dibromide (dibromethane)	0.0045000
	75-21-8	Ethylene oxide	0.0100000
	96-45-7	Ethylene thiourea	1.0000000
	50-00-0	Formaldehyde	0.0770000
	76-44-8	Heptachlor	0.0007700
	118-74-1	Hexachlorobenzene	0.0022000
	58-89-9	Hexachlorocyclohexane (Lindane) gamma BHC	0.0026000
	302-01-2	Hydrazine	0.0002000
	C7440-02-0	Nickel and compounds (as nickel subsulfide or nickel refinery dust)	0.0021000
	924-16-3	N-Nitrosodi-n-butylamine	0.0006300
	55-18-5	N-Nitrosodiethylamine (diethylnitrosoamine) (DEN)	0.0000230
	62-75-9	N-Nitrosodimethylamine	0.0000710
	79-46-9	2-Nitropropane	0.0003700
	87-86-5	Pentachlorophenol	0.3300000
	127-18-4	Perchloroethylene (tetrachloroethylene)	1.1000000
	1336-36-3	Polychlorinated biphenyls (PCB)	0.0045000
	75-56-9	Propylene oxide	0.2700000
	1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	0.00000003
	95-80-7	2,4-Toluene diamine	0.0110000
	95-53-4	o-Toluidine	0.1400000
WAC173-460-150-Table 2 (part 3)*	636-21-5	o-Toluidine hydrochloride	0.1400000
	8001-35-2	Toxaphene	0.0031000
	79-01-6	Trichloroethylene	0.5900000
	88-06-2	2,4,6-Trichlorophenol	0.3200000
	75-01-4	Vinyl chloride	0.0120000

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-150-Table 3	WAC 173-460-150 Class A toxic air pollutants: Known, probable and potential human carcinogens and acceptable source impact levels. (3) TABLE III CLASS A TOXIC AIR POLLUTANTS WITH SPECIAL ACCEPTABLE SOURCE IMPACT LEVELS

ASIL CAS #	SUBSTANCE	MICRO-GRAMS/M^3	AVERAGING TIME
	Primary aluminum smelter uncontrolled roof vent polyaromatic hydrocarbon (PAH) emissions (NOTE: Quantify according to WAC <D<12256>> 173-460-050 </D> (4)(d))	0.0013	Annual
61-82-5	Amitrole	0.06	24 hour
90-04-0	o-Anisidine	1.7	24 hour
126-99-8	-Chloroprene	120	24 hour
94-75-7	2,4-D and esters	33	24 hour
78-87-5	1,2-Dichloropropane	4.0	24 hour
77-78-1	Dimethyl sulfate	1.7	24 hour
540-73-8	1,2-Dimethylhydrazine	4.0	24 hour
319-84-6	Hexachlorocyclohexane (Lindane) alpha BHC	1.7	24 hour
319-85-7	Hexachlorocyclohexane (Lindane) beta BHC	1.7	24 hour
	Lead compounds	0.5	24 hour
101-14-4	4,4'-Methylenebis (2-Chloroaniline) (MBOCA)	0.7	24 hour
101-77-9	4,4-Methylene dianiline	2.7	24 hour
	Polyaromatic hydrocarbon (PAH) emissions (NOTE: Quantify according to WAC <D<12256>> 173-460-050 </D> (4)(d))	0.00048	Annual
584-84-9	2,4-Toluene diisocyanate	0.12	24 hour

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-460-160 (01)*	WAC 173-460-160 Class B toxic air pollutants and acceptable source impact levels.

The following table lists Class B toxic air pollutants and acceptable source impact levels:

CLASS B TOXIC AIR POLLUTANTS AND ACCEPTABLE SOURCE IMPACT LEVELS

ASIL CAS#	SUBSTANCE	MICROGRAMS/M^3 TWENTY-FOUR-HOUR AVERAGE
86-88-4	ANTU	1.0
60-35-5	Acetamide	
64-19-7	Acetic acid	83
108-24-7	Acetic anhydride	67
67-64-1	Acetone	5900
75-05-8	Acetonitrile	220
98-86-2	Acetophenone	
79-27-6	Acetylene tetrabromide	47
107-02-8	Acrolein	0.02
79-10-7	Acrylic acid	0.30
107-18-6	Allyl alcohol	17
107-05-1	Allyl chloride	1.0
106-92-3	Allyl glycidyl ether (AGE)	77
2179-59-1	Allyl propyl disulfide	40.0
C7429-90-5	Aluminum, Al alkyls	6.7
7429-90-5	Aluminum, as AL metal dust	33
C7429-90-5	Aluminum, as AL pyro powders	17
C7429-90-5	Aluminum, as Al soluble salts	6.7
C7429-90-5	Aluminum, as Al welding fumes	17
504-29-0	2-Aminopyridine	6.3
7664-41-7	Ammonia	100
12125-02-9	Ammonium chloride fume	33
3825-26-1	Ammonium perfluorooctanoate	0.33
7773-06-0	Ammonium sulfamate	33
628-63-7	n-Amyl acetate	1800
626-38-0	sec-Amyl acetate	2200
62-53-3	Aniline & homologues	1.0
29191-52-4	Anisidine (o-,p- isomers)	1.7
C7440-36-0	Antimony & compounds as Sb	1.7
1309-64-4	Antimony trioxide, as Sb	1.7

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (02)*	7784-42-1	Arsine	0.53
	8052-42-4	Asphalt (petroleum) fumes	17
	1912-24-9	Atrazine	17
	86-50-0	Azinphos-methyl	0.67
	C7440-39-3	Barium, soluble compounds Ba	1.7
	17804-35-2	Benomyl	33
	98-07-7	Benzotrichloride	
	94-36-0	Benzoyl Peroxide	17
	100-44-7	Benzyl chloride	17
	92-52-4	Biphenyl	4.3
	1304-82-1	Bismuth telluride	33
	1304-82-1	Bismuth telluride Se doped	17
	C1303-96-4	Borates, anhydrous	3.3
	C1303-96-4	Borates, decahydrate	17
	C1303-96-4	Borates, pentahydrate	3.3
	1303-86-2	Boron oxide	33
	10294-33-4	Boron tribromide	33
	76737-07-2	Boron trifluoride	9.3
	314-40-9	Bromacil	33
	7726-95-6	Bromine	2.2
	7789-30-2	Bromine pentafluoride	2.4
	106-97-8	Butane	6300.0
	111-76-2	2-Butoxyethanol	400
	123-86-4	n-Butyl acetate	2400
	105-46-4	sec-Butyl acetate	3200
	540-88-5	tert-Butyl acetate	3200
	141-32-2	Butyl acrylate	170
	71-36-3	n-Butyl alcohol	500
	78-92-2	sec-Butyl alcohol	1000
	75-65-0	tert-Butyl alcohol	1000
	1189-85-1	tert-Butyl chromate, as CrO3	0.33
	2426-08-6	n-Butyl glycidyl ether (BGE)	440
	138-22-7	n-Butyl lactate	83
	109-79-5	n-Butyl mercaptan	6.0
	109-73-9	n-Butylamine	50.0
	89-72-5	o-sec-Butylphenol	100
	98-51-1	p-tert-Butyltoluene	200
	156-62-7	Calcium cyanamide	1.7
	1305-62-0	Calcium hydroxide	17
	1305-78-8	Calcium oxide	6.7
	76-22-2	Camphor, synthetic	40
	105-60-2	Caprolactam, dust	3.3
	105-60-2	Caprolactam, vapor	67

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (03)*	2425-06-1	Captafol	0.33
	133-06-2	Captan	17
	63-25-2	Carbaryl	17
	1563-66-2	Carbofuran	0.33
	1333-86-4	Carbon black	12
	75-15-0	Carbon disulfide	100
	558-13-4	Carbon tetrabromide	4.7
	353-50-4	Carbonyl fluoride	18
	463-58-1	Carbonyl sulfide	
	120-80-9	Catechol	77
	21351-79-1	Cesium hydroxide	6.7
	133-90-4	Chloramben	
	55720-99-5	Chlorinated diphenyl oxide (hexachlorophenyl ether)	1.7
	7782-50-5	Chlorine	5.0
	10049-04-4	Chlorine dioxide	0.2
	7790-91-2	Chlorine trifluoride	1.3
	600-25-9	1-Chloro-1-nitropropane	33
	107-20-0	Chloroacetaldehyde	11
	79-11-8	Chloroacetic acid	
	532-27-4	a-Chloroacetophenone	1.1
	79-04-9	Chloroacetyl chloride	0.67
	2698-41-1	o-Chlorobenylidene malonitrile	1.3
	108-90-7	Chlorobenzene	150
	74-97-5	Chlorobromomethane	3500
	75-45-6	Chlorodifluoromethane	12000
	76-15-3	Chloropentafluoroethane	21000
	76-06-2	Chloropicrin	2.2
	2039-87-4	o-Chlorostyrene	940
	95-49-8	o-Chlorotoluene	860
	2921-88-2	Chlorpyrifos	0.67
	C7440-47-3	Chromium (II) compounds, as Cr	1.7
	C7440-47-3	Chromium (III) compounds, Cr	1.7
	7440-47-3	Chromium (metal)	1.7
	14977-61-8	Chromyl chloride	0.53
	2971-90-6	Clopidol	33
	7440-48-4	Cobalt as Co metal Dust and fume	0.17
	10210-68-1	Cobalt carbonyl as Co	0.33
	16842-03-8	Cobalt hydrocarbonyl	0.33
	C7440-50-8	Copper, Dusts and mists, as Cu	3.3
	7440-50-8	Copper, Fume	0.67
		Cotton dust, raw	0.67
	1319-77-3	Cresol, all isomers	73

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (04)*	4170-30-3	Crotonaldehyde	20
	299-86-5	Crufomate	17
	98-82-2	Cumene	820
	420-04-2	Cyanamide	6.7
	51-12-5	Cyanides, as CN	17
	460-19-5	Cyanogen	67
	506-77-4	Cyanogen chloride	2.5
	110-82-7	Cyclohexane	3400
	108-93-0	Cyclohexanol	690
	108-94-1	Cyclohexanone	330
	110-83-8	Cyclohexene	3400
	108-91-8	Cyclohexylamine	140
	121-82-4	Cyclonite	5.0
	542-92-7	Cyclopentadiene	680
	287-92-3	Cyclopentane	5700
	13121-70-5	Cyhexatin	17
	17702-41-9	Decaborane	0.83
	8065-48-3	Demeton	0.37
	123-42-2	Diacetone alcohol	790
	333-41-5	Diazinon	0.33
	334-88-3	Diazomethane	1.1
	19287-45-7	Diborane	0.37
	96-12-8	1,2-Dibromo-3-chloropropane	0.20
	107-66-4	Dibutyl phosphate	29
	84-74-2	Dibutyl phthalate	17
	102-81-8	2-N-Dibutylaminoethanol	47
	594-72-9	1,1-Dichloro-1-nitroethane	40
	118-52-5	1,3-Dichloro-5,5-Dimethyl hydantoin	0.67
	7572-29-4	Dichloroacetylene	1.3
	95-50-1	o-Dichlorobenzene(1,2-Dichlorobenzene)	1000
	75-71-8	Dichlorodifluoromethane	16000
	75-34-3	1,1-Dichloroethane	2700
	540-59-0	1,2-Dichloroethylene	2600
	75-43-4	Dichlorofluoromethane	130
	542-75-6	Dichloropropene	20
	75-99-0	2,2-Dichloropropionic acid	19
	76-14-2	Dichlorotetrafluoroethane	23000
	62-73-7	Dichlorvas	3.3
	141-66-2	Dicrotophos	0.83
	77-73-6	Dicyclopentadiene	100
	102-54-5	Dicyclopentadienyl iron	33

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (05)*	111-42-2	Diethanolamine	43
	96-22-0	Diethyl ketone	2300
	84-66-2	Diethyl phthalate	17
	64-67-5	Diethyl sulfate	
	109-89-7	Diethylamine	100
	100-37-8	Diethylaminoethanol	170
	111-40-0	Diethylene triamine	14
	75-61-6	Difluorodibromomethane	2900
	2238-07-5	Diglycidyl ether	1.7
	108-83-8	Diisobutyl ketone	480
	108-18-9	Diisopropylamine	67
	127-19-5	Dimethyl acetamide	120
	60-11-7	Dimethyl aminoazobenzene	
	79-44-7	Dimethyl carbamoyl chloride	
	124-40-3	Dimethylamine	60
	121-69-7	Dimethylaniline	83
	68-12-2	Dimethylformamide	30
	57-14-7	1,1-Dimethylhydrazine	4.0
	131-11-3	Dimethylphthalate	17
	148-01-6	Dinitolmide	17
	534-52-1	Dinitro-o-cresol	0.67
	528-29-0	Dinitrobenzene, all isomers	3.3
	51-28-5	2,4-Dinitrophenol	
	121-14-2	2,4-Dinitrotoluene	5.0
	78-34-2	Dioxathion	0.67
	122-39-4	Diphenylamine	33
	123-19-3	Dipropyl ketone	780
	34590-94-8	Dipropylene glycol methyl ether	2000
	85-00-7	Diquat	1.7
	97-77-8	Disulfiram	6.7
	298-04-4	Disulfuton	0.33
	128-37-0	2,6-Ditert. butyl-p-cresol	33
	330-54-1	Diuron	33
	1321-74-0	Divinyl benzene	180
	2104-64-5	EPN	1.7
	115-29-7	Endosulfan	0.33
	72-20-8	Endrin	0.33
	13838-16-9	Enflurane	1900
	106-88-7	1,2-Epoxybutane	20
	141-43-5	Ethanolamine	25
	563-12-2	Ethion	1.3
	110-80-5	2-Ethoxyethanol	200

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (06)*	111-15-9	2-Ethoxyethyl acetate	90
	141-78-6	Ethyl acetate	4800
	140-88-5	Ethyl acrylate	66
	64-17-5	Ethyl alcohol	6300
	541-85-5	Ethyl amyl ketone	440
	100-41-4	Ethyl benzene	1000
	74-96-4	Ethyl bromide	3000
	106-35-4	Ethyl butyl ketone	780
	51-79-5	Ethyl carbamate	
	75-00-3	Ethyl chloride	10000
	60-29-7	Ethyl ether	4000
	109-94-4	Ethyl formate	1000
	75-08-1	Ethyl mercaptan	4.3
	78-10-4	Ethyl silicate	280
	75-04-7	Ethylamine	60
	107-07-3	Ethylene chlorohydrin	11
	107-15-3	Ethylene diamine	83
	107-21-1	Ethylene glycol	420
	628-96-6	Ethylene glycol dinitrate	1.0
	151-56-4	Ethylenimine	2.9
	16219-75-3	Ethylidene norbornene	83
	100-74-3	N-Ethylmorpholine	77
	22224-92-6	Fenamiphos	0.33
	115-90-2	Fensulfothion	0.33
	55-38-9	Fenthion	0.67
	14484-64-1	Ferbam	33
	12604-58-9	Ferrovanadium dust	3.3
		Fibrous glass dust	33
		Fine mineral fibers	33
	16984-48-8	Fluorides, as F	8.3
	7782-41-4	Fluorine	5.3
	944-22-9	Fonofos	0.33
	75-12-7	Formamide	60
	64-18-6	Formic acid	31
	98-01-1	Furfural	26
	98-00-1	Furfuryl alcohol	130
	7782-65-2	Germanium tetrahydride	2.1
	111-30-8	Glutaraldehyde	2.5
	556-52-5	Glycidol	250
		Glycol ethers	
	7440-58-6	Hafnium	1.7
	151-67-7	Halothane	1300
	142-82-5	Heptane (n-Heptane)	5500

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (07)*	87-68-3	Hexachlorobutadiene	0.70
	77-47-4	Hexachlorocyclopentadiene	0.33
	67-72-1	Hexachloroethane	32
	1335-87-1	Hexachloronaphthalene	0.67
	684-16-2	Hexafluoroacetone	2.3
	822-06-0	Hexamethylene diisocyanate	0.11
	100-54-3	Hexane (n-Hexane)	200
		Hexane, other isomers	5900
	591-78-6	2-Hexanone (MBK)	67
	108-84-9	sec-Hexyl acetate	980
	107-41-5	Hexylene glycol	400
	10035-10-6	Hydrogen bromide	33
	7647-01-0	Hydrogen chloride	7.0
	74-90-8	Hydrogen cyanide	37
	7664-39-3	Hydrogen fluoride, as F	8.7
	7722-84-1	Hydrogen peroxide	4.7
	7783-07-5	Hydrogen selenide, as Se	0.53
	7783-06-4	Hydrogen sulfide	0.9
	123-31-9	Hydroquinone	6.7
	999-61-1	2-Hydroxypropyl acrylate	9.3
	95-13-6	Indene	160
	C7440-74-6	Indium, & compounds as In	0.33
	7553-56-2	Iodine	3.3
	75-47-8	Iodoform	33
	1309-37-1	Iron oxide fume, Fe203 as Fe	17
	13463-40-6	Iron pentacarbonyl, as Fe	0.83
		Iron salts, soluble as Fe	3.3
	123-92-2	Isoamyl acetate	1700
	123-51-3	Isoamyl alcohol	1200
	110-19-0	Isobutyl acetate	2400
	78-83-1	Isobutyl alcohol	510
	26952-21-6	Isocyl alcohol	890
	78-59-1	Isophorone	93
	4098-71-9	Isophorone diisocyanate	0.15
	109-59-1	Isopropoxyethanol	350
	108-21-4	Isopropyl acetate	3500
	67-63-0	Isopropyl alcohol	3300
	108-20-3	Isopropyl ether	3500
	4016-14-2	Isopropyl glycidyl ether (IGE)	790
	75-31-0	Isopropylamine	40
	768-52-5	N-Isopropylaniline	37
	463-51-4	Ketene	2.9
	3687-31-8	Lead arsenate, as Pb3 (A204)2	0.50

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (08)*	7758-97-6	Lead chromate, as Cr	0.040
	68476-85-7	Liquified petroleum gas	6000
	7580-67-8	Lithium hydride	0.080
	1309-48-4	Magnesium oxide fume	33
	121-75-5	Malathion	33
	108-31-6	Maleic anhydride	3.3
	C7439-96-5	Manganese dust & compounds	0.40
	C7439-96-5	Manganese fume	3.3
	12079-65-1	Manganese cyclopentadienyl tricarbonyl	0.33
	C7439-97-6	Mercury, Aryl & inorganic cmpd	0.33
	C7439-97-6	Mercury, as Hg Alkyl compounds	0.33
	C7439-97-6	Mercury, vapors except alkyl	0.17
	141-79-7	Mesityl oxide	200
	79-41-4	Methacrylic acid	230
	16752-77-5	Methomyl	8.3
	72-43-5	Methoxychlor	33
	109-86-4	2-Methoxyethanol	20
	110-49-6	2-Methoxyethyl acetate	80
	150-76-5	4-Methoxyphenol	17
	137-05-3	Methyl 2-cyanoacrylate	30
	79-20-9	Methyl acetate	2000
	74-99-7	Methyl acetylene	5500
	59355-75-8	Methyl acetylene-propadiene mixture (MAPP)	5500
	96-33-3	Methyl acrylate	120
	67-56-1	Methyl alcohol	870
	100-61-8	N-Methyl aniline	7.3
	74-83-9	Methyl bromide	5.0
	74-87-3	Methyl chloride	340
	71-55-6	Methyl chloroform (1,1,1-Trichloroethane)	6400
	8022-00-2	Methyl demeton	1.7
	78-93-3	Methyl ethyl ketone (MEK)	1000
	1338-23-4	Methyl ethyl ketone peroxide	5.0
	107-31-3	Methyl formate	820
	60-34-4	Methyl hydrazine	1.2
	74-88-4	Methyl iodide	40
	110-12-3	Methyl isoamyl ketone	780
	108-11-2	Methyl isobutyl carbinol	350
	108-10-1	Methyl isobutyl ketone (MIBK)	680
	624-83-9	Methyl isocyanate	0.16
	563-80-4	Methyl isopropyl ketone	2300

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (09)*	74-93-1	Methyl mercaptan	3.3
	80-62-6	Methyl methacrylate	1400
	110-43-0	Methyl n-amyl ketone	780
	591-78-6	Methyl n-butyl ketone	67
	298-00-0	Methyl parathion	0.67
	107-87-9	Methyl propyl ketone	2300
	681-84-5	Methyl silicate	20
	1634-04-4	Methyl tert-butyl ether	500
	98-83-9	a-Methyl styrene	810
	126-98-7	Methylacrylonitrile	9.0
	109-87-5	Methylal	10000
	74-89-5	Methylamine	43
	108-87-2	Methylcyclohexane	5400
	25639-42-3	Methylcyclohexanol	780
	583-60-8	o-Methylcyclohexanone	760
	12108-13-3	Methylcyclopentadienyl manganese tricarbonyl	0.67
	5124-30-1	Methylene bis (4-cyclo-hexylisocyanate)	0.18
	101-68-8	Methylene bis(phenyl isocyanate)	0.2
	21087-64-9	Metribuzin	17
	7786-34-7	Mevinphos	0.33
	C7439-98-7	Molybdenum, as Mo soluble cpds	17
	C7439-98-7	Molybdenum, insoluble cpds	33
	6923-22-4	Monocrotophos	0.83
	110-91-8	Morpholine	240
	300-76-5	Naled	10
	91-20-3	Napthalene	170
	54-11-5	Nicotine	1.7
	1929-82-4	Nitrapyrin	33
	7697-37-2	Nitric acid	17
	10102-43-9	Nitric oxide	100
	100-01-6	p-Nitroaniline	10
	98-95-3	Nitrobenzene	1.7
	100-00-5	p-Nitrochlorobenzene	2.0
	79-24-3	Nitroethane	1000
	7783-54-2	Nitrogen trifluoride	97
	92-93-3	4-Nitrobiphenyl	
	55-63-0	Nitroglycerin	1.5
	75-52-5	Nitromethane	830
	100-02-7	4-Nitrophenol	
	108-03-2	1-Nitropropane	20
	684-93-5	N-Nitroso-N-methylurea	

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (10)*	88-72-2	Nitrotoluene	37
	111-84-2	Nonane	3500
	2234-13-1	Octachloronaphthalene	0.33
	111-65-9	Octane	4700
	8012-95-1	Oil mist, mineral	17
	20816-12-0	Osmium tetroxide, as Os	0.0053
	144-62-7	Oxalic acid	3.3
	7783-41-7	Oxygen difluoride	0.37
	8002-74-2	Parafin wax fume	6.7
	4685-14-7	Paraquat	4.5
	56-38-2	Parathion	0.33
	19624-22-7	Pentaborane	0.043
	1321-64-8	Pentachloronaphthalene	1.7
	82-68-8	Pentachloronitrobenzene (quintobenzene)	1.7
	109-66-0	Pentane	6000
	594-42-3	Perchloromethyl mercaptan	2.5
	7616-94-6	Perchloryl fluoride	43
	108-95-2	Phenol	63
	92-84-2	Phenothiazine	1.7
	101-84-8	Phenyl ether	23
	122-60-1	Phenyl glycidyl ether	2000
	108-98-5	Phenyl mercaptan	7.7
	106-50-3	p-Phenylenediamine	0.33
	100-63-0	Phenylhydrazine	1.5
	638-21-1	Phenylphosphine	0.77
	298-02-2	Phorate	0.17
	75-44-5	Phosgene	1.3
	7803-51-2	Phosphine	1.3
	7664-38-2	Phosphoric acid	3.3
	7723-14-0	Phosphorus	0.33
	10025-87-3	Phosphorus oxychloride	2.1
	10026-13-8	Phosphorus pentachloride	2.8
	1314-80-3	Phosphorus pentasulfide	3.3
	7719-12-2	Phosphorus trichloride	3.7
	85-44-9	Phthalic anhydride	20
	626-17-5	m-Phthalodinitrile	17
	1918-02-1	Picloram	33
	88-89-1	Picric acid	0.33
	83-26-1	Pindone	0.033
	142-64-3	Piperazine dihydrochloride	17
	7440-06-4	Platinum, Metal	3.3
	C7440-06-4	Platinum, Soluble salts as Pt	0.0067

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (11)*	1310-58-3	Potassium hydroxide	6.7
	107-19-7	Propargyl alcohol	7.7
	57-57-8	B-Propiolactone	5.0
	123-38-6	Propionaldehyde	
	114-26-1	Propoxur	1.7
	79-09-4	Propionic acid	100
	109-60-4	n-Propyl acetate	2800
	71-23-8	n-Propyl alcohol	1600
	627-13-4	n-Propyl nitrate	360
	6423-43-4	Propylene glycol dinitrate	1.1
	107-98-2	Propylene glycol monomethyl ether	2000
	75-55-8	Propylene imine	16
	8003-34-7	Pyrethrum	1.7
	110-86-1	Pyridine	53
	91-22-5	Quinoline	
	106-51-4	Quinone	1.5
	108-46-3	Resorcinol	150
	7440-16-6	Rhodium Metal	3.3
	C7440-16-6	Rhodium, Insoluble compounds	3.3
	C7440-16-6	Rhodium, Soluble compounds	0.033
	299-84-3	Ronnel	33
	83-79-4	Rotenone	17
		Rubber solvent (Naphtha)	5300
	C7782-49-2	Selenium compounds, as Se	0.67
	7783-79-1	Selenium hexafluoride, as Se	0.53
	136-78-7	Sesone	33
	7803-62-5	Silicon tetrahydride	22
	7440-22-4	Silver, Metal	0.33
	C7440-22-4	Silver, soluble compounds as Ag	0.033
	26628-22-8	Sodium azide	1.0
	7631-90-5	Sodium bisulfite	17
	62-74-8	Sodium fluoroacetate	0.17
	1310-73-2	Sodium hydroxide	6.7
	7681-57-4	Sodium metabisulfite	17
	7803-52-3	Stibine	1.7
	57-24-9	Strychnine	0.5
	100-42-5	Styrene	1000
	96-9-3	Styrene oxide	
	1395-21-7	Subtilisins	0.0002
	3689-24-5	Sulfotep	0.67
	2551-62-4	Sulfur hexafluoride	20000
	10025-67-9	Sulfur monochloride	18
	5714-22-7	Sulfur pentafluoride	0.33

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (12)*	7783-60-0	Sulfur tetrafluoride	1.5
	7664-93-9	Sulfuric acid	3.3
	2699-79-8	Sulfuryl fluoride	67
	35400-43-2	Sulprofos	3.3
	93-76-5	2,4,5-T	33
	107-49-3	TEPP	0.16
	C7440-25-7	Tantalum, metal & oxide dusts	17
	C13494-80-9	Tellurium & compounds as Te	0.33
	7783-80-4	Tellurium hexafluoride, as Te	0.33
	3383-96-8	Temephos	33
	26140-60-3	Terphenyls	16
	76-12-0	1,1,2,2-Tetrachloro-1,2-difluoroethane	14000
	76-11-9	1,1,1,2-Tetrachloro-2,2-difluoroethane	14000
	79-34-5	1,1,2,2-Tetrachloroethane	23
	1335-88-2	Tetrachloronaphthalene	6.7
	78-00-2	Tetraethyl lead, as Pb	0.33
	109-99-9	Tetrahydrofuran	2000
	75-74-1	Tetramethyl lead, as Pb	0.5
	3333-52-6	Tetramethyl succinonitrile	9.3
	509-14-8	Tetranitromethane	27
	7722-88-5	Tetrasodium pyrophosphate	17
	479-45-8	Tetryl	5.0
	C7440-28-0	Thallium, soluble compounds, Tl	0.33
	96-69-5	4,4-Thiobis(6-tert, butyl-m-cresol)	33
	68-11-1	Thioglycolic acid	13
	7719-09-7	Thionyl chloride	16
	137-26-8	Thiram	3.3
	7440-31-5	Tin, Metal	6.7
	C7440-31-5	Tin, Organic compounds, as Sn	0.33
	7440-31-5	Tin, oxide & inorganic except SnH4	6.7
	7550-45-0	Titanium tetrachloride	
	108-88-3	Toluene	400
	108-44-1	m-Toluidine	29
	106-49-0	p-Toluidine	29
	126-73-8	Tributyl phosphate	7.3
	76-13-1	1,1,2-Trichloro-1,2,2-trifluorethane	27000
	76-03-9	Trichloroacetic acid	22
	120-82-1	1,2,4-Trichlorobenzene	120

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description		
WAC173-460-160 (13)*	79-00-5	1,1,2-Trichloroethane	180
	75-69-4	Trichlorofluoromethane	19000
	1321-65-9	Trichloronaphthalene	17
	95-95-4	2,4,5-Trichlorophenol	
	96-18-4	1,2,3-Trichloropropane	200
	121-44-8	Triethylamine	7.0
	75-63-8	Trifluorobromomethane	20000
	1582-09-8	Trifluralin	
	552-30-7	Trimellitic anhydride	0.13
	2551-13-7	Trimethyl benzene	420
	540-84-1	2,2,4-Trimethylpentane	
	121-45-9	Trimethyl phosphite	33
	75-50-3	Trimethylamine	80
	118-96-7	2,4,6-Trinitrotoluene	1.7
	78-30-8	Triorthocresyl phosphate	0.33
	603-34-9	Triphenyl amine	17
	115-86-6	Triphenyl phosphate	10
	C7440-33-7	Tungsten, Insoluble compounds	17
	C7440-33-7	Tungsten, Soluble compounds	3.3
	8006-64-2	Turpentine	1900
	C7440-61-1	Uranium, insoluble & soluble	0.67
	8032-32-4	VM & P Naphtha	4600
	110-62-3	n-Valeraldehyde	590
	1314-62-1	Vanadium, as V205	0.17
	108-05-4	Vinyl acetate	200
	593-60-2	Vinyl bromide	73
	106-87-6	Vinyl cyclohexene dioxide	200
	75-35-4	Vinylidene chloride	67
	25013-15-4	Vinyl toluene	800
	81-81-2	Warfarin	0.33
		Welding fumes	17
	1477-55-0	m-Xylene a,a'-diamine	0.33
	1330-20-7	Xylenes (m-,o-,p-isomers)	1500
	1300-73-8	Xylidine	8.3
	C7440-65-5	Yttrium, metal and cpds as Y	3.3
	7646-85-7	Zinc chloride fume	3.3
	13530-65-9	Zinc chromates	0.033
	1314-13-2	Zinc oxide, fume	17
	C7440-67-7	Zirconium compounds, as Zr	17

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC173-480-060	Emission standards for new and modified emission units. (1) Whenever the construction, installation or establishment of a new emission unit subject to this chapter is contemplated, the project shall utilize best available radionuclide control technology (BARCT). (2) Addition to, enlargement, modification, replacement, alteration of any process or emission unit or replacement of air pollution control equipment which will significantly change potential radionuclide emissions or significantly change the dose equivalent will require the proposed project to utilize best available radionuclide control technology (BARCT) for emission control. [Statutory Authority: RCW 70.94.331. 86-10-053 (Order 86-04), 173-480-060, filed 5/7/86.]
WAC173-480-070	Emission monitoring and compliance procedures. (1) The procedures specified in chapter 402-80 WAC shall be used to determine compliance with the standard. Radionuclide emissions shall be determined and dose equivalents to members of the public shall be calculated using department of social and health services approved sampling procedures, department of social and health services approved models, or other procedures, including those based on environmental measurements that department of social and health services has determined to be suitable. (2) Compliance with this standard shall be determined by calculating, the dose to members of the public at the point of maximum annual air concentration in an unrestricted area where any member of the public may be. [Statutory Authority: RCW 70.94.331. 86-10-053 (Order 86-04), 173-480-070, filed 5/7/86.]
WAC246-220-007	Statement of philosophy. In accordance with the recommendations of the Environmental Protection Agency, formerly the Federal Radiation Council, approved by the president of the United States of America, persons engaged in activities under licenses issued by the Washington state department of health pursuant to the Atomic Energy Act of 1954, as amended, shall, in addition to complying with the requirements set forth in chapter 246-221 WAC, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. Such persons should make particular efforts to keep the radiation exposure of an embryo or fetus as low as is reasonably achievable during the entire gestation period as recommended by the National Council on Radiation Protection and Measurements. The term "as low as is reasonably achievable" means making every reasonable effort to maintain exposures to radiation as far below the dose limits in these regulations as is practical, consistent with the purpose for which the licensed or registered activity is undertaken, taking, into account the state of technology, the economics of improvements in relation to the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other socioeconomic considerations, and in relation to the utilization of nuclear energy, ionization radiation, and radioactive materials in the public interest. [Statutory Authority: RCW 70.98.050. 94-01-073, 246-220-007, filed 12/9/93, effective 1/9/94. Statutory Authority: RCW 70.98.050 and 70.98.080. 91-15-112 91-15-112 (Order 184), 246-220-007, filed 7/24/91, effective 8/24/91. Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as 246-220-007, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.050. 81-01-011 (order 1570), 402-10-010, filed 12/8/80; Order 1095, 402-10-010, filed 2/6/76.]

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-001	WAC 246-247-001 Purpose. The purpose of this chapter is to establish application requirements and procedures for the issuance of a radioactive air emissions license and for the regulation of those emissions by the department of health (hereinafter referred to as "the department") to ensure compliance with the standards for radioactive air emissions set by the department of ecology pursuant to RCW 70.94.331, promulgated in chapter <D<12290>> 173-480 </D> WAC, and with the rules and regulations of this chapter.
WAC246-247-002	WAC 246-247-002 Authority. (1) Rules and regulations set forth herein are adopted and enforced by the department pursuant to the provisions of chapter 70.98 RCW which: (a) Designate the department as the state's radiation control agency having sole responsibility for the administration of the regulatory, licensing, and radiation control provisions of chapter 70.98 RCW; (b) Vest in the department the authority to formulate, adopt, promulgate, and repeal codes, rules, and regulations related to the control of sources of ionizing radiation; (c) Authorize the department to implement an independent state-wide program to monitor radioactive air emissions from sources within the state; (d) Authorize the department to conduct inspections of facilities, both private and public, to determine whether or not there is compliance with or violation of the provisions of chapter 70.98 RCW and rules and regulations issued thereunder; and (e) Authorize the department to require registration of sources of ionizing radiation. (2) In addition, RCW 70.94.422 (Washington Clean Air Act) grants to the department the enforcement powers contained in that chapter.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-010	WAC 246-247-010 Applicability. (1) The standards and requirements of this chapter apply state-wide at the following types of facilities that emit radionuclides to the air: (a) Facilities licensed by the department or by the United States Nuclear Regulatory Commission (NRC); (b) United States Department of Energy (DOE) facilities; (c) Non-DOE federal facilities; (d) Uranium fuel cycle facilities; (e) Uranium mills that are processing material; and (f) Any other facility that the department determines emits or has the potential to emit radionuclides to the ambient air. (2) The standards and requirements of this chapter apply to point sources, nonpoint sources, and fugitive emissions. (3) The standards and requirements of this chapter apply to stationary and mobile emission units, whether temporary or permanent. (4) The control technology standards and requirements of this chapter apply to the abatement technology and indication devices of facilities and emission units subject to this chapter. Control technology requirements apply from entry of radionuclides into the ventilated vapor space to the point of release to the environment. (5) In accordance with RCW 70.94.161(10), air operating permits issued under chapter <D<12020>> 173-401 </D> WAC shall incorporate all applicable requirements of this chapter. Therefore, all facilities listed in Subsection (1) of this section that are also subject to the operating permit regulations in chapter <D<12020>> 173-401 </D> WAC shall be considered in compliance with the requirements of this chapter if they comply with all the applicable requirements of the air operating permit issued under chapter <D<12020>> 173-401 </D> WAC. These applicable requirements shall be contained in the radioactive air emissions license which shall be incorporated as part of the air operating permit. In accordance with RCW 70.94.422(1), the department shall enforce all the requirements contained in the radioactive air emissions license. (6) Should any of the federal regulations that have been adopted by reference in this chapter be rescinded, the affected facilities shall nonetheless comply with all other applicable requirements of this chapter. (7) An applicant may obtain a copy of any document referenced in this chapter by contacting the department's division of radiation protection, air emissions and defense wastes section at (206) 586-5504. Mail reports, applications, and other written correspondence to the Air Emissions and Defense Wastes Section at Airdustrial Park, Building 5, P.O. Box 47827, Olympia, Washington, 98504-7827.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-020	WAC 246-247-020 Exemptions. (1) The following types of facilities or sources of radiation are exempt from the requirements of this chapter because they release no airborne radioactivity, or they prima facie comply with the standards in WAC <D<17754>> 246-247-040 </D>, or they are already adequately regulated under other requirements: (a) Users of only sealed sources; (b) Sealed sources; (c) Accelerators less than 200 MeV; (d) Nuclear-powered vessels underway or moored dockside unless under a maintenance condition with a potential-to-emit; (e) Uranium mill tailings piles disposed of under 40 CFR Part 192. (2) Exemption determinations. (a) Any exemptions shall be consistent with 40 CFR 61. No exemptions from the standards in WAC <D<17754>> 246-247-040 </D> will be granted. (b) A nonfederal facility may request exemption from some of the requirements of WAC <D<17755>> 246-247-060 </D> and <D<17757>> 246-247-075 </D> if the potential-to-emit, for the emission unit(s) under consideration, results in compliance at level I of the COMPLY computer code or level I of the NCRP's Commentary No. 3, or equivalent as approved by the department. (c) A federal facility may request exemption from some of the requirements of WAC <D<17755>> 246-247-060 </D> and <D<17757>> 246-247-075 </D> if the potential-to-emit, for the emission unit(s) under consideration, results in a TEDE to the MEI from all pathways less than 0.1 mrem/yr. (d) The facility shall submit all the data necessary to make the exemption determinations of (b) and (c) of this subsection. The department shall determine if any exemptions apply. (e) Commercial nuclear power plants may request exemption from some of the requirements of this chapter in order to minimize dual regulation with the NRC. (3) The department may require a facility with exempt emission units to submit a radioactive air emissions report to confirm compliance with applicable standards. The department reserves the right to conduct inspections and audits of the facility to confirm the status of its exempt emission units. (4) Naturally occurring airborne radionuclides are exempt from the requirements of this chapter unless the concentrations or rates of emissions have been enhanced by industrial processes.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-030 (1-5)*	WAC 246-247-030 Definitions. Terms used in this chapter have the definitions set forth below with reference to radioactive air emissions. (1) "Abatement technology" means any mechanism, process or method that has the potential to reduce public exposure to radioactive air emissions. Abatement control features include automatic mechanisms and administrative controls used in the operation and control of abatement technology from entry of radionuclides into the ventilated vapor space to release to the environment. (2) "Administrative control" means any policy or procedure that limits the emission of radionuclides. (3) "ALARA" means as low as reasonably achievable making every reasonable effort to maintain exposures to radiation as far below the dose standards in this chapter as is practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other socioeconomic considerations, and in relation to the utilization of nuclear energy, ionizing radiation, and radioactive materials in the public interest. See WAC <D<17499>> 246-220-007 </D>. (4) "As low as reasonably achievable control technology" (ALARACT) means the use of radionuclide emission control technology that achieves emission levels that are consistent with the philosophy of ALARA. ALARACT compliance is demonstrated by evaluating the existing control system and proposed nonsignificant modifications in relation to applicable technology standards and other control technologies operated successfully in similar applications. In no event shall application of ALARACT result in emissions of radionuclides that could cause exceedance of the applicable standards of WAC <D<17754>> 246-247-040 </D>. See the definition of ALARA in this section. Note that ALARACT is equivalent to, but replaces, RACT in the May 7, 1986, version of chapter <D<12290>> 173-480 </D> WAC. (5) "Annual possession quantity" means the sum of the quantity of a radionuclide on hand at the beginning of the calendar year and the quantity of that radionuclide received or produced during the calendar year.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-030 (6-11)*	(6) "Best available radionuclide control technology" (BARCT) means technology that will result in a radionuclide emission limitation based on the maximum degree of reduction for radionuclides from any proposed newly constructed or significantly modified emission units that the licensing authority determines is achievable on a case-by-case basis. A BARCT compliance demonstration must consider energy, environmental, and economic impacts, and other costs through examination of production processes, and available methods, systems, and techniques for the control of radionuclide emissions. A BARCT compliance demonstration is the conclusion of an evaluative process that results in the selection of the most effective control technology from all known feasible alternatives. In no event shall application of BARCT result in emissions of radionuclides that could exceed the applicable standards of WAC <D<17754>> 246-247-040 </D>. Control technology that meets BARCT requirements also meets ALARACT requirements. See WAC <D<12293>> 173-480-030 </D> and <D<17762>> 246-247-120 </D>. (7) "Committed effective dose equivalent" (CEDE) means the sum of the products of absorbed dose from internally deposited radionuclides and appropriate factors to account for differences in biological effectiveness due to the quality of radiation and its distribution in the body of reference man over a fifty-year period. (8) "Construction" means fabrication, erection, or installation of a new building, structure, plant, process, or operation within a facility that has the potential to emit airborne radionuclides. Construction includes activities of a permanent nature aimed at completion of the emission unit, such as pouring concrete, putting in a foundation, or installing utilities directly related to the emission unit. It does not include preliminary activities such as tests to determine site suitability, equipment procurement and storage, site clearing and grading, and the construction of ancillary buildings. (9) "Decommissioning" means actions taken to reduce or eliminate the potential public health and safety impacts of a building, structure, or plant that has permanently ceased operations, including, but not limited to, actions such as decontamination, demolition, and disposition. (10) "Emission unit" means any single location that emits or has the potential to emit airborne radioactive material. This may be a point source, nonpoint source, or source of fugitive emissions. (11) "Facility" means all buildings, structures, plants, processes, and operations on one contiguous site under control of the same owner or operator.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-030 (12-17)*	(12) "Fugitive emissions" are radioactive air emissions which do not and could not reasonably pass through a stack, vent, or other functionally equivalent structure, and which are not feasible to directly measure and quantify. (13) "Indication device" means any method or apparatus used to monitor, or to enable monitoring, the operation of abatement controls or the potential or actual radioactive air emissions. (14) "License" means a radioactive air emissions license, either issued by the department or incorporated by the department as an applicable portion of an air operating permit issued by the department of ecology or a local air pollution control authority, with requirements and limitations listed therein to which the licensed or permitted party must comply. Compliance with the license requirements shall be determined and enforced by the department. (15) "Maximally exposed individual" (MEI) means any member of the public (real or hypothetical) who abides or resides in an unrestricted area, and may receive the highest TEDE from the emission unit(s) under consideration, taking into account all exposure pathways affected by the radioactive air emissions. (16) "Modification" means any physical change in, or change in the method of operation of, an emission unit that could increase the amount of radioactive materials emitted or may result in the emission of any radionuclide not previously emitted. This definition includes the cleanup of land contaminated with radioactive material, the decommissioning of buildings, structures, or plants where radioactive contamination exists, and changes that will cause an increase in the emission unit's operating design capacity. This definition excludes routine maintenance, routine repair, replacement-in-kind, any increases in the production rate or hours of operation, provided the emission unit does not exceed the release quantities specified in the license application or the operating design capacity approved by the department, addition of abatement technology as long as it is not less environmentally beneficial than existing, approved controls, and changes that result in an increase in the quantity of emissions of an existing radionuclide that will be offset by an equal or greater decrease in the quantity of emissions of another radionuclide that is deemed at least as hazardous with regard to its TEDE to the MEI. (17) "Monitoring" means the measurement of radioactive material released to the ambient air by means of an in-line radiation detector, and/or by the withdrawal of representative samples from the effluent stream. Ambient air measurements may be acceptable for nonpoint sources and fugitive emissions.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-030 (18-21)*	(18) "Nonpoint source" is a location at which radioactive air emissions originate from an area, such as contaminated ground above a near-surface waste disposal unit, whose extent may or may not be well-defined. (19) "Notice of construction" (NOC) is an application submitted to the department by an applicant that contains information required by WAC <D<17755>> 246-247-060 </D> for proposed construction or modification of a registered emission unit(s), or for modification of an existing, unregistered emission unit(s). (20) "Point source" is a discrete, well-defined location from which radioactive air emissions originate, such as a stack, vent, or other functionally equivalent structure. (21) "Potential-to-emit" means the rate of release of radionuclides from an emission unit based on the actual or potential discharge of the effluent stream that would result if all abatement control equipment did not exist, but operations are otherwise normal. Determine the potential-to-emit by one of the following methods: (a) Multiply the annual possession quantity of each radionuclide by the release fraction for that radionuclide, depending on its physical state. Use the following release fractions: (i) 1 for gases; (ii) 10^-3 for liquids or particulate solids; and (iii) 10^-6 for solids. Determine the physical state for each radionuclide by considering its chemical form and the highest temperature to which it is subjected. Use a release fraction of one if the radionuclide is subjected to temperatures at or above its boiling point; use a release fraction of 10^-3 if the radionuclide is subjected to temperatures at or above its melting point, but below its boiling point. If the chemical form is not known, use a release fraction of one for any radionuclide that is heated to a temperature of one hundred degrees Celsius or more, boils at a temperature of one hundred degrees Celsius or less, or is intentionally dispersed into the environment. Other release fractions may be used only with the department's approval; or (b) Perform a back-calculation using measured emission rates and in situ measurements of the control equipment efficiencies, as approved by the department; or (c) Measure the quantities of radionuclides captured in each control device, coupled with in situ measurements of the control equipment efficiencies, as approved by the department; or (d) Sample the effluent upstream from all control devices, as approved by the department; or (e) Use an alternative method approved by the department.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-030 (22-27)*	(22) "Replacement-in-kind" means the substitution of existing systems, equipment, components, or devices of an emission unit's control technology with systems, equipment, components, or devices with equivalent, or better, performance specifications that will perform the same function(s). (23) "Routine" means: (a) Maintenance, repair, or replacement-in-kind performed on systems, equipment, components, or devices of an emission unit's abatement technology as a planned part of an established inspection, maintenance, or quality assurance program that does not increase the emission unit's operating design capacity; or (b) Normal, day-to-day operations of a facility. (24) "Sealed source" means radioactive material that is permanently bonded or fixed in a capsule or matrix, or radioactive material in airtight containers, designed to prevent release and dispersal of the radioactive material under the most severe conditions encountered in normal use and handling. (25) "Significant" means the potential-to-emit airborne radioactivity at a rate that could increase the TEDE to the MEI by at least 1.0 mrem/yr as a result of a proposed modification. (26) "Total effective dose equivalent" (TEDE) means the sum of the dose equivalent due to external exposures and the CEDE due to internal exposures. (27) "Uranium fuel cycle" means the operations of milling uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity in a nuclear power plant that uses uranium fuel, and reprocessing of spent uranium fuel, to the extent that these operations solely support the production of electrical power for public use. Excluded are mining operations, waste disposal sites, transportation of any radioactive material, and the reuse of recovered nonuranium special nuclear and by-product materials from the cycle.
WAC246-247-040	WAC 246-247-040 Standards. (1) Standards for radioactive air emissions in the state of Washington are contained in WAC <D<12294>> 173-480-040 </D>, <D<12295>> 173-480-050 </D>, and <D<12296>> 173-480-060 </D> and in 40 CFR Part 61, subparts H and I published in the Federal Register on December 15, 1989. In accordance with WAC <D<12295>> 173-480-050 </D>(3), the department shall enforce the most stringent standard in effect, notwithstanding any agreement between EPA and any other agency, including those agreements made pursuant to 42 USC 7412(d)(9). (2) In addition to the radioactive air emission standards of Subsection (1) of this section, the department's radioactive materials licensees shall comply with the limitations on radioactive air emissions contained in WAC <D<17524>> 246-221-070 </D>. (3) All new construction and significant modifications of emission units commenced after August 10, 1988 (the date this chapter originally became effective) shall utilize BARCT (see Appendix B). (4) All existing emission units and nonsignificant modifications shall utilize ALARACT (see Appendix C). (5) In order to implement these standards, the department may set limits on emission rates for specific radionuclides from specific emission units and/or set requirements and limitations on the operation of the emission unit(s) as specified in a license. (6) All emissions of radionuclides, including those due to emergency conditions resulting from startup, shutdown, maintenance activities, or process upsets are subject to the standards of this section and, therefore, subject to the enforcement actions of WAC <D<17760>> 246-247-100 </D>.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-060 (1)*	WAC 246-247-060 Applications, registration and licensing. This section describes the information requirements for approval to construct, modify, and operate an emission unit. Any notice of construction (NOC) requires the submittal of the information listed in Appendix A. Complex projects may require additional information. The applicant should contact the department early in the conceptual design phase for guidance on applicable control technologies to consider. Appendices B and C outline the procedures to demonstrate compliance with the BARCT and ALARACT standards. Based on the Appendix A information provided, the department may advise the applicant which subset of technologies to consider as candidates for meeting BARCT or ALARACT requirements. For those facilities subject to the operating permit regulations in chapter <D<12020>> 173-401 </D> WAC, the radioactive air emissions license will be incorporated as an applicable portion of the air operating permit issued by the department of ecology or a local air pollution control authority. The department will be responsible for determining the facility's compliance with and enforcing the requirements of the radioactive air emissions license. (1) Requirements for new construction or modification of emission units. (a) Early in the design phase, the applicant shall submit a NOC containing the information required in Appendix A. (b) Within thirty days of receipt of the NOC, the department shall inform the applicant if additional information is required. The department may determine, on the basis of the information submitted, that the requirements of BARCT or ALARACT have been met, or may require the applicant to submit a BARCT or ALARACT demonstration compatible with Appendix B or C, respectively. (c) Within sixty days of receipt of all required information, the department shall issue an approval or denial to construct. The department may require changes to the final proposed control technology. (d) The applicant may request a phased approval process by so stating and submitting a limited application. The department may grant a conditional approval to construct for such activities as would not preclude the construction or installation of any control or monitoring equipment required after review of the completed application. (e) The department shall issue a license, or amend an existing license, authorizing operation of the emission unit(s) when the proposed new construction or modification is complete. For facilities subject to the air operating permit requirements of chapter <D<12020>> 173-401 </D> WAC, the license shall become part of the air operating permit issued by the department of ecology or a local air pollution control authority. For new construction, this action shall constitute registration of the emission unit(s).

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-060 (2-5)*	(2) Requirements for modification of unregistered emission units that are not exempt from these regulations. (a) The applicant shall submit an application containing the information required in Appendix A. (b) Within thirty days of receipt of the application, the department shall inform the applicant if additional information is required. The department may determine, on the basis of the information submitted, that the requirements of BARCT or ALARACT have been met, or may require the applicant to submit a BARCT or ALARACT demonstration compatible with Appendix B or C, respectively. (c) Within sixty days of receipt of all required information, the department shall issue or amend the license. For facilities subject to the air operating permit requirements of chapter <D<12020>> 173-401 </D> WAC, the license shall become part of the air operating permit issued by the department of ecology or a local air pollution control authority. This action shall constitute registration of the emission unit(s). A determination of noncompliance may result in the issuance of a notice of violation. (d) The department reserves the right to require the owner of an existing, unregistered emission unit to make modifications necessary to comply with the applicable standards of WAC <D<17754>> 246-247-040 </D>. (3) If an emission unit is in violation of any standards contained in WAC <D<17754>> 246-247-040 </D>, the facility shall either submit a compliance plan which describes how it intends to achieve compliance with the standards, and/or cease operation of the emission unit(s). The facility shall submit the compliance plan within forty-five days of the notice of violation. The cessation of operation of the emission unit(s) shall not necessarily exempt the facility from the requirements of this chapter if active or passive ventilation and radioactive air emission controls will still be required. The department reserves the right to take further enforcement action, if necessary, in accordance with WAC <D<17760>> 246-247-100 </D>. (4) The facility shall notify the department at least seven calendar days prior to any planned preoperational tests of new or modified emission units that involve emissions control, monitoring, or containment systems of the emission unit(s). The department reserves the right to witness or require preoperational tests involving the emissions control, monitoring, or containment systems of the emission unit(s). (5) The license shall specify the requirements and limitations of operation to ensure compliance with this chapter. The facility shall comply with the requirements and limitations of the license.
WAC246-247-060 (6-10)*	(6) All radioactive air emissions licenses issued by the department, except those issued to radioactive materials licensees, shall have an expiration date of five years from date of issuance or as specified in the air operating permit. For radioactive material licensees, the requirements and limitations for the operation of emission units shall be incorporated into their radioactive materials license, and shall expire when the radioactive materials license expires. (7) Each federal facility that comes under the authority of this chapter shall hold one license for each site, base, or installation. When applicable, the license shall be part of the facility's air operating permit. (8) Facilities may request a single categorical license which identifies limits and conditions of operation for similar multipurpose temporary and/or portable emission units. When applicable, the license shall be part of the facility's air operating permit. (9) All facilities with licensed emission units, except for radioactive materials licensees, shall submit a request to the department for renewal of their radioactive air emissions license at least sixty days prior to expiration of the license or as required by the air operating permit. All renewal requests shall include a summary of the operational status of all emission units, the status of facility compliance with the standards of WAC <D<17754>> 246-247-040 </D>, and the status of any corrective actions necessary to achieve compliance with the requirements of this chapter. Facilities with licensed emission units that also hold a radioactive materials license issued by the department shall submit this information along with their radioactive material license renewal submittal. If the department is unable to renew a radioactive air emissions license before its expiration date, the existing license, with all of its requirements and limitations, remains in force until the department either renews or revokes the license. (10) For commercial nuclear power plants or any other thermal energy facility subject to chapter 80.50 RCW and to the requirements of this chapter, the radioactive air emissions license and amendments thereto shall be issued pursuant to a memorandum of agreement between the energy facility site evaluation council (EFSEC) and the department.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-065	WAC 246-247-065 Fees. (1) All facilities under the authority of this chapter shall submit fees in accordance with WAC <D<17834>> 246-254-160 </D>. (2) Those facilities required by WAC <D<17834>> 246-254-160 </D>(2) to submit an application fee, shall submit the fee with the application.
WAC246-247-075 (1-8)*	WAC 246-247-075 Monitoring, testing and quality assurance. (1) All radioactive air emissions monitoring, testing, and quality assurance requirements of 40 CFR 61, Subparts H and I published in the Federal Register on December 15, 1989, are adopted by reference, as applicable as specified by the referenced subparts. (2) Equipment and procedures used for the continuous monitoring of radioactive air emissions shall conform, as applicable, to the guidance contained in ANSI N13.1, ANSI N42.18, ANSI N323, ANSI N317, reference methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17 of 40 CFR Part 60, Appendix A, 40 CFR Part 52, Appendix E, and any other methods approved by the department. (3) The operator of an emission unit with a potential-to-emit of less than 0.1 mrem/yr TEDE to the MEI may estimate those radionuclide emissions, in lieu of monitoring, in accordance with 40 CFR 61 Appendix D, or other procedure approved by the department. The department may require periodic confirmatory measurements (e.g., grab samples) during routine operations to verify the low emissions. Methods to implement periodic confirmatory monitoring shall be approved by the department. (4) The department may allow a facility to use alternative monitoring procedures or methods if continuous monitoring is not a feasible or reasonable requirement. (5) The following types of facilities shall determine radionuclide emissions in accordance with either a methodology referenced in Subsections (1) through (4) of this section or the respective document referenced below: (a) Nuclear power reactors licensed by the NRC: Offsite Dose Calculation Manual; (b) Fuel fabrication plants licensed by the NRC: NRC's Regulatory Guide 4.16, dated December 1985; (c) Uranium mills that are processing material: NRC's Regulatory Guide 4.14, dated April 1980. (6) Licensed facilities shall conduct and document a quality assurance program. Except for those types of facilities specified in Subsection (5) of this section, the quality assurance program shall be compatible with applicable national standards such as ANSI/ASME NQA-1-1988, ANSI/ASME NQA-2-1986, QAMS-004, and QAMS-005. (7) Those types of facilities specified in Subsection (5) of this section shall conduct and document a quality assurance program compatible with either the applicable national standards referenced in Subsection (6) of this section or the NRC's Regulatory Guide 4.15, dated February 1979. (8) Facilities shall monitor nonpoint and fugitive emissions of radioactive material.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-075 (9-13)*	(9) The department may conduct an environmental surveillance program to ensure that radiation doses to the public from emission units are in compliance with applicable standards. The department may require the operator of any emission unit to conduct stack sampling, ambient air monitoring, or other testing as necessary to demonstrate compliance with the standards in WAC <D<17754>> 246-247-040 </D>. (10) The department may require the owner or operator of an emission unit to make provision, at existing emission unit sampling stations, for the department to take split or collocated samples of the emissions. (11) The planning for any proposed new construction or significant modification of the emission unit must address accidental releases with a probability of occurrence during the expected life of the emission unit of greater than one percent. (12) All facilities must be able to demonstrate that appropriate supervisors and workers are adequately trained in the use and maintenance of emission control and monitoring systems, and in the performance of associated test and emergency response procedures. (13) All facilities must be able to demonstrate the reliability and accuracy of the radioactive air emissions monitoring data.
WAC246-247-080 (1-5)*	WAC 246-247-080 Inspections, reporting, and recordkeeping. (1) The department reserves the right to inspect and audit all construction activities, equipment, operations, documents, data, and other records related to compliance with the requirements of this chapter. The department may require a demonstration of ALARACT at any time. (2) All reporting and recordkeeping requirements of 40 CFR 61, Subparts H and I published in the Federal Register on December 15, 1989, are adopted by reference, as applicable as specified by the referenced subparts. (3) The facility shall annually submit to the department the information requirements adopted in Subsection (2) of this section, as applicable, along with the following additional information, as applicable: (a) The results of emission measurements for those emission units subject only to periodic confirmatory measurements; (b) Wind rose or joint frequency table; (c) Annual average ambient temperature; (d) Annual average emission unit gas temperature, if available; (e) Annual total rainfall; (f) Annual average emission unit flow rate and total volume of air released during the calendar year. If this additional information is available in another annual report, the facility may instead provide a copy of that report along with the information requirements in this subsection. Annual reports are due by June 30 for the previous calendar year's operations. (4) Any report or application that contains proprietary or procurement-sensitive information shall be submitted to the department with those portions so designated. The department shall hold this information confidential, unless required to release the information pursuant to laws, regulations, or court order. (5) The facility shall notify the department within twenty-four hours of any shutdown, or of any transient abnormal condition lasting more than four hours or other change in facility operations which, if allowed to persist, would result in emissions of radioactive material in excess of applicable standards or license requirements. If requested by the department, the facility shall submit a written report within ten days including known causes, corrective actions taken, and any preventive measures taken or planned to minimize or eliminate the chance of recurrence.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-080 (6-11)*	(6) The facility shall file a report of closure with the department whenever operations producing emissions of radioactive material are permanently ceased at any emission unit (except temporary emission units) regulated under this chapter. The closure report shall indicate whether, despite cessation of operations, there is still a potential for radioactive air emissions and a need for an active or passive ventilation system with emission control and/or monitoring devices. If decommissioning is planned and will constitute a modification, a NOC is required, as applicable, in accordance with WAC <D<17755>> 246-247-060 </D>. (7) The facility shall maintain a log for each emission unit that has received categorical approval under WAC <D<17755>> 246-247-060 </D>(8). The log shall contain records of important operations parameters including the date, location, and duration of the release, measured or calculated radionuclide concentrations, the type of emissions (liquid, gaseous, solid), and the type of emission control and monitoring equipment. (8) The facility shall maintain readily retrievable storage areas for all records and documents related to, and which may help establish compliance with, the requirements of this chapter. The facility shall keep these records available for department inspection for at least five years. (9) The facility shall ensure all emission units are fully accessible to department inspectors. In the event the hazards associated with accessibility to a unit require training and/or restrictions or requirements for entry, the facility owner or operator shall inform the department, prior to arrival, of those restrictions or requirements. The owner or operator shall be responsible for providing the necessary training, escorts, and support services to allow the department to inspect the facility. (10) The facility shall make available, in a timely manner, all documents requested by the department for review. The facility shall allow the department to review documents in advance of an inspection. The facility shall allow access to classified documents by representatives of the department with the appropriate security clearance and a demonstrable need-to-know. (11) The facility shall respond in writing in a timely manner, or within a time limit set by the department, to inspection results which require the facility to implement corrective actions or any other actions so directed by the department.
WAC246-247-085	WAC 246-247-085 Compliance determination for existing emission units and facilities. (1) All procedures for determining compliance with the dose equivalent standards of 40 CFR 61, Subparts H and I published in the Federal Register on December 15, 1989, are adopted by reference, as applicable as specified by the referenced subparts. (2) Facilities subject to 40 CFR 61 shall use computer codes or procedures approved by the EPA to determine the TEDE to the MEI; all other facilities shall use computer codes or procedures approved by the department. (3) The determination of compliance with the dose equivalent standard of WAC <D<17754>> 246-247-040 </D> shall include all radioactive air emissions resulting from routine and nonroutine operations for the past calendar year.

Table 7-1. Constraint Definitions. (100 sheets)

Constraint Name	Constraint Description
WAC246-247-100	WAC 246-247-100 Enforcement actions. (1) In accordance with RCW 70.94.422, the department may take any of the following actions to enforce compliance with the provisions of this chapter: (a) Notice of violation and compliance order (RCW 70.94.332). (b) Restraining order or temporary or permanent injunction (RCW 70.94.425; also RCW 70.98.140). (c) Penalty: Fine and/or imprisonment (RCW 70.94.430). (d) Civil penalty: Up to ten thousand dollars for each day of continued noncompliance (RCW 70.94.431 (1) through (7)). (e) Assurance of discontinuance (RCW 70.94.435). (2) The department, in accordance with RCW 70.98.050(4)(l), may issue subpoenas in order to compel attendance of witnesses and/or production of records or documents in connection with any adjudicative or other administrative proceeding. (3) The department, in accordance with RCW 70.98.160, may impound sources of ionizing radiation. (4) The secretary of the department, in accordance with RCW 43.70.190, is authorized to bring an action to prohibit a violation or a threatened violation of any department rules or regulation, or to bring any legal proceeding authorized by law to a county superior court. (5) Any party, against which an enforcement action is brought by the department, has the right to submit an application for the adjudicative process in accordance with chapter <D<17183>> 246-10 </D> WAC and chapter 34.05 RCW.
Worker Radiological Safety: Hanford Site Radiological Control Manual, Chapter 1, Part 1, Section 111 and Section 112	PART 1 Department of Energy (DOE) Radiological Control Manual Part 1 Hanford Site Since 1992, the U.S. Department of Energy (DOE) Office of Health has been developing a comprehensive system of radiological control requirements and guidance that clearly defines the DOE objectives and expectations for radiological control activities throughout the DOE complex. These requirements and guidance address provisions of the Atomic Energy Act (as amended), the Price Anderson Amendments Act, and recommendations of the Defense Nuclear Facilities Safety Board. These requirements and guidance are organized into a hierarchy that includes policy, basic requirements (Rules and Orders), supplemental and complimentary information documents providing acceptable methods for implementation of basic requirements (Safety Guides and Implementation Guides), and detailed technical guidance (Technical Standards.) The Radiological Health and Safety Policy provides the general framework for the conduct of radiological control activities throughout the DOE complex. Below the policy statement are both regulatory and contractual systems of basic requirements established through 10 CFR 835, which is enforced through a regulatory system established in 10 CFR 820, and DOE Order 5480.11, which is enforced through contractual commitments. The requirements of the Rule are augmented by complementary guidance provided in Implementation Guides while the requirements of the Order are augmented by complementary guidance provided in the DOE Radiological Control Manual. The Hanford Site Radiological Control Manual (HSRCM) has been developed through a cooperative effort between the DOE Richland Operations Office (RL) and the Hanford contractors. As required by Article 114.1, the HSRCM has been approved by the senior site executives of the Hanford contractors and provides the basis for consistent and uniform implementation of radiological control requirements for the Hanford Site.

*Split out from parent requirement in TWRS database, to fit the available space. Allocation is based on parent requirement.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
200 Area TEDF Waste Acceptance Criteria	The dispositioned aqueous waste must meet the acceptance criteria and associated administrative procedures of the 200 Area Treated Effluent Disposal Facility.
ALARA-Design Compliance	The facility design shall provide for "as low as reasonably achievable (ALARA)" in accordance with 10 CFR 835, Occupational Radiation Protection, and DOE Order 5480.11, Radiation Protection for Occupational Workers. (NOTE: The DOE Order 5480.11 is to be canceled and replaced by DOE N 441.1, Radiological Protection for DOE Activities.) Guidelines for achieving exposure levels that are ALARA are contained in PNL 6577, Health Physics Manual of Good Practices for Reducing Exposure to Levels that are as Low as Reasonably Achievable (ALARA). WHC-CM-4-11, ALARA Program Manual, describes WHC's implementation of the ALARA program. (NOTE: This manual has been canceled and replaced by WHC-IP-1043, WHC Occupational ALARA Program.) Basis: Derived from performance requirement, "ALARA-Design."
Cesium Product Storage Requirements	The conditions for safe handling and storage of the cesium product shall be provided by the producer.
Documentation	Records, documents, and document control pertinent to design functions shall be in accordance with ASME-NQA-1-1994-IA, DOE 5500.7b, DOE-5480.CM, and ANSI/ANS-3.2-88.
DOE/RL 93-08 Hanford Mission Plan	The 200 Area is a limited use area.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Environmental Conditions	Environmental Conditions New facilities and systems functioning on the Hanford site shall withstand the environmental conditions specified below. Thermal effects of the soil shall be considered for the buried portions of the system. Ambient Air Temperature Range: -20 to 120 °F Rate of increase: 26 °F per 20 min., maximum Rate of decrease: 24 °F per hr., maximum Relative Humidity: 5 to 100% (Rate of change is negligible) Mean annual precipitation: 16 cm (6.3 in) Maximum precipitation rate of change: 1.52 cm/hr. (0.6 in./hr.) Blowing Dust & Smoke Visibility: 6 miles or less with sky completely obscured Frequency: 10 times per year, maximum Duration: 24 hrs. per occurrence Wind Gusts up to 80 miles per hour can be expected on site with the average wind speed in the 200 Area of 7.7 mph in the WNW direction. Frost Line: 36 in. Solar Radiation: Frequent exposure due to minimal cloud cover Additional information on Hanford site weather conditions can be obtained from the Hanford Site vicinity weather bureau.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Estimated TWRS Project Schedule	The TWRS remediation schedule will be as follows: Phase I Proof of Concept See POCR Phase I Schedule Phase II Full Scale Production Award 2005 Design, Permitting Licensing, Construction Low Activity 2005-2011 High Level 2005-2013 Operations Low Activity 2011-2021 High Level 2013-2028 D & D Low Activity 2021-2026 High Level Waste 2028-2033 Basis: General Schedule section of 95-PRI-073
Fission Product Interim Storage	Fission products separated shall be returned in a waste form and canister suitable for long-term storage. The storage duration is TBD.
Hazardous Waste Determination	The producer of IHLW shall determine, quantify, and report the presence of any hazardous waste listed in 40CFR261.31 through 40CFR261.33, in the waste or in any feed stream proposed for storage or disposal. The listed waste must be quantified in the WQR, or their absence must be certified in the WQR. If no "listed hazardous wastes" are present in the waste or in any feed stream, the private contractor shall perform the "Toxicity Characteristics Leaching Procedure" (TCLP) as described in 55 Federal Register 26986, 6/29/90, and other RCRA characteristics test(s) described in 40CFR261.20 through 261.24 as appropriate, using samples from production runs or prototypical specimens. Any modifications must have prior M&O contractor approval. The method to be used must be described in the WCP and results documented in the WQR. Based on the results of above, the private contractor shall verify in the WQR whether or not the waste is hazardous.
HLW Constituents Limitations	No additives shall be allowed which would have a detrimental impact on the operation of the HLW immobilization process, interim storage operations, or the volume of immobilized HLW produced. Additionally, inclusion of nonradioactive constituents should be minimized to avoid impacting the volume of immobilized HLW produced. This requirement is based upon achieving the TWRS mission goals of cost effectiveness and minimizing HLW volume (WHC-SD-WM-MAR-008).
HLW Glass Product Rework	On a case by case basis, out-of-specification HLW glass product will either be reworked, overpacked, or a waiver will be sought.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
HLW Glass Product Variability	Production of glass shall be controlled such that there is a maximum probability of maintaining the glass pour composition within established compositional limits. Basis: Process control is standard practice in the chemical processing industry, particularly where a rigid product specification exists, (Facility Configuration Study, WHC-SD-WM-ES-295, Boomer et. al. 1994)
HLW Glass Waste Oxide Loading	The volume of HLW glass shall be minimized for a given waste feed. Basis: The decrease in volume of HLW glass produced by increasing the waste oxide loading from 25% to 45%, results in savings to the program of more than $2 billion in vitrification and repository disposal costs (Feed Processability Study, WHC-SP-1143)
HLW Vitrification Production Capacity	The HLW vitrification production capacity shall be nominal 8 MT/day glass. The design basis shall be 20 MT/day. Basis: The TWRS Reference Flowsheet, WHC-SD-WM-TI-613, is based on an enhanced sludge wash process which produces approximately 12,000 MT of sludge which is immobilized in glass at a 45% waste oxide loading. On this basis, a vitrification facility with a nominal 8 MT/day throughput and a total operating efficiency of 60% will have adequate capacity to complete its mission by 2024. This time period includes one year of startup and 14 years of nominal capacity operation. These conditions would produce 23,800 MT of HLW glass in about 7,100 TWRS reference canisters (1.26 cubic meters). The 14 year operating period is based on a parametric optimization study of operating versus capital costs which showed a 5 to 15 year operating period providing a minimum life cycle cost.
Human Factors	Human Factors criteria shall apply to new construction and to retrofitting of existing facilities. These criteria shall be considered for upgrading existing facilities where cost-benefit or risk-tradeoff analysis indicate justification for such expenditures. Equipment that is to be used by personnel shall be designed or selected to accommodate their body dimensions. This equipment includes control panels, work tables and counters, enclosures, seating, storage, special clothing, and any other equipment designed for an operator. The design of equipment for personnel shall accommodate a wide variety of body dimensions. Generally, it is recommended that equipment dimensions accommodate the fifth to ninety-fifth percentile of the user population. For recommended data representing these percentiles, see NUREG 0700, Section 6.1, and MIL-STD-1472D, Section 5.6.
Monitoring of Solidified High-Level Waste Packages	Containerized immobilized HLW/TRU waste and dispositioned Cs/Sr capsules shall be monitored during the period of interim storage to determine compliance with the geologic repository waste acceptance criteria allocated to interfaces IHLW for Shipment, ITRU for Shipment, and Dispositioned Cs/Sr Capsules for Shipment. If an immobilized HLW, immobilized TRU waste, or dispositioned capsule container is determined to not comply with the allocated requirements for geologic repository disposal, the suspect container will be evaluated for re-work or acceptance by the geological repository as a non-standard waste form.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Notification of Startup, Shutdown, or Other Change That May Affect Emissions Measurement	WHC Environmental Emission Management (EEM) shall be notified directly by the appropriate facility management as soon as practicable, but no later than one working day after any radioactively contaminated forced ventilation exhaust systems start-up or shut-down. The date and time for each such exhaust system startup or shutdown shall also be recorded in the facility operating log. This requirement addresses equipment of any size involving any radioactive emissions to air resulting from forced air flow. Relocation of any portable exhaust unit (e.g., HEPA-filtered portable exhausters, greenhouse exhausters, or HEPA-filtered vacuums) requires the earliest possible prior notification. Use of hand held HEPA filtered vacuums does not require such notification. Such notification shall also include any shutdown of stack sampling or monitoring systems or any other change that may affect the measurement of airborne radioactive emissions to the environment, including those outlined in the applicable Facility Effluent Monitoring Plan (FEMP). WHC EEM shall then notify WHC Air and Water Permits (AWP) of any shutdown, abnormal operation, or other change in facility operation which could result in an airborne radionuclide emissions violation of applicable standards. Basis: WAC 246-247-090, "Special Reports," and reporting requirements of 40 CFR 61.14 and 61.94. [WHC-CM-7-5, CHAPTER 2, 2.5.7]
Onsite Transport of Radioactive Materials	The transport of onsite radioactive solid waste shall be in accordance with DOE-95-SWT-186 and CM-2-14 "Hazardous Material Packaging and Shipping", based upon DOE Order 460.1 BASIS: DOE-95-SWT-186
Personnel and Training	The system shall be designed for operation by personnel possessing qualifications in accordance with DOE 5480.20 Chapter IV, and trained in accordance with Chapter I.
Phase I Solidified HLW Quantity	The solidified HLW interim storage facility(ies) shall accommodate the cumulative total of Phase I generated HLW. • The number of standard (0.61 m diameter by 3.00 m tall) immobilized HLW canisters produced ranges from 599 at the minimum order quantity of 245 MT waste oxides (exclusive of silicon and sodium) to 1,137 at the maximum order quantity of 465 MT waste oxides (exclusive of silicon and sodium). • The number of separated cesium containers ranges from 53 at 1.5 kW per container to 158 at 0.5 kW per container. Basis: TWRS Privatization Request for Proposals, Solicitation Number DE-RP06-96RL13308, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Preservation of Producer Generated Solidified HLW and TRU Waste Certification Status	Solidified HLW and TRU waste (i.e., immobilized HLW canisters, TRU waste canisters, cesium product containers, and dispositioned cesium/strontium capsules) handling and storage features shall be designed such that, during facility operation, they do not intentionally invalidate certification data provided by the production facilities relative to solidified HLW and TRU waste compliance with applicable acceptance specifications [e.g., DOE-RW, 1994, Waste Acceptance System Requirement Document (WASRD), DOE/RW-0351P, Rev. 01, U.S. Department of Energy, Washington, D.C.; DOE-EM, 1995, Waste Acceptance Product Specifications for Vitrified High-Level Waste Forms (WAPS), DOE/EM-0093, Rev. 01, U.S. Department of Energy, Washington, D.C.; DOE-WIPP, 1991, TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant, WIPP-DOE-069, Rev. 4, Westinghouse Electric Corporation, Carlsbad, New Mexico]. If any facility operations potentially impact certification data, provisions shall be provided to re-certify solidified HLW and TRU waste prior to shipment. Basis: Derived. Primary responsibility for compliance with repository acceptance specifications rest with the production facility. Where compliance certification information (data, records, documents) supplied by the producer would be sufficient at time of shipment to re-certify the canister, it is cost effective to require that such information not be invalidated by interim storage operations. Some canister properties must be certified at the time of shipment, regardless of the state at time of receipt by the interim storage facility (e.g., surface contamination). Certification of repository acceptance specifications are explicitly allocated to the interim storage function as constraints only for such limited instances.
Product Verification	Verification of products for compliance with requirements may be audited by DOE at DOE's discretion.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Quality Assurance Plan	This function shall adhere to the applicable requirements of 10 CFR 830, "Nuclear Safety Management, Subpart A, General Provisions, Section 830.120, Quality Assurance Requirements," Code of Federal Regulations. In accordance with these requirements, the project shall develop a project specific Quality Assurance Program Plan (QAPP) encompassing the following program elements as applicable to the project: Program Personnel Training and Qualifications Quality Improvement Documents and Records Work Processes Design Procurement Inspection And Acceptance Testing Management Assessment Independent Assessment. The QAPP shall be submitted to DOE for approval. All subcontractors providing services for the function, such as: architect and engineering (A-E) services, Construction Management (CM) services, and testing services in support of technology development shall be required to have or develop a QAPP compatible with the requirements of 10 CFR 830.120, as specific to the subcontractors area of responsibility. As long as the program is compatible with the above referenced requirements, it's bases can be founded in existing consensus standards, such as: ASME NQA-1, 10 CFR 50 Appendix B, and the ISO 9000 series. All subcontractor QAPPs shall be submitted to the M&I Contractor for review and concurrence.
Quantity of IHLW for Storage	The estimated quantity of immobilized HLW glass produced is not expected to exceed 2.4E+04 metric tons (~9.0E+03 cubic meters) at a 45wt% waste oxide loading or 4.3E+04 metric tons (~1.6E+04 cubic meters) at a 25wt% waste oxide loading.
Quantity of ITRU Waste for Storage	The maximum quantity of immobilized TRU glass produced shall not exceed 8.8E+02 metric tons (~3.3E+02 cubic meters) at a 45wt% waste oxide loading or 1.6E+03 metric tons (~5.9E+02 cubic meters) at a 25wt% waste oxide loading.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Quantity of Packaged Capsules	The estimated quantity of standard HLW canisters (0.62 m^3 per canister) produced from packaging Cs/Sr capsules is ~400 standard canisters, based upon packaging 6 capsules end to end per canister.
Quantity of Waste Canisters	The expected volume of immobilized HLW/TRU waste is ~9,060 m^3 at 45wt% waste oxide (orme 1995) loading or ~16,300 m^3 at 25wt% waste oxide loading. If packaged in the standard HLW canister (0.62 m^3 per canister), ~14,600 to 26,300 canisters will be produced. An additional ~400 standard HLW canisters would be produced from overpackaging cesium and strontium capsules. The interim store immobilized waste function must have sufficient capacity to receive and interim store this projected quantity of standard canisters.
Reporting of Canister Material Removed During Decontamination	The producer of HLW shall report an estimate of the amount of canister material (particularly wall thickness) removed during decontamination of the canister surface.
Safety Class	The degree of redundancy, reliability, and availability shall correspond to a systematically determined safety classification for all systems, structures, and components. Basis: DOE 6430.1A
Shielding Criteria	Guidelines for radiological design are provided in WHC-SD-GN-DGS-30011, Radiological Design Guide. The shielding design criteria in WHC-SD-GN-DGS-30011, Section 7.0, shall be used to determine the shielding requirements of different areas in the facility. Shielding shall be designed to limit the total whole body dose to less than 5 mSv per year.
Site Boundary	A site boundary, consistent with the draft Tank Waste Remediation System (TWRS) Environmental Impact Statement (EIS) shall be used for safety and environmental impact assessments. The site boundaries for the EIS will be as follows: North - Columbia River (1/4 mile from bank per REACH EIS); East - Columbia River (1/4 mile from bank per REACH EIS); South - A line running west from the Columbia River, just north of the Washington Public Power Supply System leased are, through the Wye Barricade to Highway 240; West - Highway 240 and Highway 24. Basis: Preliminary TWRS EIS

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Site Location - Cs/Sr Capsules Interim Storage	The capsule storage facility shall be co-located with the Phase II HLW interim storage facility to maximize the use of common support facility services. The facility will be located near the TWRS processing complex within the 200 East Area. Basis: The TWRS Facility Configuration Study finds that there is a significant savings associated with the sharing of facilities and equipment.
Solid Radioactive Waste Transfer	Transfer of solid radioactive waste to the Hanford Site Solid Waste program for dispositioning shall be in accordance with criteria specified in the Hanford Site Solid Waste Acceptance Criteria, WHC-EP-0063, DOE 1540.1 Material, Transportation and Traffic Management, and DOE 95-SWT-186 for on site shipment.
Solidified HLW and TRU Waste Interim Storage Design Philosophy	The solidified HLW and TRU waste interim storage facility(ies) shall be designed to minimize monitoring and maintenance. Basis: Derived from performance requirement, "IHLW Storage Maintenance, Operations and Design Philosophy."
Solidified HLW and TRU Waste Interim Storage Facility Design Life	The minimum design life shall be 40 years for non-replaceable facility components. A design life less than 40 years is acceptable for replaceable components, but should be maximized to the extent practical. Basis: Derived from performance requirement, "HLW Interim Storage Facility Design Life." The earliest repository acceptance is 2023, but significant uncertainty exists in this schedule (Calmus, 1996, Solidified High-Level Waste Interim Storage Alternative Analysis and Path Forward, WHC-SD-WM-SP-001, Rev. 0, Westinghouse Hanford Company, Richland, Washington). A 40-yr design life provides reasonable contingency.
Solidified HLW and TRU Waste Interim Storage Facility Siting	Solidified HLW and TRU waste interim storage facility(ies) shall be located in the 200 East Area of the Hanford Site. Basis: Derived from performance requirement, "Land Use," based on rationale as described in Calmus, 1996, Solidified High-Level Waste Interim Storage Alternative Analysis and Path Forward, WHC-SD-WM-SP-001, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
Solidified HLW and TRU Waste Interim Storage Schedule	The solidified HLW and TRU Waste interim storage facility shall support receipt of Phase I solidified HLW from June 1, 2002, through June 1, 2011, and receipt of Phase II solidified HLW and TRU Waste from January 1, 2013, through December 31, 2028 (a 16-year period). After receipt, the immobilized HLW shall remain in interim storage until 2035 at which time loadout for shipment to the federal geologic repository shall commence. The ITRU could be shipped to the WIPP immediately if storage at the WIPP is available in 1998. The last of the ITRU must be shipped well before 2018, which is the year that the WIPP is expected to close. Loadout capability shall be provided for cesium product containers beginning January 1, 2013. All solidified HLW and TRU waste loadout shall be completed by 2040.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Solidified HLW and TRU Waste Rework	If primary containment (i.e., canister or container) is breached during interim storage, the solidified HLW and TRU waste (i.e., dispositioned Cs/Sr capsule container, immobilized HLW canister, immobilized TRU canister, or cesium product container) shall be over-packed. An over-packed immobilized HLW canister may violate the repository waste acceptance specification for canister dimension and, as such, the over-packed canister shall be addressed under the non-standard waste form clause (DOE-RW, 1994, Waste Acceptance System Requirements Document, Rev. 1, DOE/RW-0351P, U.S. Department of Energy, Washington, D.C.). Basis: Environmental regulations explicitly state that a container not in good condition (e.g., severe rusting, apparent structural defects) or a leaking container require corrective action to mitigate the hazard (40 CFR 264.171). In such instances the only reasonable engineering option is to overpack the canister. The repository acceptance specification for canister dimension includes specified tolerances that implicitly preclude the use of an overpack while retaining a standard waste form status. The enabling assumption is that the overpack canister will be accepted by the repository under the non-standard waste form clause.
Storage Capacity/Availability	The interim storage facility shall support the scheduled operation of the HLW vitrification facility and capsule overpack facility.
Time Temperature Transformation Data	The producer of IHLW shall provide the Time Temperature Transformation diagrams and data for the canistered waste form.
TRU Waste Volume Projection	A group of 7 SSTs (241-T-201 through 241-T-204, 241-T-110, 241-T-111, and 241-T-112), and 3 DSTs (241-SY-102, 241-AW-103 and 241-AW-105) have been identified as potentially containing TRU waste (WHC-SQ-WM-ES-331). If segregated and processed as a separate vitrification campaign an estimated 2060 m^3 (3320 standard canisters) of immobilized TRU waste would be produced, at the ZrO2 limit for HLW or ~1070 m^3 (~1725 canisters) at 46wt% waste oxide limit. The immobilized HLW volume would be reduced to ~7,780 m^3 (12,550 standard canisters). [Internal memo #75520-95-005, dated June 12, 1995; TRU Waste Volume Projection Revision 1]

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Untreated Liquid Effluents (1)*	The following criteria are derived from regulatory and facility design requirements and must be met. 1. The waste stream must be characterized to the degree established in RCRA Part B Permit. Analytical procedures used must be consistent with RCRA waste analysis plans. Basis: The waste stream cannot be designated without accurate and complete characterization data. 2. Only the waste codes listed in the Delisting Petition and the RCRA permit can be accepted for treatment at the ETF, unless the permit and the Delisting Petition are modified. Basis: The ETF is limited by RCRA regulations to treat only those waste streams containing constituents that have been demonstrated to be treatable. The Delisting Petition to the EPA is the primary document controlling what is considered treatable. This document can be updated to reflect an expansion of the treatment envelope. 3. The absorbed radiation dose to a hypothetical individual at the site boundary cannot increase over permitted levels without a modification to the Radionuclide Air Emission Program (RAEP) permit. Influent concentrations must remain low enough such that this remains true. Radionuclides which have not previously been accounted for, may also force a permit reevaluation. Basis: Washington State Department of Health (DOH) regulations.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Untreated Liquid Effluents (2)*	Acceptance criteria based on operability parameters are listed below. While the following are not mandatory criteria, each must be considered when determining the acceptability of a waste stream sent to the LERF for storage and the ETF for treatment. These criteria may change in response to modifications made to the LERF and ETF. 1. No separable organics. Basis: The ETF is designed to process dilute, single-phase aqueous waste streams containing soluble levels of organics. Dual-phase aqueous/organic mixtures would far exceed the treatment capacity of UV/oxidation (UV/OX), can damage plant equipment, and would not be compatible with the LERF basin liner material. The UV/OX system is designed to treat dissolved organics in concentrations that generally do not exceed 100 to 300 ppm, depending on the organic species present. Some process flexibility is available to extend this range. 2. Minimize colloidal matter to protect filters in the ETF from plugging. Basis: Physical limitation of the rough and fine filters. 3. Minimize concentrations of scale forming compounds, (e.g., calcium sulfate, calcium phosphate, and metal silicates). Basis: Physical limitations of the UV/OX and Reverse Osmosis (RO). Note that silicate concentrations in excess of 0.001 molar fed to the RO system could foul the membranes. The RO membranes have an influent total dissolved solids (TDS) limit of approximately 1000 ppm. TDS concentrations in excess of this may foul the second stage RO membranes, depending on the types of contaminants present. 4. Minimize concentrations of corrosive constituents, such as chloride and fluoride. Basis: Physical limitation of the ETF evaporator and dryer. In sufficient concentrations, these constituents can corrode the ETF evaporator and dryer. 5. Minimize concentration of constituents that can absorb UV light to the extent destruction of targeted organics is significantly compromised. Basis: Physical limitations of the UV/OX system. Nitrate and sulfide are two such constituents. For example, proof-of-principle testing by the Japan Gas Company found hydrogen sulfide forms a milky light-absorbing substance when subjected to ultraviolet light oxidation.
Untreated Liquid Effluents (3)*	6. Significant concentrations of neutral radionuclide species cannot be accepted by the LERF and ETF without jeopardizing compliance with discharge requirements for radionuclides (0.04 times the Derived Concentration Guidelines) per section 8.4.2.1 of WHC-CM-7-5. Plutonium and Ruthenium are known to form such neutral species. Basis: Neutral species have lower decontamination factors primarily because the IX system is only effective on ionic species.The LETF is not currently designed to handle streams with elevated levels of volatile radionuclides.

Table 7-2. Performance Requirement Definitions. (13 sheets)

Performance Requirement Name	Performance Requirement Description
Waste Acceptance Process Activity	Upgraded quality assurance requirements of DOE/RW-0333P, Quality Assurance Requirements and Description for the Civilian Radioactive Waste Management (QARD) (DOE/RW 1995), shall be applied to items identified as being a waste acceptance process activity. Waste acceptance process activity are those items that produce information which will be used to certify that immobilized HLW canisters comply with repository acceptance criteria as specified in DOE/RW-0351P, Waste Acceptance System Requirements Document (WASRD) (DOE/RW 1996), and DOE/EM-0093, Waste Acceptance Product Specification for the Vitrified High-Level Waste Forms (WAPS) (DOE/EM 1995). Waste acceptance process activity items and the actions to prevent or mitigate their failure shall be identified by a comprehensive, systematic, documented evaluation of the design. Basis: Derived.
Waste Designation	Solidified high-level waste (HLW) and transuranic (TRU) waste are mixed waste (containing both hazardous and radioactive waste components), and are regulated in accordance with the Resource Conservation and Recovery Act (RCRA) and the Washington Administrative Code (WAC) 173-303, Dangerous Waste Regulations. Basis: Derived from performance requirement, "Hazardous Waste Management" based on rationale described in Calmus, 1996, Solidified High-Level Waste Interim Storage Alternative Analysis and Path Forward, WHC-SD-WM-SP-001, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
Worker Occupational Safety	TWRS activities shall conform to 29 CFR 1910 and DOE 5483.1a Occupational Safety and Health Administration (OSHA) Program at Government owned contractor operated facilities.

*Split out from parent requirement in TWRS database, to fit available space. Allocation is based on parent requirement.

Table 7-3. Proof-of-Concept Requirement Definitions.

Proof-of-Concept Requirement Name	Proof-of-Concept Requirement Description
Interchangeability	The grapple/flange combination shall be designed so that if an approved design (West Valley Demonstration Plant or Defense Waste Processing Facility) is chosen the grapple/flange will be compatible with the mating design components. The contractor's grapple/flange will be designed so as to not be capable of mating with a different grapple/flange design.
Lift Capability	The grapple, when attached to a suitable hoist and when engaged with the flange, shall be capable of raising and lowering a canistered waste form of maximum weight in a vertical direction and transporting the canister horizontally.
Wall Thickness	The canister shall have a minimum wall thickness of 0.25 in.
Waste Loading in Glass	Loading of nonvolatile components originating in the feed shall be a minimum of 25 percent by weight in product glass, on an equivalent oxide basis. This requirement shall be calculated on an average annual basis. It is desired to maximize actual waste loading to the extent feasible. No credit is given for the Na_2O and SiO_2 in the waste feed toward the calculated percent waste loading in the product glass.
Welding	All canister fabrication welds shall be made using the gas tungsten arc welding process or equivalent. After cooling, the welds shall be ground and inspected for integrity by dye penetrant. All welding, welding procedure qualifications, repair, electrodes, and welder performance tests used in the fabrication of the canisters are to be performed in accordance with ASME *Boiler and Pressure Vessel Code*, Section IX, 1995.

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8.0 REFERENCES

10 CFR 830, "Nuclear Safety Management," *Code of Federal Regulations*, as amended.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

40 CFR 50, "National Primary and Secondary Ambient Air Quality Standards," *Code of Federal Regulations*, as amended.

40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal Regulations*, as amended.

40 CFR 191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High Level and Transuranic Radioactive Wastes," *Code of Federal Regulations*, as amended.

40 CFR 261, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 262, "Standards Applicable to Generators of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

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DOE, 1994, *Maintenance Management Program*, DOE Order 4330.4B, U.S. Department of Energy, Washington, D.C.

DOE, 1995, *Packaging and Transportation Safety*, DOE Order 460.1, U.S. Department of Energy, Washington, D.C.

DOE, 1995, *Waste Acceptance Product Specifications for Vitrified High-Level Waste Forms*, EM-WAPS, Rev. 1, U.S. Department of Energy, Office of Environmental Management, Washington, D.C.

DOE-RW, 1994, *Waste Acceptance System Requirements Document (WASRD)*, DOE/RW-0351P, Rev. 1, Section 3, U.S. Department of Energy, Washington, D.C.

National Environmental Policy Act of 1969, 42 USC 4321, et seq.

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