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System Specification for Immobilized High-Level Waste Interim Storage

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U.S. Department of Energy Contract DE-AC06-99RL14047

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Abstract: This specification establishes the system-level functional, performance, design, interface, and test requirements for Phase 1 of the IHLW Interim Storage System, located at the Hanford Site in Washington State. The IHLW canisters will be produced at the Hanford Site by a Selected DOE contractor. Subsequent to storage the canisters will be shipped to a federal geologic repository.

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SYSTEM SPECIFICATION FOR IMMOBILIZED HIGH-LEVEL WASTE INTERIM STORAGE

DECEMBER 2000

PREPARED FOR
U.S. Department of Energy
Office of River Protection
Richland, Washington

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LIST OF ACRONYMS

AGA	Alternative Generation and Analysis
ALARA	As Low As Reasonably Achievable
BARCT	Best Available Radionuclide Control Technology
CAS	Central Alarm System
CCTV	Closed-Circuit Television
CFR	*Code of Federal Regulations*
CRWMS	U.S. Department of Energy, Office of Civilian Radioactive Waste Management System
CSB	Canister Storage Building
DBA	Design Basis Accident
DOE	U.S. Department of Energy
DOE-ORP	U.S. Department of Energy, Office of River Protection
DOT	U.S. Department of Transportation
D&D	Decontamination and Decommissioning
HEPA	High-Efficiency Particulate Air
HVAC	Heating, Ventilation, and Air Conditioning
IHLW	Immobilized High-Level Waste
ISMS	Integrated Safety Management System
LAW	Low-Activity Waste
NEPA	*National Environmental Policy Act*
NFPA	National Fire Protection Association
RL	U.S. Department of Energy, Richland Operations Office
RPP	River Protection Project
RPP-WTP	River Protection Project-Waste Treatment Plant
SAR	Safety Analysis Report
SCT	Shielded Canister Transporter
SNF	Spent Nuclear Fuel
SNFP	Spent Nuclear Fuel Program
S/RID	Standard/Requirements Identification Document
SSC	Structures, Systems and Components
TBD	To Be Determined
WAC	*Washington Administrative Code*

1.0 SCOPE

1.1 IDENTIFICATION

Program: River Protection Project (RPP), Immobilized Tank Waste Storage and Disposal Program

Project: Phase 1 Immobilized High-Level Waste (IHLW) Interim Storage System

Mission: Transport, receive, and temporarily store canisters containing IHLW. Eventually retrieve IHLW canisters and transport to a staging area (Staging and Load-out Facility) in preparation for shipment to a national geologic repository.

This specification establishes the system-level functional, performance, design, interface, and test requirements for Phase 1 of the IHLW Interim Storage System, located at the Hanford Site in Washington State. Storage capacity for the first 880 canisters is to be addressed through retrofit of the Canister Storage Building (CSB), including its superstructure and Vaults 2 and 3. Storage capacity beyond the initial 880 canisters will be provided by one or more additional facilities. The architecture (i.e., retrofit of existing structures or new construction) for these follow-on IHLW Interim Storage Facilities has not yet been selected.

The existing CSB (original design and construction) is considered a constraining architecture (i.e., unchangeable), and will not be assessed for compliance to current construction codes and standards called-out herein. Any modification to the existing CSB structure that may affect the spent nuclear fuel (SNF) storage in Vault 1 shall be designed and constructed according to the original design basis documents (Code of Record) for the CSB. Other modifications to the CSB and new installations shall be performed in compliance with RPP-PRO-097, *Engineering Design and Evaluation.*

1.2 IMMOBILIZED HIGH-LEVEL WASTE PROJECT OVERVIEW

To facilitate the RPP mission, the U.S. Department of Energy, Office of River Protection (DOE-ORP) has implemented a process to acquire Hanford Site tank waste treatment and immobilization services by construction and operation of the RPP-Waste Treatment Plant (RPP-WTP). The primary product from the RPP-WTP will be immobilized low-activity waste and IHLW (also termed glass or vitrified waste). The tank waste treatment and immobilization services during Phase 1 will be a "proof-of-principle/demonstration-scale" effort that will produce a minimum of 600 IHLW canisters. Phase 2 will be a "full-scale" production effort.

In accordance with the planned approach, the Immobilized Tank Waste Storage and Disposal Program will furnish interim storage and disposal services for the products from the RPP-WTP. To address IHLW interim storage, the Immobilized Tank Waste Storage and Disposal Program created the Phase 1 IHLW Interim Storage System. In general, this system consists of onsite transportation of IHLW to interim storage, long-term isolation of IHLW in a safe and environmentally compliant manner, and retrieval of IHLW from interim storage for subsequent

disposal. A more detailed description of the IHLW Interim Storage System and its functional components is provided in Section 3.0 of this specification.

The path forward for IHLW interim storage entails sequential construction of potentially several discrete facilities as described in HNF-3899, *Immobilized High-Level Waste Interim Storage Alternative Generation and Analysis and Decision Report.* The first facility involves retrofit/completion of the existing CSB under Project W-464 to accommodate the minimum Phase 1 production quantity (600 canisters). One or more additional facilities will be modified/constructed as necessary to furnish IHLW interim storage capacity beyond that provided by the CSB.

1.3 DOCUMENT OVERVIEW

The purpose of this Level 1 Specification is to define the system level requirements for the Phase 1 IHLW Interim Storage System. This specification represents the collection of upper-level requirements (functional, performance, design, interface, and test) that are allocated to the IHLW Interim Storage System and it spans the entire lifecycle of this system. The program and its implementing project(s) will follow the requirements and guidance of DOE O 430.1A, *Life Cycle Asset Management.*

This specification is used to allocate functional and technical requirements for the design of one or more subordinate construction projects necessary to implement the program mission identified in Section 1.1. This specification also guides lower-tier documents that determine the requirements for the hardware and component specifications/constraints associated with these subordinate construction projects (e.g., Project W-464 Design Requirements Document.) However, the IHLW Interim Storage System currently does not have a Standards/Requirements Identification Document (S/RID), Safety Analysis Report (SAR), or formal interface control documents with all the appropriate entities [e.g., the Spent Nuclear Fuel Program (SNFP)]. Moreover, the IHLW Interim Storage System is not covered by either the Tank Farm (RPP) or SNFP safety documentation (i.e., S/RID and SAR), although the existing CSB structure is covered under the SNFP S/RID and SAR. Therefore, an S/RID and a SAR, and potentially other requirement documents, will need to be created for each of the subordinate construction projects. Consequently, more finite requirements may be developed, as needed, and reflected in lower-tier requirements documents for the subordinate construction projects of the IHLW Interim Storage System.

This document was prepared to address the requirements for implementing the entire Phase 1 IHLW Interim Storage System (i.e., CSB retrofit and follow-on interim storage facilities). Given that the existing CSB structure is covered under the SNFP safety documentation, special consideration must be given to any modification that affect the SNF storage in Vault 1. Such a modification must be designed and constructed according to the original "Code of Record" (Design Basis Documents for the CSB), and it cannot adversely impact the safety basis as established in HNF-3553, *Annex A Canister Storage Building Final Safety Analysis Report.* Other modifications to the CSB and new installations are not bound by these constraints. These differences will be reflected in the lower-tier documents for each subordinate construction project.

Given that the Phase 1 IHLW Interim Storage System is an evolving and long-term endeavor, some physical characteristics of the system are unknown or are subject to change. Where information is to be provided at a later date, the information is labeled "TBD" (to be determined). Where information is tentative, the information is labeled "Hold". Use of "TBD" and "Hold" is addressed in HNF-IP-0842, *RPP Administration*, Volume IV, Engineering, Section 4.19, "Engineering TBDs/Holds".

The use of the words "shall", "should", "may", and "will" within this specification express the following meaning:

"Shall" indicates a provision that is binding. "Should" and "may" indicate non-mandatory, but conceptually desirable, provisions. Design development could render the "should" and "may" provisions infeasible, impractical, excessively costly, or otherwise incapable of implementation from the designer's perspective. "Will" is a simple declaration of purpose or futurity.

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2.0 APPLICABLE DOCUMENTS

The requirements applicable to the IHLW Interim Storage System come from many government and non-government source documents, and various codes and standards. Each document (of the exact revision identified) in this section is called out in the text by one or more requirements of this specification and represents a part of this specification to the extent specified where cited.

Requirements contained in this document are a result of identifying requirements from a review of the following sources:

- WHC-SD-WM-DRD-012, Design Requirements Document for the Interim Store Phase 1 Solidified High-Level Waste
- HNF-2298, Conceptual Design Report for Immobilized High-Level Waste Interim Storage Facility (Phase 1)
- HNF-2298, Conceptual Design Report for Immobilized High-Level Waste Interim Storage Facility (Phase 1), Appendix G, Preliminary Safety Evaluation for Project W-464
- DE-AC06-99RL14047, CH2M Hill Contract with the Department of Energy
- DE-AC06-96RL13200, Fluor Daniel Hanford Contract with the Department of Energy
- HNF-3553, Spent Nuclear Fuel (SNF) Safety Analysis Report (SAR), Annex A, CSB Final Safety Analysis Report
- HNF-SD-SNF-RD-001, Spent Nuclear Fuels Project Standards and Requirements Identification Document (S/RID)
- Direct input from Security representatives.

These sources identify regulatory/institutional requirements (e.g., 10 CFR 835, DOE Order 6430.1A, WAC 173-303, etc.), but are not themselves requirements documents for the IHLW Interim Storage System. This Level 1 Specification provides traceability to the governing Federal/State laws, and U.S. Department of Energy (DOE) orders or standards.

2.1 GOVERNMENT DOCUMENTS

The following DOE orders and regulatory documents of the exact issue shown (see Table 2-1), including those promulgated by the Federal and Washington State government, constitute a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall take precedence.

Table 2-1. Government Documents. (5 sheets)

Document Number	Title
10 CFR 20	*Standards for Protection Against Radiation* (1994)
10 CFR 70.59	*Domestic Licensing of Special Nuclear Material, Effluent Monitoring Reporting Requirements Section* (1/1/99)
10 CFR 72.106	*Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste* (1/1/99)
10 CFR 830.120	*Quality Assurance Requirements* (1/1/99)
10 CFR 835	*Occupational Radiation Protection* (1/1/98)
10 CFR 1021	*National Environmental Policy Act Implementing Procedures* (1/1/99)
29 CFR 1910	*Occupational Safety and Health Standards* (7/1/98)
29 CFR 1926	*Safety and Health Regulations During Construction* (7/1/99)
40 CFR 52, Appendix E	*Approval and Promulgation of Implementation Plans*
40 CFR 60	*Standards of Performance for New Stationary Sources*
40 CFR 61	*National Emissions Standards for Hazardous Air Pollution* (7/1/99)
40 CFR 122	*EPA Administered Permit Programs, The National Pollutant Discharge Elimination System* (7/1/99)
40 CFR 264	*Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities* (1986)
49 CFR 173.441	*Shippers - General Requirements for Shipments and Packaging* (1/1/99)
DOE/EIS 0189F	*TWRS, Hanford Site, Richland, Washington, Final Environmental Impact Statement*
DOE/EM-0093	*Waste Acceptance Product Specifications for Vitrified High-Level Waste Forms*
DOE O 151.1	*Comprehensive Emergency Management System*
DOE O 232.1A	*Occurrence Reporting and Processing of Operations Information*

Table 2-1. Government Documents. (5 sheets)

Document Number	Title
DOE M 232.1-1A	*Occurrence Reporting and Processing of Operations Information*
DOE O 414.1	*Quality Assurance* (8/1/96)
DOE C 420.1	*CRD Facility Safety*
DOE O 420.1	*Facility Safety*
DOE O 425.1A	*Startup and Restart of Nuclear Facilities*
DOE O 430.1A	*Life Cycle Asset Management* (10/14/98)
DOE O 435.1	*Radioactive Waste Management* (6/9/99)
DOE O 440.1A	*Worker Protection Management for DOE and Contractors* (3/27/98)
DOE O 451.1A	*National Environmental Policy Act Compliance Program* (6/5/97)
DOE O 460.1A	*Packaging and Transportation Safety* (10/2/96)
DOE O 470.1, Chg. 1	*Safeguards and Security Program*
DOE O 471.1	*Identification and Protection of Unclassified Controlled Nuclear Information*
DOE O 472.1B	*Personnel Security Activities*
DOE O 474.1	*Control and Accountability of Nuclear Materials*
DOE Order 1324.5B	*Records Management Program* (7/19/96)
DOE Order 4330.4B	*Maintenance Management Program* (2/10/94)
DOE Order 5300.1C	*Telecommunications* (6/12/92)
DOE Order 5400.1, Change 1	*General Environmental Protection Program* (6/29/90)
DOE Order 5400.5, Change 2	*Radiation Protection of the Public and the Environment* (1/7/93)

Table 2-1. Government Documents. (5 sheets)

Document Number	Title
DOE Order 5480.3	*Safety Requirements for the Packaging and Transportation of Radioactive Material*
DOE Order 5480.4, Change 4	*Environmental Protection, Safety and Health Protection Standards* (1/7/93)
DOE Order 5480.10	*Contractor Industrial Hygiene Program*
DOE Order 5480.11	*Radiation Protection for Occupational Workers* (12/21/88)
DOE Order 5480.19, Change 1	*Conduct of Operations Requirements for DOE Facilities* (5/18/92)
DOE Order 5480.20A	*Personnel Selection, Qualification, Training, and Staffing at DOE Reactor and Non-Reactor Nuclear Facilities* (11/15/94)
DOE Order 5480.21	*Unreviewed Safety Questions* (12/24/91)
DOE Order 5480.22	*Technical Safety Requirements*
DOE Order 5480.23	*Nuclear Safety Analysis Report*
DOE Order 5632.1C	*Protection and Control of Safeguards and Security Interests* (7/15/94)
DOE M 5632.1C-1	*Manual for Protection and Control of Safeguards and Security Interests*
DOE Order 5820.2A	*Radioactive Waste Management*
DOE Order 6430.1A	*General Design Criteria* (4/6/89)
DOE/RL-89-10, Rev 5	*Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)*
DOE/RL-92-36	*Hanford Site Hoisting and Rigging Manual* (3/27/00)
DOE/RL-94-04	*Hanford Emergency Management Plan*
DOE/RL-97-67	*Pollution Prevention and Best Management Practices Plan for State Waste Discharge Permits ST4508 and ST4509*

Table 2-1. Government Documents. (5 sheets)

Document Number	Title
DOE-RL-SOD-INST-L&T. 001	*Hanford Site Lockout/Tagout Program*
DOE/RW-0333P	*Quality Assurance Requirements and Description for the Civilian Radioactive Waste Management Program*
DOE/RW-0351P	*Waste Acceptance System Requirements Document*
DOE-STD-1020-94, Change 1	*Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities* (1/96)
DOE-STD-1027-92, Change 1	*Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports* (9/97)
DOE-STD-3009-94, Change 1	*Preparation Guide for U.S. Department of Energy Non-Reactor Nuclear Facilities Safety Analysis Report* (1/00)
DOH PUB 331-123 (Washington State Department of Health)	*Water System Design Manual*
NRC Regulatory Guide 8.8, Rev. 2	*Information Relevant to Ensuring that Occupational Exposures at Nuclear Power Stations will be as is Reasonably Achievable* (6/78)
RCW 46.44.041	*Revised Code of Washington, Maximum gross weights – Wheelbase and axle factors*
RLID 473.1	*Protection of Safeguards and Security Interests*
RLID 1360.2B	*Unclassified Computer Security Program*
W-A-450C/GEN	*Federal Specification Components for Interior Alarm Systems*
WAC 173-303	*Dangerous Waste Regulations*
WAC 173-400	*General Regulations for Air Pollution Sources*
WAC 246-220	*Radiation Protection – General Provisions*
WAC 246-247	*Radiation Protection – Air Emissions*

Table 2-1. Government Documents. (5 sheets)

Document Number	Title
WAC 246-272	*On-Site Sewage System*
WSDOT M41-10	*Washington State Department of Transportation Standard Specification for Road, Bridge, and Municipal Construction*

Copies of specifications, standards, drawings, and publications required by suppliers in connection with specified procurement functions should be obtained from the contracting agency or as directed by the contracting agent.

2.2 NON-GOVERNMENT DOCUMENTS

National codes and standards, and the Hanford Site and RPP documents of the exact issue shown (see Table 2-2) constitute a part of this specification to the extent specified herein[1]. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered the superseding requirement.

Table 2-2. Non-Government Documents. (2 sheets)

Document Number	Title
ANSI/ANS 57.9-1992	*Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)*
ANSI N14.6-1993	*Radioactive Materials - Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds or More*
BNFL-5193-ID-14, Rev. 5	*Interface Control Document for Immobilized High-Level Waste*
HNF-2962	*A List of Electro-Magnetic Interference (EMI) and Electro-Magnetic Compatibility (EMC) Requirements.*
HNF-5173	*Project Hanford Management Contract Radiological Control Manual*
HNF-EP-0063	*Hanford Site Solid Waste Acceptance Criteria*
NFPA 70	*National Electrical Safety Code (NEC)*

[1] The RPP-PROs implement federal and state regulations, and DOE Orders.

Table 2-2. Non-Government Documents. (2 sheets)

Document Number	Title
NFPA 101	*Safety to Life from Fire in Buildings and Structures*
RPP-PRO-097, Rev. 0	*Engineering, Design, and Evaluation*
UBC 1994	*Uniform Building Code*
TBD (TBD No. W464-007)	*Interface Control Document for the SNF Program and IHLW Interim Storage Program at the Canister Storage Building*

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and Federal Agencies.

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3.0 PROJECT FUNCTIONS AND REQUIREMENTS

3.1 SYSTEM DEFINITION

3.1.1 Functional Description

Five top-level functions describe the IHLW Interim Storage Mission. These functions and their subordinate mid-level functions are listed below.

1. Receive and store IHLW

    - Receive Phase 1 IHLW from the RPP-WTP
    - Transport Phase 1 IHLW to interim storage
    - Isolate/store Phase 1 IHLW
    - Support interim storage of Phase 1 IHLW

2. Maintain safe and compliant IHLW interim storage

3. Disposition IHLW (i.e., stage IHLW for offsite shipping)

    - Retrieve Phase 1 IHLW from interim storage
    - Prepare IHLW canisters for offsite shipment

4. Transition IHLW Interim Storage Facilities to decommissioning

5. Decontaminate and decommission (D&D) IHLW Interim Storage Facilities

The primary scope of these functions is to provide safe, economic, environmentally sound receipt, handing, and storage of IHLW until the IHLW is transferred offsite to the federal geologic repository. Of these functions, all but staging IHLW for offsite shipping and D&D have been allocated to the Phase 1 IHLW Interim Storage System. The specific architecture and implementation timing to address staging IHLW for offsite shipping is undefined pending completion of a future Alternative Generation and Analysis (AGA) and the finalization of the repository interface criteria. Although the system must consider the eventual D&D facilities, actual D&D will be performed under the Excess Facilities Program.

3.1.2 Major Facility Description

The CSB and one or more additional major facilities are required to perform functions identified in Section 3.1.1. The CSB superstructure and Vault 1were initially constructed to provide for the safe interim storage of SNF at the Hanford Site. The CSB design and storage capacity of Vaults 2 and 3 will be adapted for IHLW interim storage. The implementing architectures for the follow-on facilities are tentative pending completion of a future AGA.

3.1.3 Interface Definition

The IHLW Interim Storage System will interface with various facilities, systems, projects and programs as described in the following sections.

3.1.3.1 Interfaces with Other River Protection Project Elements

3.1.3.1.1 Interfaces with the Tank Waste Treatment Program

The RPP-WTP will receive HLW feed from the Waste Feed Delivery System. This waste will be immobilized (vitrified) along with materials (e.g., radionuclides) that are separated from LAW feed. The resultant IHLW will be sealed in canisters and transferred to interim storage. The initial state at which administrative control transitions from the RPP-WTP to the Phase 1 IHLW Interim Storage System entails a single IHLW canister that is confined and shielded within an onsite transportation cask at a location within the RPP-WTP site boundary.

The IHLW Onsite Transportation System (tractor and trailer with cask) of the IHLW Interim Storage System effects the physical interface between the RPP-WTP and the IHLW Interim Storage Facilities. The key interface parameters are primarily related to physical attributes of the canisters and transportation casks. Other interface items are programmatic (e.g., arrival, handling, unloading, loading, loading procedures; and dispatching of the transportation cask). The transportation system must coordinate canister shipments and transfer of associated documentation (i.e., canister manifest) with the Tank Waste Treatment Program. The transportation casks must include the necessary provisions to facilitate handling, lifting, surveying, and inspecting as needed at both the RPP-WTP and IHLW Interim Storage Facilities. These interfaces are being formally described and controlled by BNFL-5193-ID-14, *Interface Control Document for Immobilized High-Level Waste.*

3.1.3.1.2 Interfaces with Spent Nuclear Fuel Canister Storage Building Program

Because the CSB retrofit entails modifications to an existing facility that is in use for SNF storage, the IHLW Interim Storage System has an interface with the SNFP. The key interfaces of the Phase 1 IHLW Interim Storage System (i.e., CSB retrofit) with the CSB SNF Program are associated with the following:

- The CSB retrofit design and construction (e.g., Vaults 2 and 3 modifications, new Load-in/Load-out Annex, canister transportation system, and cask/canister lifting devices and hoists, etc.).

- Numerous shared utility and support systems (e.g., electrical power; fire protection; computer; heating, ventilation, and air conditioning; instrumentation and control; storage and personnel office space; etc.).

- Common programmatic activities (e.g., deck operations during retrofit construction, dual-mission worker activities on the operations deck, common facilities maintenance, operational schedules, security, etc.).

These interfaces are recognized and controlled during the Project W-464 design and construction activities, and IHLW storage operations in TBD, *Interface Control Document for the SNF Program and IHLW Interim Storage Program at the Canister Storage Building* (TBD No. W464-007).

3.1.3.1.3 Interfaces of Additional Interim Storage Facilities with Other Programs

Details relative to the additional (follow-on) IHLW Interim Storage Facilities (e.g., architecture and location) have not yet been formulated. Therefore, corresponding interfaces with other Hanford Site programs, if any, have not been identified.

3.1.3.2 Interfaces with Hanford Site Infrastructure and Utilities

The IHLW Interim Storage System connects to elements of the Hanford Site infrastructure, and receives services needed for its operation from the Hanford Site utilities. For the CSB retrofit, many of these infrastructure services will be effected through interface with existing CSB systems. Other IHLW Interim Storage System elements may establish new connections to these existing services.

3.1.3.2.1 Interface with Existing Rail Lines

Although the Hanford Site rail system has been decommissioned, a rail line is required to support the Staging and Load-out Facility interface with the repository. The implementing architecture for the Staging and Load-out Facility is undecided and details of this interface are unknown. However, the staging and load-out function could be co-located with a follow-on IHLW Interim Storage Facility. Therefore, a follow-on IHLW Interim Storage Facility could have an interface with the rail system maintained by the Port of Benton.

3.1.3.2.2 Interface with Existing Roadways

Access to IHLW Interim Storage Facilities will be over existing Hanford Site roads. Paving installed by the subordinate construction projects of the IHLW Interim Storage System shall be compatible with, and connected to, the existing roads. Appropriate design analysis shall be performed to determine whether existing roadways are capable of handling the IHLW Onsite Transportation System. The IHLW Onsite Transportation System should be designed such that it is compatible with the existing roadways or upgrade of the existing roadways will need to be effected.

3.1.3.2.3 Interface with Existing Security System

Security of the IHLW Interim Storage Facilities will be provided through signals to the Hanford Site security central alarm system (CAS) for category II-D nuclear material. (See Section 3.2.4.6 for additional details on the security requirements.)

3.1.3.2.4 Interface with the Existing Communications Network

Local area network and telephone communications will be provided to the IHLW Interim Storage Facilities by connecting their communications system to the Hanford Site communication network.

3.1.3.2.5 Interface with the Existing Electric Power Grid

Electric power service will be provided to the IHLW Interim Storage Facilities by connecting their electric power system to the Hanford Site electric power grid. Electrical power delivered to the system and electrical devices shall conform to the NFPA 70, *National Electrical Code (NEC).*

3.1.3.2.6 Interfaces with the Existing Water Systems

If water services are needed, the IHLW Interim Storage Facilities will be provided with water by connecting to Hanford Site water systems. When sanitary sewage services are needed they should be acquired by connecting to an appropriate (e.g., suitable proximity and available excess capacity) drain field, if available. Otherwise, when sanitary sewage services are needed the IHLW Interim Storage System must furnish them in accordance with WAC 246-272, *On-Site Sewage System.*

3.1.3.3 Interfaces with Other Hanford Site Programs

Other Hanford Site programs will provide support to the IHLW Interim Storage System by receiving the solid waste and liquid effluent generated by operations and maintenance activities.

3.1.3.4 Interface with the Repository

The end state of the operational phase entails retrieval of IHLW canisters for subsequent transfer to a Staging and Load-out Facility where they will be prepared for offsite shipment to the Civilian Radioactive Waste Management System (CRWMS) (i.e., the national geologic repository). The interface is being developed and controlled by the CRWMS in DOE/RW-0351, *Waste Acceptance System Requirements Document.*

3.2 CHARACTERISTICS

3.2.1 Performance Characteristics

The following performance characteristics describe the generalized capabilities and expected performance of the IHLW Interim Storage System.

3.2.1.1 Receive and Store Immobilized High-Level Waste

The Phase 1 IHLW Interim Storage System shall be capable of receiving sealed canisters of IHLW from the RPP-WTP and placing these canisters into appropriate storage locations. The

system shall have the capability to retrieve the canisters from storage, and to prepare and load them into casks for future shipment.

3.2.1.1.1 Immobilized High-Level Waste Canisters

The Phase 1 IHLW Interim Storage System shall be capable of accepting IHLW canisters produced by the RPP-WTP. The estimated radiological composition and chemical composition of the IHLW (glass matrix) are provided in Tables 3-1 and 3-2, respectively. Table 3-3 contains the physical characteristics of IHLW and Table 3-4 contains physical attributes of a standard IHLW canister. The canister will be designed to withstand a 7-m drop as specified in DOE/EM-0093, *Waste Acceptance Product Specification for Vitrified High-Level Waste Form*. Additional canister drop conditions may be specified in the applicable RPP-WTP Authorization Basis or accident analysis documents.

Table 3-1. Glass Maximum Radionuclide Composition.[(a)(b)(c)]

Isotope	Ci/kg	Isotope	Ci/kg	Isotope	Ci/kg
^{3}H	2.1 E-04	^{129}I	1.4 E-06	^{237}Np	3.7 E-04
^{14}C	2.1 E-05	^{137}Cs	9.9 E+01	^{238}Pu	1.8 E-03
^{60}Co	5.0 E-02	^{152}Eu	2.4 E-03	^{239}Pu	1.6 E-02
^{90}Sr	5.0 E+01	^{154}Eu	2.6 E-01	^{240}Pu	2.9 E-03
^{99}Tc	7.5 E-02	^{155}Eu	1.5 E-01	^{241}Pu	1.1 E-01
^{125}Sb	1.6 E-01	^{233}U	4.5 E-06	^{241}Am	4.5 E-01
^{126}Sn	7.4 E-04	^{235}U	1.3 E-06	$^{243+244}Cm$	5.4 E-01

[(a)]Some decay products (e.g., 90Y from 90Sr) and trace isotopes are not shown.

[(b)]Simultaneous maximum total canister inventory (in Ci) of 90Sr, 125Sb, 137Cs, 154Eu, and 241Am is limited by: (90Sr * 0.00669) + (125Sb * 0.00335) + (137Cs * 0.00494) + (154Eu * 0.00898) + (241Am * 0.0328) < 1,500.

[(c)]Values based on BNFL-5193-ID-14, Interface Control Document for Immobilized High-Level Waste.

Table 3-2. Glass Nominal Chemical Composition.[(a)(b)] (2 sheets)

Component	kg Element/kg Glass	Component	kg Element/kg Glass
Al	0.0498	Na	0.0693
B	0.0280	Ni	0.0046
Ca	0.0019	O	0.4567
Cs	0.0013	Pb	0.0016
Fe	0.0793	Si	0.1980
K	0.0032	Sr	0.0043

Table 3-2. Glass Nominal Chemical Composition.[a][b] (2 sheets)

Component	kg Element/kg Glass	Component	kg Element/kg Glass
La	0.0043	U	0.0082
Li	0.0257	Zn	0.0148
Mn	0.0188	Zr	0.0278

[a]Only constituents with weight fractions greater than 0.0010 are included in this table.
[b]Values based on BNFL-5193-ID-14, *Interface Control Document for Immobilized High-Level Waste.*

Table 3-3. Glass Physical Characteristic.[a]

Parameter	Unit	0 °C Value	100 °C Value
Thermal conductivity	Watts/m - ° C	1.80	2.03
Heat capacity	J/g – ° C	0.75	0.85
Density	kg/m^3	2,660	2,650

[a]Values based on BNFL-5193-ID-14, Interface Control Document for Immobilized High-Level Waste.

Table 3-4. Standard Canister Attributes.[c] (2 sheets)

Parameter	Unit	Nominal	Maximum Allowed Compliant	Maximum Allowed Non-Conforming
Surface Dose Rate (gamma)	Sv/h	--	10^3	10^3
Surface Dose Rate (neutron)	Sv/h	--	0.1	0.1
Removable Surface Contamination (alpha)	Bq/m^2	--	3,670	3,670
Removable Surface Contamination (beta-gamma)	Bq/m^2	--	36,700	36,700
Inert Cover Gas Leak Rate	$Atm\text{-}cm^3/s$	--	10^{-4}	10^{-4}
Decay Heat	W	300[a]	1,500	1,500[b]
Overall Length	m	4.500	4.505	4.505
Diameter	m	0.610	0.625	0.625
Wall Thickness	cm	0.953	1.092	--
Glass Volume	m^3	1.150	1.214	1.214
Glass Fraction (% fill)	%	95	100	100
Glass Weight	kg	2,973	--	--

Table 3-4. Standard Canister Attributes.[c] (2 sheets)

Parameter	Unit	Nominal	Maximum Allowed Compliant	Maximum Allowed Non-Conforming
Shell Weight	kg	708	--	--
Total Canister Weight	kg	3,681	4,200	4,200

[a]Nominal decay heat represents the allowed maximum averaged over all IHLW canisters (i.e., entire Phase 1 population).

[b]Table E-2 of the Privatization Contract (DE-RP06-96RL13308) allows non-conforming IHLW canisters of up to 2,200 W. However, IHLW canisters exceeding 1,200 W are not expected and IHLW canisters exceeding 1,500 W are not considered credible, BNFL-5193-ID-14, *Interface Control Document for Immobilized High-Level Waste.* The IHLW canister handling, transportation, and interim storage equipment shall be designed based on a 1,500 W maximum individual IHLW canister decay heat.

[c]Values based on BNFL-5193-ID-14, *Interface Control Document for Immobilized High-Level Waste.*

3.2.1.1.2 Immobilized High-Level Waste Receipt/Retrieval Throughput

The Phase 1 IHLW Interim Storage System shall be able to accommodate canister receipt or retrieval at an average rate of one canister every two days (see BNFL-5193-ID-14). Also, the system shall be capable of canister receipt or retrieval at a peak rate of one canister per day.

Based on potential offsite shipping needs, the IHLW Interim Storage Facility shall be capable of retrieving an IHLW canister from its storage location within 12 hours once it has been authorized for transport to the Staging and Load-out Facility. Retrieval shall assume a last-in/first-out process.

3.2.1.1.3 Storage Capacity

The Phase 1 IHLW Interim Storage System shall accommodate a minimum of 600 IHLW canisters (0.61-m diameter by 4.5-m tall) and a maximum of 1,120 IHLW canisters. The initial implementing architecture (i.e., the CSB) shall provide storage capacity for at least the minimum Phase 1 quantity and should be maximized to the extent practical. Additional IHLW Interim Storage Facilities will furnish storage capacity beyond that provided by the CSB retrofit.

3.2.1.1.4 Canister Temperature Control

The Phase 1 IHLW Interim Storage System (including onsite transportation) shall be designed to ensure that the IHLW canister centerline temperature never exceeds 400° C as specified in DOE/EM-0093, *Waste Acceptance Product Specification for Vitrified High-Level Waste Form.*

The design basis thermal load generated by radiological decay heat from IHLW canisters shall be based on an average value of 300 W per canister and a maximum

individual canister heat output of 1,500 W. Furthermore, each CSB vault total thermal load shall be based on 440 IHLW canisters with an aggregate heat output of 150-kW.

3.2.1.2 Maintain Safe and Compliant System

The Phase 1 IHLW Interim Storage System shall be capable of being maintained in a safe and compliant mode until turnover to the D&D phase as described in the Closure Plan (TBD No. W464-002). The design life of system structures and components shall be based on forty years.

3.2.1.3 Disposition of Immobilized High-Level Waste

The IHLW Interim Storage System shall provide capabilities to retrieve, prepare, and transport IHLW canisters in interim storage to a future Staging and Load-out Facility. Requirements for this staging and load-out function are TBD (TBD No. W464-001).

3.2.1.4 System Transition

The Phase 1 IHLW Interim Storage System shall be capable of performing those activities necessary to place the system components into a safe, stable, and environmentally sound condition pending final disposition.

3.2.1.5 Decontamination and Decommission

The Phase 1 IHLW Interim Storage System shall comply with the design criteria of DOE Order 6430.1A, *General Design Criteria,* and DOE O 435.1, *Radioactive Waste Management*

3.2.2 System Capability Relationships

This section describes the relationship among operating modes of the IHLW Interim Storage System.

3.2.2.1 Definition of Operating Modes

The system, while supporting the RPP IHLW interim storage mission, entails three general operating modes. These operating modes are load-in/load-out, passive interim storage, and D&D transition. The following provides a brief description of each operating mode.

In the load-in/load-out mode of operation, the Interim Storage Facility is either actively receiving IHLW for storage or actively retrieving IHLW from interim storage. The load-out process is essentially the reverse of the load-in process. Retrieved IHLW is transported to a Staging and Load-out Facility. At the Staging and Load-out Facility, the IHLW canisters are prepared for shipment and loaded onto an offsite shipping mechanism.

In the interim storage mode of operation, no further IHLW is received at the IHLW Interim Storage Facility and the entire inventory of IHLW is in passive interim storage. During this

period the only activities required are periodic assessment (e.g., monitoring, inspection, instrument calibration, equipment maintenance, etc.) of storage locations to verify containment integrity and sufficient cooling. The IHLW will remain in interim storage (potentially up to 40 years) until final disposition (i.e., disposal via the national geologic repository) is available. The 40-year storage period begins with the startup of the IHLW Interim Storage Facility and any facility design life analysis should take into account the age of the existing facility and equipment.

Following the retrieval of all IHLW, (and SNF for the case of the CSB), the system is placed in a D&D transition operating mode. When completed, the system is turned over for excess facility processing (i.e., D&D), and the facility's administrative control is handed over to an environmental restoration contractor.

3.2.2.2 Operating Modes Schedule

Based on the RPP schedule, the initial IHLW Interim Storage Facility shall be ready to receive IHLW canisters in June 2008. During the period when the canisters are being received, the system is in the load-in/load-out operating mode.

3.2.3 External Interface Requirements

The external interfaces are identified and described in Section 3.1.3, Interface Definition. The following defines the primary requirements imposed on these interfaces.

3.2.3.1 Waste Treatment Plant

Requirements imposed on this interface are identified and controlled by BNFL-5193-ID-14, *Interface Control Document for Immobilized High-Level Waste*. In addition, the IHLW Interim Storage System shall be designed such that, during facility operation, canister handling and interim storage activities do not intentionally invalidate canister parameters that have been certified by the RPP-WTP as being compliant with DOE/RW-0351P, *Waste Acceptance System Requirements Document* and DOE/EM-0093, *Waste Acceptance Product Specification for Vitrified High-Level Waste Form*. Also, certification data supplied by the RPP-WTP concurrent with transfer of a canister's institutional control to the Phase 1 IHLW Interim Storage System must be maintained and controlled in accordance with DOE/RW-0333P, *Quality Assurance Requirements and Description for the Civilian Radioactive Waste Management Program*. The system shall provide features necessary to effect the maintenance and control of this producer-generated certification data.

3.2.3.2 Spent Nuclear Fuel Storage

Requirements imposed on this interface are recognized and controlled in TBD, *Interface Control Document for the SNF Program and IHLW Interim Storage Program at the Canister Storage Building* (TBD No. W464-007). The principal purpose for these requirements is to ensure that the IHLW interim storage mission does not adversely impact the SNF storage mission. During construction of new installations and retrofit modifications associated with the Phase 1 IHLW interim storage mission and subsequent operation phases, CSB Vault 1 will contain SNF in

passive storage. Therefore, new installations and retrofit modifications to the CSB shall not compromise or adversely impact the safety, security, and confinement integrity of SNF in storage, or preclude eventual removal of SNF from storage. The CSB safety basis for SNF storage is established in the HNF-3553, *Annex A Canister Storage Building Final Safety Analysis Report*. Modifications to the CSB for the IHLW interim storage mission that affect the SNF storage and vault shall be designed and constructed according to the original "Code of Record" for the CSB (design basis documents).

3.2.3.3 Repository Acceptance

Requirements imposed on this interface are documented and controlled in DOE/RW-0351, *Waste Acceptance System Requirements Document*. The design and construction of the Phase 1 IHLW Interim Storage System shall provide all features required to comply with applicable criteria established in DOE/RW-0351, *Waste Acceptance System Requirements Document*, and DOE/EM-0093, *Waste Acceptance Product Specification for Vitrified High-Level Waste Form.*

3.2.4 Physical Characteristics

This section identifies the physical characteristics of the Phase 1 IHLW Interim Storage System. Given that there may be multiple IHLW Interim Storage Facilities, specific physical characteristics will vary on a facility-by-facility basis. This section, therefore, provides only an upper-level overview. In addition, every individual IHLW Interim Storage Facility will not exhibit every characteristic reflected herein. Functional allocations to the various subordinate construction projects, as reflected in Section 3.7, may render a physical characteristic unnecessary or non-relevant.

3.2.4.1 Onsite Transportation

The IHLW Interim Storage System administrative control over the transportation system starts with the onsite transportation system (containing a filled cask) leaving the gate of the RPP-WTP receiving area and stops once it returns with an empty cask to the RPP-WTP. The IHLW Interim Storage System operates the transporter, but the RPP-WTP contractor loads the transporter.

3.2.4.1.1 Physical Parameters

The transporter, which includes tractor and trailer, shall be properly sized to meet the access requirements for the RPP-WTP (see BNFL-5193-ID-14, *ICD for Immobilized High-Level Waste*) and the load-in/load-out structure of the IHLW Interim Storage Facilities.

The onsite shipping cask design shall adhere to physical constraints as specified in BNFL-5193-ID-14, *ICD for Immobilized High-Level Waste*. For the existing 200 East Area roads, the maximum weight of loaded cask, truck, and trailer should not exceed the requirement of RCW 46.44.041, *Maximum gross weights – Wheelbase and axle factors*. If necessary, oversize loads may be allowed provided prior authorization is obtained.

The following lists additional cask requirements.

- The shipping cask shall be designed to be repeatedly loaded onto and unloaded from the transport trailer by means of a lifting device.
- Each shipment shall entail one IHLW canister loaded within a single onsite-shipping cask.
- The shipping cask shall be transported in vertical orientation with the opening on the top of the cask.
- The cask shall provide the safety functions of a confinement barrier and structural protection to the canister from accidents (e.g., drops by lifting device or traffic incidents) as specified in the applicable Authorization Basis or accident analysis documents (e.g., Hazards Analysis or SAR for packaging).
- The cask shall provide cooling and shielding of the IHLW products to the degree necessary to comply with restriction defined in Section 3.2.1.1.4 and Section 3.2.4.1.3.

3.2.4.1.2 Transporter and Cask Release Inspections

The transporter and cask (internal cavity and external surfaces) shall be designed to facilitate conducting radiological surveys to assess contamination levels, and visual inspections to assess the condition and determine maintenance needs.

The internal cavity of empty casks provided to the RPP-WTP shall not exhibit removable (smearable) surface contamination greater than limits specified in BNFL-5193-ID-14, *Interface Control Document for Immobilized High-Level Waste.* Furthermore, removable surface contamination levels on the transporter and cask external surfaces shall comply with limits specified in HNF-5173, *Project Hanford Management Contract Radiological Control Manual.* The external surfaces of filled casks received from the RPP-WTP will also comply with these limits as specified in BNFL-5193-ID-14, *Interface Control Document for Immobilized High-Level Waste.*

3.2.4.1.3 Transportation Shielding

Transportation system shielding criteria are summarized in Table 3-5. The transport cask system shall provide sufficient shielding to comply with U.S. Department of Transportation (DOT) radiological protection guidelines and the requirements listed in 49 CFR 173.441, *Shippers - General Requirements for Shipments and Packaging.* A loaded transport cask shall not exceed the following criteria for contact handling. Additional shielding to yield contact dose rates below these maximum acceptable values shall be considered in accordance with As Low As Reasonably Achievable (ALARA) principles (see Section 3.3.6.1.1).

Table 3-5. Transportation Shielding Criteria.

Basis for limit	Maximum dose rate (micro Sv/h)	Maximum dose rate (mRem/h)
Contact Handling	2000 at container surface	200 at container surface
DOT Cargo	100 at 2 meters	10 at 2 meters
DOT Driver	20 at truck cab	2 at truck cab

3.2.4.2 General Facility Configuration

The structure and layouts of the facility shall conform to DOE Order 6430.1A, *General Design Criteria;* NFPA 70, *National Electrical Code;* NFPA 101, *Safety to Life from Fire in Buildings and Structures;* and UBC 1994, *Uniform Building Code.* Control devices for access to High Radiation Areas shall conform to the requirements of 10 CFR 835.502, *Occupational Radiation Protection*, High and Very High Radiation Areas.

3.2.4.2.1 Canister Receipt

The Phase 1 IHLW Interim Storage System shall include features required to effect the exchange of an IHLW canister between the Onsite Transportation System and the Canister Handling System internal to the IHLW Interim Storage Facility. Also included in this system are features necessary to prepare (e.g., test for removable contamination and decontaminate if required) the empty cask for return to the RPP-WTP.

3.2.4.2.1.1 Load-In/Load-Out Area

The system shall be capable of removing the cask from the trailer and placing the cask into a transfer station. Each IHLW Interim Storage Facility shall be furnished with a load-in/load-out area that is capable of supporting the weight of a fully-loaded (i.e., a cask loaded with a canister) tractor/trailer. The load-in/load-out area shall include the flexibility to receive a cask loaded with an IHLW canister and an empty/clean cask by conventional truck-trailer. Road access to this area shall be provided as described in Section 3.2.4.2.11.

3.2.4.2.1.2 Transfer Station

The transfer station shall protect facility workers from excessive radiation doses when a canister is transferred from the cask to the Canister Handling System. The transfer station shall be of sufficient size to accommodate a cask, remotely remove the cask lid, and transfer the canister into the Canister Handling System.

3.2.4.2.1.3 Lifting Devices

A lifting device shall be furnished within the load-in/load-out area, and shall have a lift-capacity and lift-height sufficient to accommodate a fully-loaded

cask. The lifting device is used to move a vertically-positioned cask from the trailer to a transfer station and to return a cask back to the trailer. The lifting device shall be of sufficient size and capacity for this activity. This lifting device shall be configured to prevent tipping or dropping of the cask.

A lifting device or an auxiliary hoist is also required to handle the cask lid. This smaller, remote controlled lifting device located in the transfer station will remove the lid of the transportation cask.

Lifting devices shall comply with ANSI N14.6-1993, *Radioactive Materials - Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds or More*. Lifting device designs shall consider ALARA concepts during operations. Consideration shall be given in design and procurement to disassembly features such as plug-in units for drives and electrical connectors. Lifting devices and hoists shall also conform to applicable sections of DOE/RL-92-36, *Hoisting and Rigging Manual*. Maintenance platforms or areas shall be provided where necessary for work on lifting devices. Proximity to a non-radioactive maintenance area should be provided.

3.2.4.2.2 Canister Handling

The Phase 1 Interim Storage System shall provide the mechanisms necessary to effect intra-facility (within the IHLW Interim Storage Facilities) movement of the IHLW canister (i.e., between transfer station and storage location). The system shall be capable of removing the canister from the transportation cask, inspecting the canister by visual or other appropriate means to confirm its containment integrity (i.e., detect gross breachment of confinement) and general condition, preparing the canister as necessary for interim storage, moving the canister to a suitable storage location, and placing the canister into storage. The control system should include a closed-circuit television (CCTV) and redundant back-up controls.

3.2.4.2.2.1 Physical Constraints

The Canister Handling System shall be appropriately designed to operate within both the load-in/load-out area and interim storage area (i.e., capable of effecting a canister transfer between these two locations). Canister handling shall be sized to accommodate one standard (full-sized) canister. The ability to handle an overpacked canister is also required. Physical and operational interferences, such as storage location of the Canister Handling System(s) during idle operation periods, and operational limitations (size and weight constraints) shall be considered in the design.

3.2.4.2.2.2 Canister Hoisting

Canister lifting devices shall comply with ANSI N14.6-1993, *Radioactive Materials - Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds or More*. Remote CCTV shall be provided in conjunction

with the Canister Handling System lifting device. A CCTV shall also be provided in other areas where remote viewing will facilitate operations and security.

3.2.4.2.3 Interim Storage

The Phase 1 Interim Storage System shall provide for the interim/retrievable storage of IHLW canisters. The system shall be capable of isolating the IHLW canister in storage from the ambient environment, and controlling and monitoring the storage location as necessary to ensure the integrity of its confinement properties. Confinement for storage locations shall be provided in accordance with DOE Order 6430.1A, *General Design Criteria.*

Storage locations shall be designed to support and maintain the required storage configuration. The storage shall have cooling sufficient to maintain the canister centerline temperature specified in Section 3.2.1.1.4 and monitoring, if required to ensure the canisters and structural materials are within the allowances.

3.2.4.2.4 Canister Rework/Overpack

If primary containment (i.e., the canister or container wall) is breached during interim storage, the IHLW shall be overpacked. Although each IHLW Interim Storage Facility (CSB or other follow-on facilities) shall have the capability to store overpacked canisters, the overpack and associated canister rework operations will be allocated to only one of the IHLW Interim Storage Facilities. Rework/overpack operations shall be those activities required to inspect and overpack a canister (including overpack closure and verification of closure seal), to decontaminate the overpacked canister, and to ascertain removable surface contamination levels of the sealed overpack.

The overpack/rework station shall have the following capabilities; welding equipment and ancillary support equipment (e.g., electrical power, bottled gas, mechanical lifting equipment, gas tungsten arc welding system, weld repair equipment) as required to effect overpack closure, ultrasonic inspection equipment or other appropriate means to verify closure, and equipment necessary to smear test and decontaminate overpacked canisters.

3.2.4.2.5 Systems Controls

There shall be an area for control panels for active electrical and mechanical systems as well as monitoring functions. This need not be a separate, independent building, but a zone or protected room with such functions.

3.2.4.2.6 Equipment Decontamination

The IHLW Interim Storage Facilities may require an area for a limited decontamination within the radioactively controlled area. If required, this area should be located within close proximity to the areas that service the canister/cask. Equipment and systems for

remote decontamination of large equipment components and casks should not be necessary and are not intended at the IHLW Interim Storage Facilities.

3.2.4.2.7 Health Physics Support and Personnel Decontamination

The IHLW Interim Storage Facilities shall have an area for health physics work controls (not office administration). If required by health physics considerations, safety showers, personnel decontamination functions, and change rooms shall be provided to support activities in contaminated work areas. The area should be located in close proximity to the radioactive activities surrounding the canister/cask services and limited decontamination area.

3.2.4.2.8 Heating, Ventilation, and Air-Conditioning

Heating and ventilation shall be provided to the operations area as needed. The Interim Storage area ventilation shall be separated from operations ventilation. For example, the CSB vault will be provided with a passive ventilation system that is a separate ventilation zone with natural draft (convective) cooling features to maintain canister centerline temperature below the allowed maximum.

3.2.4.2.9 Waste Handling Area

An area for the purposes of handling (collect and package) wastes shall be provided. The liquid and solid waste shall be shipped to approved disposal facilities as needed.

3.2.4.2.10 Emergency Generator Area

If required by the safety analysis, emergency/backup generators shall be provided to maintain Safety Class and Safety Significant functions.

3.2.4.2.11 Exterior Area

The surrounding exterior area shall have 2-lane asphalt service roads with an HS-20 load capacity and shall be compliant with WSDOT M 41-10, *Washington State Department of Transportation Standard Specification for Road, Bridge, & Municipal Construction*. These roads will serve to accommodate vehicle traffic to the load-in/load-out area and other areas that require vehicular access (e.g., emergency generator and gas cylinder storage locations). Access roads to load-in/load-out area should be capable of allowing an over-size and over-weight load, and should consider turning radius and ease of backing a trailer into the load-in/load-out area. If the Staging and Load-out Facility is co-located with an IHLW Interim Storage Facility, the exterior area of this facility shall preserve access for a future rail routing to the Staging and Load-out Facility.

3.2.4.3 Maintenance Features

3.2.4.3.1 Finishes for Decontamination

Special wall coatings that can be easily decontaminated shall be used on the walls, floors, and ceilings in the canister/cask service area and in other areas where the need for infrequent decontamination is possible. Finishes used to facilitate decontamination shall be in accordance with DOE Order 6430.1A, *General Design Criteria.*

3.2.4.4 Fire Protection

The fire protection system shall meet the requirements of DOE Order 6430.1A, *General Design Criteria*; DOE O 420.1, *Facility Safety*; DOE C 420.1, *CRD Facility Safety*; 29 CFR 1910, *Occupational Safety and Health Standards;* 29 CFR 1926, *Safety and Health Regulations During Construction;* and UBC 1994,*Uniform Building Code.* Where practical, the need for fire protection system shall be minimized by eliminating unprotected combustibles.

3.2.4.4.1 Fire Sprinklers

Retrofit of CSB shall not use sprinklers. New facilities shall be evaluated based on combustible loading through a future fire hazards analysis.

3.2.4.4.2 Fire Hydrants

Retrofit of the CSB does not require additional fire hydrants. New facilities may require fire hydrants for fire suppression in accordance with a future fire hazards analysis.

3.2.4.4.3 Halon

Halon shall not be used for fire suppression systems.

3.2.4.4.4 Central Fire Alarms

A Fire Alarm Control Panel shall be conveniently located in the building and shall be compatible with the site Radio Fire Alarm Report Box.

3.2.4.5 Safeguards and Security

The IHLW Interim Storage Facility shall incorporate measures necessary to prevent unauthorized access to nuclear materials, theft, diversions, hoaxes, and other malevolent acts intended to release radioactivity or disrupt operations, based upon a specified threat, in accordance with Section 3.3.9, Safeguards and Security. A security alarm system shall be installed in accordance with W-A-450C/GEN *Federal Specification Components for Interior Alarm Systems.*

3.2.4.6 Communications

Communication systems shall be provided in accordance with DOE Order 6430.1A, *General Design Criteria*, and DOE Order 5300.1C, *Telecommunications* (this order was cancelled by DOE N 251.17, but is currently dictated by the CHG contract). All normally occupied parts of the facility shall have telephone conduits installed to accommodate communications.

3.2.4.6.1 Telephone System

Telephones shall be provided for internal and external communications in accordance with DOE Order 6430.1A, *General Design Criteria*. Unit locations shall be chosen to provide operations support, and personnel and equipment safety. Redundant emergency telephone units shall be located in the main operation areas.

3.2.4.6.2 Plant and Security

Exterior communications and alarm systems shall be designed in accordance with DOE Order 6430.1A, *General Design Criteria*. Fire, security, and telephone systems shall be included. Computer and software security shall be considered in the design.

3.2.4.6.3 Intra-Facility Communication System

A communication system shall be included to provide communication between occupied areas within the facility. Unit locations shall be determined to provide communications between areas within the building. Call privacy and call annunciator capabilities shall be provided. The communication system shall be an integral part of the telephone system.

3.2.4.6.4 Public Address System

A public address system shall be included. Speakers shall be installed throughout the building interior and around the building perimeter. The public address system control panel will be located in the communications room. Access to the public address system shall be provided in each main operation area.

3.2.4.6.5 Computer Intra-Net System

A computer intra-net system (physical hardware) shall be provided that is compatible with the Hanford Local Area Network.

3.2.4.7 Heating, Ventilating, and Air-Conditioning

The IHLW Interim Storage Facility design shall include a ventilation system that provides contamination confinement to ensure contamination control in order to maintain acceptable concentrations within the facility. The ventilation system shall be in accordance with DOE Order 6430.1A, *General Design Criteria* and DOE Order 5400.5, *Radiation Protection of the Public and the Environment*.

The total volume of air handled shall be that required for workspace conditioning and contamination control, and shall include the infiltration air from the outside. The infiltration of outside air shall be limited by providing tight-fitting doors or airlocks, as appropriate, at building entrances.

Sufficient redundancy and/or spare capacity shall be provided as necessary to ensure adequate ventilation during normal operations and design basis accident (DBA) conditions.

3.2.4.7.1 Ventilation Zones

Where active ventilation systems (motive force provided by mechanical means) are provided to maintain confinement, the definition of the ventilation zones shall be as specified in Table 3-6. Air locks and other barriers shall be provided as required to separate zones, to ensure ventilation balance and contamination control, and to maintain pressure differentials. Ventilation shall maintain a minimum 3.1E-02 kPa differential pressure between different zones.

Table 3-6. CSB Ventilation Zones.

Zone	Minimum DP (kPa)	Description of Typical Area
I	-2.49 E-01	High and potentially high contamination areas.
II	-1.25 E-01	Areas providing access or penetrations to Zone I. Not normally contaminated areas with moderate contamination potential. May be normally or frequently occupied areas.
III	-6.23 E-02	Not normally contaminated areas with low contamination potential. Normally or frequently occupied areas.
IIIA	-2.49 E-02	Less contamination potential than Zone III. Minimum DP may not be maintained with outer doors open.
IV	+3.11 E-02	Clean areas. Areas where contamination is unacceptable.
Neutral	N/A	Areas not requiring confinement ventilation.

DP = Differential pressure with respect to atmospheric pressure.

If dampers are provided to control and balance airflows, the dampers must be accessible for operation and repair.

3.2.4.7.2 Process, Control, and Operating Zones

3.2.4.7.2.1 Supply Air

Supply air shall be conditioned in accordance with DOE Order 6430.1A, *General Design Criteria*. Supply air filters shall be rated at a minimum of 85 percent efficiency (atmospheric dust spot).

The air temperature in human-accessible work areas shall be maintained for normal operating conditions.

3.2.4.7.2.2 Exhaust Air

Releases to the environment postulated to occur as a result of DBAs shall be limited according to Section 0200-1, Facility Siting, of DOE Order 6430.1A, *General Design Criteria.* Air emissions shall be in accordance with 40 CFR 52, Appendix E, *Approval and Promulgation of Implementation Plans;* 40 CFR 60, *Standards of Performance for New Stationary Sources*; 40 CFR 61, *National Emissions Standards for Hazardous Air Pollution*; and WAC 173-400, *General Regulations for Air Pollution Sources.*

All planned release points (excludes low probability accident pathways) of airborne emissions to the environment that potentially could contain particulate radioactive contaminants shall be treated using Best Available Radionuclide Control Technology (BARCT), as cited in WAC 246-247, *Radiation Protection - Air Emissions.* The effluent monitoring requirements of 10 CFR 20, *Standards for Protection Against Radiation*; 10 CFR 70.59, *Domestic Licensing of Special Nuclear Material,* Section *Effluent Monitoring Reporting Requirements*; and 10 CFR 835, *Occupational Radiation Protection* shall be reviewed to provide the necessary monitoring instrumentation.

Any installed high-efficiency particulate air (HEPA) or HEPA-equivalent filter shall have an efficiency of at least 99.95 percent of 0.3-micron particles. The exhaust HEPA filter assemblies shall comply with DOE Order 6430.1A, *General Design Criteria.* In-place testing design requirements shall meet all the recommendations cited in DOE Order 6430.1A.

Final HEPA filter systems shall include the necessary fire protection provisions to comply with DOE Order 6430.1A, *General Design Criteria,* DOE C 420.1, *CRD Facility Safety*, and DOE O 420.1, *Facility Safety.* Ember screens upstream of the HEPA filters shall be provided to protect the filters from potential fire damage.

Provisions shall be made for representative sampling (shrouded probe) and continuous monitoring of particulate/gaseous effluents to the environment in accordance with DOE Order 5480.4, *Environmental Protection, Safety, and Health Protection Standards.* Capability shall be provided for local and remote indication of gaseous effluent contamination levels and monitoring equipment alarm conditions.

Exhaust stack height shall be sufficient to meet dispersion requirements for normal as well as DBA releases for process gaseous effluents.

3.2.4.7.2.3 Uncontrolled Access Zones

The uncontrolled access zone ventilation system shall filter, condition, and control the zone environment in accordance with DOE Order 6430.1A, *General Design Criteria.* Design consideration shall be given to using recycle air or economy cycles in accordance with DOE Order 6430.1A. Exhaust air shall not be used to dilute process, control, and operating zone exhaust to meet emission standards.

3.2.4.7.2.4 Computer Rooms

If required, computer room ventilation shall be designed to accommodate the requirements of the specific computer manufacturer's recommendation for temperature, humidity, and filtration.

3.2.4.7.2.5 Toilet Facilities

If installation of toilet facilities are required to support operating personnel, ventilation air requirements shall be in accordance with DOE Order 6430.1A.

3.2.4.8 Service Provisions

Major operational areas shall be provided with utilities and services as necessary to support their intended functions. Utilities and services include, but are not limited to, water, compressed air, lighting, CCTV, and electrical outlets. The design shall provide corrosion protection for outdoor/buried metallic equipment and piping.

3.2.4.8.1 Utilities

The following identifies requirements for utilities, if required, to support Phase 1 IHLW Interim Storage System operations.

3.2.4.8.1.1 Steam

There is no steam utility to be supplied.

3.2.4.8.1.2 High Pressure and Instrument Air

A high-pressure air system, if required, shall have a sufficiently low dew point to prevent condensation from forming in the distribution piping. The air-stream shall be free of particulate dirt and oil.

An instrument air system, if required, shall have a dew point of -40° C, and shall be free of oil (<1 ppm) and particulate.

3.2.4.8.1.3 Raw and Sanitary Water

If required, raw and sanitary water shall be provided in accordance with DOH PUB 331-123, *Water System Design Manual.* Sanitary (potable)

water shall be separated from raw (non-potable) water by the design criteria as stated in DOE Order 6430.1A, *General Design Criteria* (for cross-contamination control). Sanitary water shall be used to supply water needs (e.g., water for domestic purposes) of any permanent or temporary administrative support structure(s). Water shall be provided for equipment needs. Water shall be supplied if required for fire suppression as specified in Section 3.2.4.5, Fire Protection. Water for fire suppression measures should normally be supplied by the raw water system.

3.2.4.8.1.4 Bottled Gases

Bottled gases shall be supplied as required for facility operation.

3.2.4.8.1.5 Electrical

All electrical system designs shall conform to NFPA 70, *National Electrical Safety Code*; DOE-RL-SOD-INST-L&T.001, *Hanford Site Lockout/Tagout Program; and* DOE Order 6430.1A, *General Design Criteria*. However, the use of aluminum conductors requires prior approval.

- The IHLW Interim Storage Facilities shall be supplied with electrical power to meet all facility and operations requirements.
- The process and facility power shall be supplied via medium-voltage switchgear, load centers (low-voltage switchgear), motor control centers, and distribution panels.
- An uninterruptible power supply system shall provide uninterruptible power to plant functions where continuity of monitoring is essential. The uninterruptible power supply system also shall provide uninterruptible power to alarms, critical equipment, instrumentation, and other circuits.
- Lightning protection/grounding shall be provided for this facility in accordance with requirements in DOE Order 6430.1A, *General Design Criteria*, and NFPA 70, *National Electrical Safety Code*.
- Sensors and display devices shall be provided for the electrical distribution system. These sensors and devices shall be an integral part of the switchgear, switch panels, and motor control centers, and shall have the capacity to interface with standard programmable controllers and desktop-type personal computers.

Emergency power shall be provided as required to support safety functions. Emergency power for the CSB is governed by the current safety basis. Standby power to support design features may be employed.

3.2.4.8.2 Vent Systems

Service vents shall be installed as required and shall not be cross-tied with process vents.

3.2.4.8.3 Drains

Floors furnished with drains shall be drained at the low point. Contaminated and non-contaminated drains shall not be interconnected and backflow prevention shall be provided. Access for cleaning out all drains and lines shall be provided. Curbs or other containment features shall be provided around stationary equipment that is subject to oil leakage, if required, to prevent the flow of oil into the drain system.

3.2.4.8.3.1 Sanitary Drains

Sanitary drains, where required, shall be sized and installed according to the DOE Order 6430.1A, *General Design Criteria.*

3.2.4.8.3.2 Storm Drains

If necessary, storm drains shall be installed in accordance with DOE Order 6430.1A, *General Design Criteria.*

3.2.4.8.3.3 Chemical Drains

If necessary, a chemical collection sump shall be provided to serve the area designated for portable decontamination. The sump material shall be compatible with the chemical waste.

3.2.4.8.4 Solid and Liquid Waste

If hazardous/dangerous solid and liquid waste is generated, their transfer to Hanford Site treatment, storage, and disposal facilities shall comply with applicable requirements of 40 CFR 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*, and WAC 173-303, *Dangerous Waste Regulations.* Waste intended for Hanford Site burial grounds shall adhere to waste acceptance requirements given in HNF-EP-0063, *Hanford Site Solid Waste Acceptance Criteria.*

3.2.5 System Quality Factors

The requirements for reliability, maintainability, availability, and other quality factors for the IHLW Interim Storage System are discussed below.

3.2.5.1 Reliability

To meet the plant reliability requirements, the following concepts shall be utilized:

- Maximize equipment interchangeability.
- Locate complex components including electronic devices or those having a high probability of failure in non-radiation areas.
- Specify fabrication materials for equipment that provide appropriate performance in the intended operating environment.
- Perform a RAM analysis to evaluate the system reliability and ensure that canister receipt/retrieval throughput can be accomplished.

3.2.5.2 Maintainability

The design shall consider the maintainability factors peculiar to the specific equipment to be used in the IHLW Interim Storage System. The facility design shall provide for routine preventive maintenance/calibration where required, and maintenance, repair, or replacement of equipment subject to failure. For each IHLW Interim Storage Facility planned, an Operation and Maintenance Concept document will be provided as defined in HNF-IP-0842, *RPP Administration*, Volume IV, Engineering, Section 2.15, "Operation and Maintenance Planning Process".

3.2.5.3 Availability

The system shall not, under any credible scenario, be susceptible to an extended downtime (i.e., unable to receive IHLW canisters) greater than 45 continuous. Upon recovery, the system shall be capable of receiving canisters at the peak rate specified in 3.2.1.1.2 until the canister inventory accumulated at the WTP during the outage is eliminated.

3.2.5.4 Repair Facilities

Adequate space and environmental quality for equipment maintenance and repair and materials storage shall be provided in three areas: contaminated maintenance areas, electrical/instrument and mechanical rooms, and the cask service vicinity of the load-in/load-out area. The size of the area reserved for decontamination should be reviewed to ensure small or similarly appropriate equipment could be decontaminated, inspected, or repaired.

3.2.6 Environmental Conditions

3.2.6.1 Site Environmental Conditions

New and retrofit structures, systems, and components (SSC) associated with Phase 1 IHLW Interim Storage System shall withstand the natural environmental conditions as contained in RPP-PRO-097, *Engineering, Design, and Evaluation*. The RPP-PRO-097 implements DOE-STD-1020-94, *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities*.

3.2.6.2 Induced Environments/Accidental Radioactive Releases

The IHLW Interim Storage System shall be designed, constructed, and operated so after a DBA, the potential exposure to radiation shall be within regulatory requirements, as specified in applicable sections of 10 CFR 72.106, *Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste* (Subparts E, F, G, and H).

3.2.7 Transportability

Repository transportability requirements are specified in DOE/RW-0351P, *Waste Acceptance System Requirements Document* and DOE/EM-0093, *Waste Acceptance Product Specification for Vitrified High-Level Waste Forms.*

3.2.8 Flexibility and Expansion

Each subsystem and component design in an IHLW Interim Storage Facility shall, to the maximum extent practical, provide sufficient flexibility to accommodate programmatic changes or operational modifications, per DOE Order 6430.1A, *General Design Criteria,* Section 0110-3.

3.2.9 Portability

This paragraph is not applicable to this specification.

3.3 DESIGN AND CONSTRUCTION

The IHLW Interim Storage System design and construction shall follow the general guidelines provided in RPP-PRO-097, *Engineering, Design, and Evaluation*; DOE Order 6430.1A, *General Design Criteria*; and ANSI/ANS 57.9, *Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type).* The permitting process shall adhere to guidance provided by 10 CFR 1021, *National Environmental Policy Act Implementing Procedures*; DOE O 451.1A, *National Environmental Policy Act Compliance Program*; and other such guidelines as may be authorized pursuant to DOE/RL-89-10, *Hanford Federal Facility Agreement and Consent Order* (commonly called the Tri-Party Agreement). Authorization Basis development and maintenance shall comply with DOE Order 5480.21, *Unreviewed Safety Questions*; occurrence reporting from DOE O 232.1A, *Occurrence Reporting and Processing of Operations Information*; and DOE M 232.1-1A, *Occurrence Reporting and Processing of Operations Information.* In addition, the transportation requirements in DOE O 460.1A, *Packaging and Transportation Safety* apply to the Onsite Transportation System. The design shall incorporate the appropriate requirements on Structures, Systems and Components (SSC) based upon the derived safety classification for that item. Design, equipment, and construction practices will be according to industry standards for nonreactor nuclear facilities. Design requirements for various systems are described in Section 3.2.4, Physical Characteristics.

3.3.1 Materials

3.3.1.1 Energy Conservation

3.3.1.1.1 Lighting

High-pressure sodium vapor lighting and fluorescent lighting shall be used whenever possible. The interior lighting shall be installed in accordance with DOE Order 6430.1A, *General Design Criteria*, except in the remote areas where the minimum requirements shall be determined by the light intensity requirements for remote viewing. Emergency lighting shall be in accordance with NFPA 101, *Safety to Life from Fire in Buildings and Structures.*

3.3.1.1.2 Insulation

The exterior wall insulation requirements shall be in accordance with DOE Order 6430.1A, *General Design Criteria.* Identification of outside and inside design temperatures shall be in accordance with DOE Order 6430.1A, *General Design Criteria.*

3.3.1.1.3 Equipment

Where applicable, economics of alternatives shall be considered in accordance with DOE Order 6430.1A, *General Design Criteria.* Electrical equipment shall conform to DOE Order 6430.1A and National Electric Code (NFPA 70) requirements.

3.3.1.1.4 Metering

Energy metering shall be provided in accordance with DOE Order 6430.1A, *General Design Criteria.*

3.3.1.2 Toxic Products and Formulations

The system shall comply with the requirements of DOE O 451.1A, *National Environmental Protection Act Compliance Program*, and WAC 173-303, *Dangerous Waste Regulations.*

3.3.1.3 Waste Minimization

Waste generated by the IHLW Interim Storage System shall be controlled, reduced, segregated and minimized in accordance with DOE O 435.1, *Radioactive Waste Management* (this order replaced DOE Order 5820.2A, *Radioactive Waste Management,* which is currently required by the CHG contract; the CHG contract dictates both orders); DOE Order 5400.1, *General Environmental Protection Program;* WAC 173-303, *Dangerous Waste Regulations;* and 40 CFR 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.*

3.3.2 Electromagnetic Radiation

The system shall comply with electromagnetic radiation emission requirements set forth in HNF-2962, *A List of Electro-Magnetic Interference (EMI) and Electro-Magnetic Compatibility (EMC) Requirements.*

3.3.3 Nameplates and Product Markings

The system, subsystem, equipment, and materials shall comply with the nameplate and labeling requirements in DOE Order 6430.1A, *General Design Criteria,* Section 1300-12.4.11, Labels; and DOE Order 5480.19-XVIII, *Conduct of Operations Requirements for DOE Facilities.*

3.3.4 Workmanship

Workmanship issues related to the design/procurement of the systems and components of an IHLW Interim Storage Facility shall specify use of new materials, verification that counterfeit parts are not present, construction to approved codes and standards, maintenance of proper procurement standards for Safety Class and Safety Significant equipment, and assurance of work to the required Quality Level. Only trained and certified workers shall perform the appropriate tasks, and all contractors and vendors shall demonstrate documented evidence of compliance with applicable requirements in accordance with quality assurance provisions specified in Section 4.0.

3.3.5 Interchangeability

Equipment and parts used in IHLW Interim Storage Facilities should be interchangeable and standardized to the maximum extent.

3.3.6 Safety

The RPP-MP-003, *Integrated Environment, Safety and Health Management System Plan* describes the environmental and safety management system, which integrates environment, safety, and health requirements into the work planning and execution processes to effectively protect the workers, the public, and the environment. The following sections are all part of the integrated safety management system (ISMS) and design, construction, and operations shall adhere to these ISMS principles.

3.3.6.1 Personnel Safety

3.3.6.1.1 Occupational Radiological Protection

Facilities associated with the IHLW Interim Storage System shall be designed to protect workers from occupational radiation exposures and keep radiation exposure ALARA in accordance with 10 CFR 835, *Occupational Radiation Protection;* WAC 246-220, *Radiation Protection, General Provisions;* NRC Regulatory Guide 8.8, Rev.

2, *Information Relevant to Ensuring that Occupational Exposures at Nuclear Power Stations will be as low as Reasonably Achievable;* HNF-5173, *Project Hanford Management Contract Radiological Control Manual;* DOE Order 5400.5, *Radiation Protection of the Public and the Environment;* DOE O 435.1, *Radioactive Waste Management* (this order replaced DOE Order 5820.2A, *Radioactive Waste Management,* which is currently required by the CHG contract; the CHG contract dictates both orders) and DOE Order 5480.11 *Radiation Protection for Occupational Workers.* Facilities shall be designed to maintain the radiation dose to ALARA throughout the IHLW receiving, handling, interim storage, and retrieval for final disposition operations.

3.3.6.1.2 Occupational Safety and Health Standards

The system shall comply with the occupational safety and health requirements of 29 CFR 1910, *Occupational Safety and Health Standards*; DOE O 440.1A, *Worker Protection Management for DOE and Contractors;* and 29 CFR 1926, *Safety and Health Regulations During Construction*; and the industrial safety/hygiene requirements of DOE Order 5480.10, *Contractor Industrial Hygiene Program.*

3.3.6.2 System Safety

Facility safety shall comply with DOE C 420.1, *CRD Facility Safety*; DOE O 420.1, *Facility Safety*; and DOE Order 6430.1A, *General Design Criteria.*

The Onsite Transportation System, and its equipment and materials shall comply with the handling, packaging and transportation requirements set forth in DOE O 460.1A, *Packaging and Transportation Safety,* DOE Order 5480.3, *Safety Requirements for the Packaging and Transportation of Radioactive Material;* and 49 CFR 173.441, *Shippers - General Requirements for Shipments and Packaging.*

3.3.6.2.1 Defense-In-Depth Approach

The IHLW Interim Storage System design shall use the fundamental principles of defense-in-depth (i.e., redundancy and diversity) as described in DOE Order 5480.23, *Nuclear Safety Analysis Report;* DOE Order 5480.22, *Technical Safety Requirements; DOE*-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23; Nuclear Safety Analysis Reports*, and DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Non-Reactor Nuclear Facilities Safety Analysis Report*, to ensure that crucial safety functions are achieved and that multiple barriers are provided against the release of radioactivity.

3.3.6.3 Environmental Protection

The system shall comply with the National Environmental Policy Act (NEPA) of 1969 and the environmental, safety, and health requirements of DOE Order 5480.4, *Environmental Protection, Safety, and Health Protection Standards;* DOE/RL-97-67 *Pollution Prevention and Best Management Practices Plan for State Waste Discharge Permits ST4508 and ST4509;* and with

applicable federal, state, and local laws and regulations to protect the public, worker health and safety, and the environment.

3.3.6.3.1 National Environmental Policy Act

The IHLW Interim Storage System shall be designed, constructed, and operated in full compliance with DOE O 451.1A, *National Environmental Protection Act Compliance Program;* 10 CFR 1021, *National Environmental Policy Act Implementation Procedures*; and DOE/EIS 0189F, *TWRS, Hanford Site, Richland, Washington, Final Environmental Impact Statement.*

3.3.6.3.2 Radiation Protection of the Public and Environment

The system shall comply with the radiation release limit requirements specified in 10 CFR 20, *Standards for Protection Against Radiation;* DOE Order 5400.5, *Radiation Protection of the Public and Environment;* and WAC 246-247, *Radiation Protection – Air Emissions.*

3.3.6.3.3 Resource Conservation and Recovery Act

The system shall be designed, constructed, and operated in full compliance with Resource Conservation and Recovery Act, as specified by implementing regulations 40 CFR 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*, and WAC 173-303, *Dangerous Waste Regulations.*

3.3.6.3.4 Emergency Planning

The system shall be designed and comply with emergency preparedness applications contained in DOE O 151.1, *Comprehensive Emergency Management System,* DOE O 232.1A, *Occurrence Reporting and Processing of Operations Information*, and applicable Federal and Washington State laws as implemented by DOE/RL 94-02, *Hanford Emergency Management Plan.*

3.3.7 Human Engineering

The system, subsystem, and equipment shall comply with the human engineering requirements of DOE Order 6430.1A, *General Design Criteria,* Section 1300-12, Human Factors Engineering.

3.3.8 Nuclear Control/Nuclear Criticality Safety

The system shall comply with the nuclear criticality safety requirements of DOE C 420.1, *CRD Facility Safety;* and DOE O 420.1, *Facility Safety.*

3.3.9 Safeguards and Security

This system shall be design in accordance with DOE O 470.1, *Safeguards and Security Program;* DOE O 472.1B, *Personnel Security Activities;* DOE O 474.1, *Control and Accountability of Nuclear Materials;* DOE Order 5632.1C, *Protection and Control of Safeguards and Security Interests;* DOE M 5632.1C-1, *Manual for Protection and Control of Safeguards and Security Interests;* RLID 473.1, *Protection of Safeguards and Security Interests;* and W-A-450C/GEN, *Federal Specification Components for Interior Alarm Systems.*

3.3.10 Government Furnished Property

This section is not applicable to this specification

3.3.11 Computer Reserve Capacity

This section is not applicable to this specification

3.4 INFORMATION

The system shall comply with the documentation requirements and publication/drafting standards in DOE Order 1324.5B, *Records Management Program;* DOE O 471.1 *Identification and Protection of Unclassified Controlled Nuclear Information*; and RLID 1360.2B, *Unclassified Computer Security Program.*

3.4.1 Quality Assurance Documentation

See Section 4.0.

3.4.2 Safety Documentation

Safety analysis reports and technical safety requirements, or technical specifications in accordance with DOE Order 5480.23, *Nuclear Safety Analysis Report*; DOE Order 5480.22, *Technical Safety Requirements*; DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports;* and DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Non-Reactor Nuclear Facilities Safety Analysis Report*, as appropriate, shall be developed to establish a safety basis for the facility and to control IHLW Interim Storage System operations.

3.4.3 Waste Form Qualification

A waste form qualification plan and a waste form qualification report shall be prepared in accordance with DOE/RW-0351P, *Waste Acceptance System Requirements Document;* and DOE/EM-0093, *Waste Acceptance Product Specifications for Vitrified High-Level Waste Forms.*

The plan and report only shall address the IHLW canister attributes that could credibly be affected by interim storage activities, including onsite transportation.

3.4.4 Environmental Permits

Environmental permits and documentation shall be prepared in accordance with 40 CFR 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;* 10 CFR 1021, *National Environmental Policy Act Implementing Procedures;* DOE O 451.1A, *National Environmental Policy Act Compliance Program;* WAC 173-303, *Dangerous Waste Regulations;* WAC 246-247, *Radiation Protection - Air Emissions;* 40 CFR 122, *EPA Administered Permit Programs, The National Pollutant Discharge Elimination System;* and any other applicable regulation.

3.5 LOGISTICS

3.5.1 Maintenance Facilities

Facilities, equipment, and supplies shall be provided for equipment maintenance and repair to the lifting devices associated with cask receipt and canister handling. Miscellaneous materials storage to support maintenance functions shall also be provided. Major equipment storage will be handled by existing warehouse structures associated with procurement activities. The size of area designated shall be sufficient for decontamination, inspection, and repair needs based on design projections of the quantity and failure-rate of facility equipment. Equipment components shall be designed with the intent that it can be decontaminated, inspected, and/or repaired.

3.5.1.1 Radioactive Maintenance Area

Space for a radioactive maintenance area for limited maintenance on the Onsite Transporter System shall be provided.

3.5.1.2 Non-Radioactive Maintenance Area

The non-radioactive maintenance area contains normal facility maintenance activities of a non-radioactive condition. This area may be provided in a structure separate from the IHLW Interim Storage Facilities.

3.5.2 Interim Storage Design Philosophy

The Phase 1 IHLW Interim Storage Facilities should be designed to minimize monitoring and maintenance during the interim storage mode of operation as defined in Section 3.2.2.1.

3.6 PERSONNEL AND TRAINING

The system, subsystems, and equipment shall be designed, tested, inspected, and operated by personnel trained and qualified to the requirements of DOE Order 5480.20A, *Personnel Selection, Qualification, Training, and Staffing at DOE Reactor and Non-Reactor Nuclear Facilities.* Workers involved in a waste acceptance process activity, as defined in Section 4.0, also shall be trained and certified to the requirements of DOE/RW-0333P, *Quality Assurance Requirements and Description for the Civilian Radioactive Waste Management Program.*

3.7 CHARACTERISTICS OF SUB-ELEMENTS

The following identifies major sub-elements of the Phase I IHLW Interim Storage System. System functions and physical characteristics allocated to these sub-elements are also specified.

3.7.1 Project W-464, Canister Storage Building Retrofit

This system sub-element is intended to provide the initial storage capacity for Phase 1 IHLW Interim Storage System. Storage capacity for the first 880 canisters is to be addressed through retrofit of the CSB superstructure, and Vaults 2 and 3. Storage capacity beyond the initial 880 canisters will be provided by one or more additional facilities.

The CSB (Building 212H) is located in the 200 East Area of the Hanford Site. The CSB structure was constructed for Project W-379, Spent Nuclear Fuel Canister Storage Building. The CSB structure consists of a superstructure, support building, three below-grade concrete vaults, and operating deck. The Project W-379 also installed storage tubes, and intake and exhaust structures for Vault 1.

Project W-464 will install storage tube systems in CSB Vaults 2 and 3. This project will also install two intake structures and two exhaust stacks to support ventilation of Vaults 2 and 3. In addition to the storage function, the following functions and physical characteristics have been allocated to Project W-464.

3.7.1.1 Onsite Transportation System

This system encompasses the transporters (tractor/trailer), shield casks, and ancillary equipment that are required to effect the transportation of IHLW canisters from the RPP-WTP to the IHLW Interim Storage Facilities (see Section 3.2.4.1). The tractor will be obtained from the Hanford Site General Pool. Project W-464 will provide the trailers and casks (two will be provided for Phase 1).

The Onsite Transportation System furnished by Project W-464 is intended to service the follow-on Phase 1 Interim Storage Facilities. This system may also be used to effect the transportation of IHLW canisters from interim storage to the Staging and Load-out Facility. Therefore, future subordinate construction projects will not include this function unless it is

necessary to accommodate special circumstances (e.g., transportation of an overpacked canister or greatly expanded transportation rate).

3.7.1.2 Canister Receipt and Handling System

A new Load-in/Load-out Annex will be installed at the southeast corner of the CSB to support IHLW canister receipt and handling. The Load-in/Load-out Annex will consist of a concrete slab abutting the CSB, steel superstructure, and a transfer station similar to the SNF multi-canister overpack transfer station. Cask transfer will require use of a crane with a remote operated lifting device that is used for cask lid removal. It is anticipated that canisters will be moved between the Load-In/Load-Out Annex and the storage tubes in the CSB by use of a Shielded Canister Transporter (SCT).

3.7.1.3 Canister Storage System

An integrated storage tube system will be installed in the standard and overpack tube operation deck penetrations of Vaults 2 and 3. A total of 440 standard storage tubes will be installed in the vaults with a capacity to store 880 canisters. There also is capacity for 6 overpack tubes in each vault.

3.7.1.4 Canister Rework/Overpack System (Hold W464-006)

A canister rework/overpack station will be installed for recover purposes should a canister's primary containment (i.e., the canister wall) be breached during interim storage.

3.7.1.5 Utilities and Support Services

3.7.1.5.1 Utilities

All utilities required to support functions and operations will be provided in accordance with requirements for utilities as identified in Section 3.1.3.2, Interface with Hanford Site Infrastructure and Utilities, and Section 3.2.4.8, Service Provisions.

3.7.1.5.2 Heating, Ventilation, and Air Conditioning

An HVAC system is required to provide for sufficient heating and cooling of the Load-in/Load-out Annex. Existing CSB services will provide the HVAC servicing the operations deck above the vaults. Other HVAC systems may be required as necessary to maintain confinement during canister handling operations. A ventilation system is also required for cooling IHLW canisters in the storage tubes of Vaults 2 and 3. A forced air HVAC system will not be required for the CSB storage vaults because natural convection cooling will be used. Requirements for HVAC are primarily located in Section 3.2.4.7, Heating, Ventilation, and Air-Conditioning.

3.7.1.5.3 Facility Maintenance

The maintenance program shall comply with DOE Order 4330.4B, *Maintenance Management Program.* Sufficient storage and maintenance area shall be considered. Details of the maintenance program are located in Section 3.5.1.

3.7.1.5.4 Offices

Sufficient offices and working area shall be considered for support personnel.

3.7.1.5.5 Instrumentation and Control System

This system includes those features that are required to monitor and control the movement, placement, storage, and retrieval of IHLW canisters. If required to demonstrate adequate canister cooling and environmental protection, exhaust stacks will be provided with a continuous air monitoring system. Lifting devices will be provided with remote control capability. A CCTV system will be installed to allow operation and monitoring of the transport cask lid removal/placement. The remote monitoring/control station will be located in the main floor of the Load-In/Load-Out Annex.

3.7.2 Follow-on Interim Storage Facilities

This sub-element encompasses mechanisms and facilities that must be provided to furnish interim storage capacity beyond that provided by the CSB. The architecture (i.e., retrofit of existing structures or new construction) for these follow-on IHLW Interim Storage Facilities has not yet been selected. Therefore, specific physical characteristics of this sub-element are TBD (TBD No. W464-008).

3.7.3 Staging and Load-Out Facility

This sub-element encompasses the mechanisms and facilities needed to certify IHLW canister attributes at time of shipment and package IHLW canisters in an offsite transportation cask. The functions associated with this sub-element have not been allocated to the Phase 1 IHLW Interim Storage System, but is listed for completeness. Specific characteristics of this sub-element are TBD (TBD No. W464-009).

3.8 PRECEDENCE

Except where specifically denoted in the individual requirements or those instances where Washington State has been granted regulatory authority by the U.S. Government, the hierarchical relationship among requirements specified in Section 3 is as follows:

- Federal laws (e.g., *Code of Federal Regulations*)
- *Revised Code of Washington* (RCW) as specified in *Washington Administrative Codes* (WAC)
- Local ordinances
- U.S. Department of Energy orders and standards
- National consensus codes and standards
- Hanford Site-specific codes and standards.

In the event of conflict between two equivalent orders, the more stringent shall apply.

3.9 QUALIFICATION

The system, subsystem, and equipment design shall be verified in accordance with Section 4.3.

3.10 STANDARD SAMPLE

This paragraph is not applicable to this specification.

3.11 PREPRODUCTION STANDARD

This paragraph is not applicable to this specification.

4.0 QUALITY ASSURANCE PROVISIONS

Quality assurance for the IHLW Interim Storage shall be performed in accordance with DOE O 414.1, *Quality Assurance*, and 10 CFR 830.120, *Quality Assurance Requirements*. Design Verifications shall be conducted during the design and development of the system to provide assurance of compliance with the requirement of this specification.

In addition, quality assurance requirements of DOE/RW-0333P, *Quality Assurance Requirements and Description for the Civilian Radioactive Waste Management Program,* shall be applied to items identified as being a waste acceptance process activity. A waste acceptance process activity produces information that will be used to certify that IHLW canisters comply with repository acceptance criteria as specified in DOE/RW-0351P, *Waste Acceptance System Requirements Document,* and DOE/EM-0093, *Waste Acceptance Product Specifications for Vitrified High-Level Waste Forms.* Waste acceptance process activity items and the actions to prevent or mitigate their failure shall be identified by a comprehensive, systematic, documented evaluation.

4.1 RESPONSIBILITY FOR INSPECTIONS

The design agent shall be responsible for the performance and documentation of all design verifications (see Section 4.3) for each system developed in accordance with this system specification. Design verifications shall be conducted at the design agent's facilities or the facilities of the design agent's choice with the approval of the sponsor organization. The sponsor organization reserves the right to witness the specific design verifications.

4.2 SPECIAL TESTS AND EXAMINATIONS

Not applicable

4.3 DESIGN VERIFICATION

Design verification shall be performed on the IHLW Interim Storage as represented in design drawings, prototypes, engineering models, etc., for the purposes of verifying that the design meets the requirements of this specification. Inspection of the subsystem design to ensure compliance with the requirements of Section 3.0 shall be performed by one or more of the following methods: qualification testing, review, and/or alternate calculation. The verification method(s) that would usually apply to each specification requirement is identified in Table 4-1. The method of verification will be finalized as the design matures. Definition of qualification testing, review, and alternate calculation are as follows.

- Qualification testing is a design verification method consisting of test on hardware representative of the design being verified. Qualification testing can be subdivided into methods that consist of checking functional operation (Demonstration) and methods that

consist of measuring specific hardware inputs/outputs (Test) to verify compliance of the design with requirements.

- Review is a design verification method that consists of an investigation of the existing design information.

- Alternate calculation is a design verification method that uses an alternate means of calculation to confirm the correctness of an original design calculation.

Table 4-1. Verification Matrix. (5 sheets)

Section	Title	N/A	T	R	C
3.1	System Definition [a]	X	--	--	--
3.2	Characteristics	X	--	--	--
3.2.1	Performance Characteristics	X	--	--	--
3.2.1.1	Receive and Store Immobilized High-Level Waste	--	--	X	--
3.2.1.1.1	Immobilized High-Level Waste Canisters	--	--	X	X
3.2.1.1.2	Immobilized High-Level Waste Receipt/Retrieval Throughput	--	X	X	--
3.2.1.1.3	Storage Capacity	--	--	X	--
3.2.1.1.4	Canister Temperature Control	--	--	--	X
3.2.1.2	Maintain Safe and Compliant System	--	--	X	--
3.2.1.3	Disposition of Immobilized High-Level Waste	--	--	X	--
3.2.1.4	System Transition	--	--	X	--
3.2.1.5	Decontamination and Decommission	--	--	X	--
3.2.2	System Capability Relationship	X	--	--	--
3.2.2.1	Definition of Operating Modes	X	--	--	--
3.2.2.2	Operating Modes Schedule	X	--	--	--
3.2.3	External Interface Requirements	X	--	--	--
3.2.3.1	Waste Treatment Plant	--	--	X	--
3.2.3.2	Spent Nuclear Fuel Storage	--	--	X	--
3.2.3.3	Repository Acceptance	--	--	X	--
3.2.4	Physical Characteristics	X	--	--	--
3.2.4.1	Onsite Transportation	X	--	--	--
3.2.4.1.1	Physical Parameters	--	X	X	--
3.2.4.1.2	Transporter and Cask Release Inspection	--	--	X	--
3.2.4.1.3	Transportation Shielding	--	--	--	X
3.2.4.2	General Facility Configuration	--	--	X	--
3.2.4.2.1	Canister Receipt	--	--	X	--

Table 4-1. Verification Matrix. (5 sheets)

Section	Title	N/A	T	R	C
3.2.4.2.1.1	Load-In/Load-Out Area	--	--	X	--
3.2.4.2.1.2	Transfer Station	--	--	X	--
3.2.4.2.1.3	Lifting Devices	--	--	X	--
3.2.4.2.2	Canister Handling	--	--	X	--
3.2.4.2.2.1	Physical Constraints	--	--	X	--
3.2.4.2.2.2	Canister Hoisting	--	--	X	--
3.2.4.2.3	Interim Storage	--	--	X	--
3.2.4.2.4	Canister Rework/Overpack	--	--	X	--
3.2.4.2.5	Systems Controls	--	--	X	--
3.2.4.2.6	Equipment Decontamination	--	--	X	--
3.2.4.2.7	Health Physics Support and Personnel Decontamination	--	--	X	--
3.2.4.2.8	Heating, Ventilation, and Air-Conditioning	--	--	X	--
3.2.4.2.9	Waste Handling Area	--	--	X	--
3.2.4.2.10	Emergency Generator Area	--	--	X	--
3.2.4.2.11	Exterior Area	--	--	X	--
3.2.4.3	Maintenance Features	X	--	--	--
3.2.4.3.1	Finishes for Decontamination	--	--	X	--
3.2.4.4	Fire Protection	--	--	X	--
3.2.4.4.1	Fire Sprinklers	--	--	X	--
3.2.4.4.2	Fire Hydrants	--	--	X	--
3.2.4.4.3	Halon	--	--	X	--
3.2.4.4.4	Central Fire Alarms	--	X	X	--
3.2.4.5	Safeguards and Security	--	--	X	--
3.2.4.6	Communications	--	--	X	--
3.2.4.6.1	Telephone System	--	--	X	--
3.2.4.6.2	Plant and Security	--	--	X	--
3.2.4.6.3	Intra-Facility Communication System	--	--	X	--
3.2.4.6.4	Public Address System	--	--	X	--
3.2.4.6.5	Computer Intra-Net System	--	--	X	--
3.2.4.7	Heating, Ventilation, and Air-Conditioning	--	--	X	--
3.2.4.7.1	Ventilation Zones	--	X	X	--
3.2.4.7.2	Process, Control, and Operating Zones	X	--	--	--
3.2.4.7.2.1	Supply Air	--	X	X	--

Table 4-1. Verification Matrix. (5 sheets)

Section	Title	N/A	T	R	C
3.2.4.7.2.2	Exhaust Air	--	X	X	--
3.2.4.7.2.3	Uncontrolled Access Zones	--	--	X	--
3.2.4.7.2.4	Computer Room	--	--	X	--
3.2.4.7.2.5	Toilet Facilities	--	--	X	--
3.2.4.8	Service Provisions	--	--	X	--
3.2.4.8.1	Utilities	X	--	--	--
3.2.4.8.1.1	Steam	X	--	--	--
3.2.4.8.1.2	High Pressure and Instrument Air	--	X	X	--
3.2.4.8.1.3	Raw and Sanitary Water	--	--	X	--
3.2.4.8.1.4	Bottled Gases	--	--	X	--
3.2.4.8.1.5	Electrical	--	--	X	--
3.2.4.8.2	Vent Systems	--	--	X	--
3.2.4.8.3	Drains	--	--	X	--
3.2.4.8.3.1	Sanitary Drains	--	--	X	--
3.2.4.8.3.2	Storm Drains	--	--	X	--
3.2.4.8.3.3	Chemical Drains	--	--	X	--
3.2.4.8.4	Solid and Liquid Waste	--	--	X	--
3.2.5	System Quality Factors	X	--	--	--
3.2.5.1	Reliability	--	--	X	X
3.2.5.2	Maintainability	--	--	X	--
3.2.5.3	Availability	--	--	--	X
3.2.5.4	Repair Facilities	--	--	X	--
3.2.6	Environmental Conditions	X	--	--	--
3.2.6.1	Site Environmental Conditions	--	--	X	--
3.2.6.2	Induced Environmental/Accidental Radioactive Releases	--	X	--	X
3.2.7	Transportability	X	--	--	--
3.2.8	Flexibility and Expansion	--	--	X	--
3.2.9	Portability	X	--	--	--
3.3	Design and Construction	--	--	X	--
3.3.1	Materials	X	--	--	--
3.3.1.1	Energy Conservation	X	--	--	--
3.3.1.1.1	Lighting	--	--	X	--

Table 4-1. Verification Matrix. (5 sheets)

Section	Title	N/A	T	R	C
3.3.1.1.2	Insulation	--	--	X	--
3.3.1.1.3	Equipment	--	--	X	--
3.3.1.1.4	Metering	--	--	X	--
3.3.1.2	Toxic Products and Formulations	--	--	X	--
3.3.1.3	Waste Minimization	--	--	X	--
3.3.2	Electromagnetic Radiation	--	--	X	--
3.3.3	Nameplates and Product Markings	--	--	X	--
3.3.4	Workmanship	--	--	X	--
3.3.5	Interchangeability	--	--	X	--
3.3.6	Safety	X	--	--	--
3.3.6.1	Personnel Safety	X	--	--	--
3.3.6.1.1	Occupational Radiological Protection	--	--	X	--
3.3.6.1.2	Occupational Safety and Health Standards	--	--	X	--
3.3.6.2	System Safety	--	--	X	--
3.3.6.2.1	Defense-In-Depth Approach	--	--	X	--
3.3.6.3	Environmental Protection	--	--	X	--
3.3.6.3.1	National Environmental Policy Act	--	--	X	--
3.3.6.3.2	Radiation Protection of the Public and Environment	--	--	X	--
3.3.6.3.3	Resource Conservation and Recovery Act	--	--	X	--
3.3.6.3.4	Emergency Planning	--	--	X	--
3.3.7	Human Engineering	--	--	X	--
3.3.8	Nuclear Control/Nuclear Criticality Safety	--	--	X	--
3.3.9	Safeguards and Security	--	--	X	--
3.3.10	Government Furnished Property	X	--	--	--
3.3.11	Computer Reserve Capacity	X	--	--	--
3.4	Information	--	--	X	--
3.4.1	Quality Assurance Documentation	--	--	X	--
3.4.2	Safety Documentation	--	--	X	--
3.4.3	Waste Form Qualification	--	--	X	--
3.4.4	Environmental Permits	--	--	X	--
3.5	Logistics	X	--	--	--
3.5.1	Maintenance Facilities	--	--	X	--
3.5.1.1	Radioactive Maintenance Area	--	--	X	--

Table 4-1. Verification Matrix. (5 sheets)

Section	Title	N/A	T	R	C
3.5.1.2	Non-Radioactive Maintenance Area	--	--	X	--
3.5.2	Interim Storage Design Philosophy	--	--	X	--
3.6	Personnel and Training	--	--	X	--
3.7	Characteristics of Sub-Elements	X	--	--	--
3.7.1	Project W-464, CSB Retrofit	X	--	--	--
3.7.1.1	Onsite Transportation System	--	--	X	--
3.7.1.2	Canister Receipt and Handling System	--	--	X	--
3.7.1.3	Canister Storage System	--	--	X	--
3.7.1.4	Canister Rework/Overpack System	--	--	X	--
3.7.1.5	Utilities and Support Services	--	--	X	--
3.7.1.5.1	Utilities	--	--	X	--
3.7.1.5.2	Heating, Ventilation and Air Conditioning	--	--	X	--
3.7.1.5.3	Facility Maintenance	--	--	X	--
3.7.1.5.4	Offices	--	--	X	--
3.7.1.5.5	Instrumentation and Control System	--	--	X	--
3.7.2	Follow-on Interim Storage Facilities	X	--	--	--
3.7.3	Staging and Load-Out Facility	X		--	--
3.8	Precedence	X	--	--	--
3.9	Qualification	X	--	--	--
3.10	Standard Sample	X	--	--	--
3.11	Preproduction Standard	X	--	--	--

[a]Includes all subsections of Section 3.1

N/A = Not applicable
T = Qualification Testing
R = Review
C = Alternate Calculation

5.0 PREPARATION FOR DELIVERY

5.1 VENDOR SUPPLIED EQUIPMENT

Safety class and safety significant components may require special packaging to protect against corrosion, contamination, physical damage, or any effect that would lower the quality or cause the items to deteriorate during the period when they are shipped through onsite storage prior to installation. Lower level specifications (e.g. procurement specifications) shall establish the specific packaging and storage requirements.

5.2 PRE-OPERATIONAL AND STARTUP TESTING

Pre-operation and startup testing of the Phase 1 IHLW Interim Storage System shall be planned and conducted to ensure proper performance of components and subsystems individually and as part of overall facility performance according to DOE O 425.1A, S*tartup and Restart of Nuclear Facilities.*

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6.0 DEFINITIONS

Canister: A stainless steel canister 0.61-m in diameter by 4.50-m tall containing IHLW.

Design Life: The intended normal and reliable life of a Structures, Systems, and Components.

Decontamination and Decommissioning Operational Mode: System and facility configuration following the retrieval of all Immobilized High-Level Waste canisters in interim storage through turnover to excess facilities processing.

Interface: System boundary across which material, data, and/or energy passes.

Interim Storage: Post-production storage (up to 40 years) of Immobilized High-Level Waste canisters before shipment to the federal geologic repository.

Immobilized High-Level Waste: Vitrified High-Level Waste (glass) product from the River Protection Project-Waste Treatment Plant.

Load-In/Load-Out Operational Mode: System and facility configuration during which Immobilized High-Level Waste canisters are actively received at or departure from the Immobilized High-Level Waste Interim Storage System.

Mission: The transformation of a set of unacceptable initial conditions to acceptable final conditions.

Rework: Placing a failed Immobilized High-Level Waste canister inside an overpack and preparing this overpacked canister for repository acceptance.

Immobilized High-Level Waste Interim Storage System: The assembly of all Immobilized High-Level Waste Interim Storage Facilities (e.g., Canister Storage Building) and associated support facilities (offices, overpack station, etc.).

Interim Storage Operational Mode: System and facility configuration during interim storage after receipt and before retrieval for shipment to federal repository.

Transporter: Vehicle designed to move onsite transportation casks.

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7.0 REFERENCES

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8.0 TO BE DETERMINED (TBD) AND HOLD LISTING

Table 8-1. To Be Determined (TBD) Number Listing.

TBD No.	Section	Description
W464-001	3.2.1.3	Staging and Load-out Facility Functional Requirements
W464-002	3.2.1.2	IHLW Interim Storage System D&D Closure Plan
W464-007	3.1.3.1.2	Interfaces with SNF CSB Program
W464-008	3.7.2	Other Interim Storage Facilities
W464-009	3.7.3	Staging and Load-out System

Table 8-2. Hold Number Listing.

Hold No.	Section	Description
W464-006	3.7.1.4	Canister Overpack/Rework Functional Allocation

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