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ENGINEERING DOCUMENT CHANGE CONTROL

Change Identification

21. Release:

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DATE:
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1. Change Category:
☒ Direct Revision ☐ Supplemental Change ☐ Page Change
☐ Supersedure ☐ Cancel/Void ☐ New

2. Classification of Change:
☐ Major ☒ Minor ☐ Conf Baseline

3. Date: 01/29/03

4. Originator's Name, Organization, MSIN, and Telephone No.:
S A Krieg/2F500/S8-05

5. USQ Required? ☒ Yes ☐ No USQ No.: 127-2003 CX No.:

6. Technical Authority:
S. A. Krieg

7. Project/Program (WMP, FFTF, etc.): SNF

8. Area: 200E

9. Building: 212H

10. Reviewer Designator: E, N, Q

11. Plan:

12. Criteria:
NA

13. Change Description:
General update of Design Verification document to reflect current MCO Cover Cap Assembly welding processes. Paragraphs 3.1.8 and 4.0 revised and new appendix D added to address MCO Cover Cap welding activities

14. Documents Issued or Changed by this EDC:

Document	Page	Revision	Comments
SNF-6442		2	

15. Technical Justification (Need):
MCO Cover Cap Assembly welding activities are scheduled to start in February of 2003. The design verification report needs to be updated to reflect the welding activities and support the start of welding.

Evaluation and Coordination

16. Change Impact:
NA

17. Affected Documents:

Document Number	Page	Revision	Person Notified/Comments
NA			

ENGINEERING DOCUMENT CHANGE CONTROL (continued)

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18. Verification:

Design Verification by peer review per HNF-GD-8336. Found satisfactory.
by N/A 2-10-03 date

19. Approvals/Reviews:

Initials, Last Name, Date, MSIN	Initials, Last Name, Date, MSIN
Technical Authority: S A Krieg/S8-05 S.A. Krieg 1-29-03	Technical Authority Manager: G D Bazinet/S8-06 G.D. Bazinet 2-2-03
Reviewer (Title): QA S S Moss/S8-06 Stephen Scott Moss 2-2-2003	Reviewer (Title): Environmental D Watson/X3-79 2-2-2003
Reviewer (Title): Nuclear Safety W G Hartlieb/S8-02 for 2/2/03	Reviewer (Title): Welding DA D M Black/S8-05 D.M. Black 2-2-03
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Reviewer (Title):	Reviewer (Title):

Solution

20. Change Description (Solution) - Continuation Sheet:

DISTRIBUTION SHEET

To	From	Page 1 of 1
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Project Title/Work Order		EDT No.
SNF-6442, Revision 3, HNF-EDC-03-14626 Design Verification Report, SNF Project, CSB		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
G. D. Bazinet	S8-06	X			
D. M. Black	S8-05	X			
E. Biebesheimer	S8-05	X			
W. G. Hartlieb	S8-02	X			
S. A. Krieg	S8-05	X			
S. S. Moss	S8-06	X			
D. J. Watson	X3-79	X			
CSB Engineering Records	S8-05	X			
Central Files	B1-07	X			

SNF-6442
Revision 3

Design Verification Report Spent Nuclear Fuel Project Canister Storage Building

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Fluor Hanford
P.O. Box 1000
Richland, Washington

Contractor for the U.S. Department of Energy
Richland Operations Office under Contract DE-AC06-96RL13200

SNF-6442
Revision 3

Design Verification Report Spent Nuclear Fuel Project Canister Storage Building

G.D. Bazinet
NHC

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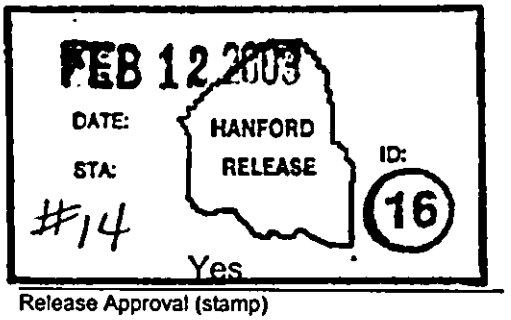
Pamela K Salazar 2-13-03
Clearance Approval Date



Release Approval (stamp)

Approved for Public Release
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For use with Technical Documents (when appropriate)	
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RECORD OF REVISION	(1) Document Number SNF-6642, Rev. 3	Page 1

(2) Title
Design Verificaation Report - Spent Nuclear Fuel Project Canister Storage Building

Change Control Record

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
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1	ECN-663447: Closure of open items identified in the original document	S. A. Krieg	G. D. Bazinet
2	ECN-66392: Replace design requirements compliance matrix in Appendix B of SNF-6442, Rev. 1	S. A. Krieg 05/14/01	G. D. Bazinet 05/14/01
3 RS	HNF-EDC-03-14626: Update to reflect MCO welding. Added new appendix D.	S.A. Krieg 1-29-03	G.D. Bazinet 1-30-03

A-7320-005 (10/97)

TABLE OF CONTENTS

FIGURES

TABLES

TERMS

A/E	Architect/Engineer
ABU	Acceptance for Beneficial Use
ACD	Advanced Conceptual Design
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
CAT	Construction Acceptance Test
CN	Conference Notes
CSB	Canister Storage Building
DCPM	Design Control Procedures Manual
DESH	Duke Engineering Services Hanford
DOE	Department of Energy
DOE/RL	Department of Energy, Richland
ECN	Engineering Change Notice
EDT	Engineering Data Transmittal
FAT	Factory Acceptance Test
FDC	Functional Design Criteria
FDI	Fluor Daniel Incorporated
FDR	Formal Design Review
FMECA	Failure Mode Effect Critical Analysis
FRD	Functions and Requirements Documents
GEM	Gaseous Effluent Monitoring
HWVP	Hanford Waste Vitrification Plant
IDR	Independent Design Review
IR	Independent Review
JTG	Joint Test Group
MCO	Multi-Canister Overpack
MHM	MCO Handling Machine
MM	Meeting Minutes
NOG-1	Nuclear Overhead Gantry ASME crane requirements
OSHA	Occupational Safety and Health Administration
PAT	Pre-Operational Acceptance Test
RAM	Reliability, Availability, Maintainability analysis
SNF	Spent Nuclear Fuel
SSC	Structures, Systems and Components
SSF	Staging and Storage Facility
TDP	Technical Data Package
TRB	Test Review Board
VDT	Vendor Data Transmittal
WHC	Westinghouse Hanford Company

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Design Verification Report
Spent Nuclear Fuel-Canister Storage Building

1.0 INTRODUCTION

The Sub-project W379, "Spent Nuclear Fuel Canister Storage Building (CSB)," was established as part of the Spent Nuclear Fuel (SNF) Project. The primary mission of the CSB is to safely store spent nuclear fuel removed from the K Basins in dry storage until such time that it can be transferred to the national geological repository at Yucca Mountain Nevada.

This sub-project was initiated in late 1994 by a series of studies and conceptual designs. These studies determined that the partially constructed storage building, originally built as part of the Hanford Waste Vitrification Plant (HWVP) Project, could be redesigned to safely store the spent nuclear fuel.

The scope of the CSB facility initially included a receiving station, a hot conditioning system, a storage vault, and a Multi-Canister Overpack (MCO) Handling Machine (MHM). Because of evolution of the project technical strategy, the hot conditioning system was deleted from the scope and MCO welding and sampling stations were added in its place. This report outlines the methods, procedures, and outputs developed by Project W379 to verify that the provided Structures, Systems, and Components (SSCs): satisfy the design requirements and acceptance criteria; perform their intended function; ensure that failure modes and hazards have been addressed in the design; and ensure that the SSCs as installed will not adversely impact other SSCs.

The original version of this document was prepared by Vista Engineering for the SNF Project. Revision 1 documented verification actions that were pending at the time the initial report was prepared. Revision 3 of this document incorporates MCO Cover Cap Assembly welding verification activities. Verification activities for the installed and operational SSCs have been completed.

2.0 DESIGN VERIFICATION REQUIREMENTS

2.1 EVOLUTION OF DESIGN VERIFICATION PROCEDURAL DOCUMENTS AND REQUIREMENTS

When Sub-project W379 was initiated, design verification was defined for the CSB sub-project by Westinghouse Hanford Company (WHC) procedure [WHC-CM-6.1], Standard Engineering Practices, EP 4.1, "Design Verification", and on the SNF Project by [HNF-1613], "Spent Nuclear Fuel Engineering Practices". Currently, design verification on the Hanford Site must be conducted in accordance with [HNF-PRO-1819], "Engineering Requirements". [Following the completion of Subproject W-379, the establishment of the MCO Welding process was conducted in accordance with [HNF-RD-1819], "Engineering Requirements".] The SNF project has developed Administrative Procedure [AP-EN-6-027-01], "Design Verification Process", for implementation of the [HNF-PRO-1819] verification requirements.

Even with the changes in the forms of the design verification implementing procedures, the design verification requirements themselves have not evolved extensively. The primary changes, which have been implemented in most recent design verification procedures, are mainly on the following aspects:

- More formalization of planning actions:
  - Ensure the graded approach on verification methods selection is based on a risk analysis (a methodology is provided as guidance)
  - Ensure that verification activities are defined during the planning phase, including:
    - Acceptance criteria
    - Verification responsibilities of the Architect/Engineer (A/E)
    - Verification documentation requirements
  - Ensure verification activities are integrated in activity/cost/schedule baselines
  - Implementation of a method to control verification status
- The addition of some detailed requirements (e.g. Design Verification Questionnaire).

The core verification requirements remain the same, and verification, regardless of originating procedures, can be categorized under the principle methods of design verification as defined in [AP-EN-6-027-01]. Verification methods include: Independent Review, Alternate Calculations, Qualification Testing, Formal Design Review, and Informal Review. The aspects of verification can be summarized as follows:

- Identify Design Requirements and associated verification methods.
- Plan and prepare verification activities and integrate them into project tasks.
- Perform verification activities according to selected method.
- Implement corrective actions resulting from verification, to ensure requirements are met and tracked to closure.
- Document verification activities and demonstrate design requirements are met.

The different design verification methods listed above are applied on a graded approach based on the importance to safety and the environment, complexity of the design, degree of standardization, state of the art, similarity with proven designs, and programmatic impacts. General application of the different design verification methods used by the CSB is described in sections 2.2 through 2.6. Specific details and documentation of design verification is described in section 3.

2.2 INDEPENDENT REVIEW

Independent reviews were used extensively to verify the design packages and procurement packages produced by the design agent, Fluor Daniel Incorporated (FDI). The independent reviews performed on FDI Design met all the requirements of a formal review with the exception of the identification of a chairman and the issuance of a design review completion report. Independent reviews were conducted in accordance with FDI's Design Control Procedures Manual (DCPM) and documented in conference notes issued with PHMC concurrence. An independent review was also completed on the MCO design. FDI used independent design review on calculations applying to SSCs with enhanced quality assurance requirements, and the computer codes were independently validated and verified.

2.3 ALTERNATE CALCULATIONS

Design verification by means of alternate calculations involves the use of one or more different methods of analysis to check and ensure the correctness and applicability of pertinent design calculations, including both hand and computer calculations. Some of the alternate calculations include the following:

- An alternate calculation was performed by Q Metrics of the thermal analysis of the MCO loading during CSB Start-up.
- An alternate calculation of the CSB Design Capacity.
- An Independent Analysis of MCO Critical Failures by M&D Associates.
- Validation and Verification of computer codes used for Spent Nuclear Fuel CSB.

2.4 QUALIFICATION TESTING

Qualification testing was applied as a final verification for all testable systems and SSCs supplied by the project to verify they met the requirements and that the systems functioned as intended. Qualification testing includes a combination of:

- Factory acceptance testing to confirm that components meet procurement specification requirements,
- Construction acceptance tests, to confirm that components are installed in accordance with the construction specification requirements, and
- Pre-operational acceptance tests to assure that all SSC's function as intended as an integrated system.
- In the case of MCO Welding, both factory acceptance testing and a field demonstration in the CSB were successfully conducted.

2.5 FORMAL DESIGN REVIEW

Formal design reviews are typically conducted at key stages of the design process to provide a comprehensive verification that the design meets requirements. The bulk of CSB design reviews that

serve this function are classified as independent reviews as described in section 2.2. Formal Design reviews on Project W379 that were completed, include:

- The Conceptual Design Report
- The MHM System
- The Security System
- The Sample/Weld Station System

2.6 INFORMAL REVIEW

This method was used for review of non-final design documents, such as engineering studies, Functions and Requirements Documents (FRD), Performance Specifications, and for reviews of designs verified by others (e.g. design change notices). This method [AP-EN-6-027-01] was used extensively and is documented by signature on the releasing document such as the EDT or ECN. Design verification documentation included with the EDT or recorded on the EDT or ECN is transmitted to a Document Control Release Station for processing and retention.

3.0 DESIGN VERIFICATION ACTIVITIES

This section briefly describes the history of the W379 Sub-project and the design as well as design verification activities. The CSB requirements baseline at each project stage, the engineering products and the verification methods used are contained in Table 1. A schedule of events with the technical baseline development and associated verification methods are shown in Figure 1. The pre-conceptual and conceptual phases of the project were verified by both informal review and formal design review. The approval and release signatures of the reviews on the Engineering Data Transmittal (EDT) coversheets document the informal reviews. The conceptual design underwent a formal design review.

During the preliminary and detailed design stages, the Design Agent (Fluor Daniel Incorporated) developed the Design Control Procedures Manual (DCPM) that was used for directing design control and design verification activities. The DCPM has requirements for verification by checking, independent design review, squad checks, internal reviews, and client reviews. Additionally there was independent analysis performed and/or directed by the Project Management Hanford Contractor (PHMC).

Verification in the construction/start-up phase included: analysis, informal review, independent review, factory acceptance testing, construction acceptance testing, inspections, pre-operational testing, and As-builts. Changes to the approved design are controlled by Design Change Notice (DCN) process as outlined in the DCPM. SNF Procedure [AP-EN-6-027-01] states that all design changes are required to undergo a design verification. The design verification included an evaluation of the effects of those changes on the overall design and on any design analyses upon which the design change is based that are affected by the change. These reviews were included as assurance that the design analyses for the structure, system, or components are still valid. For the CSB, verification of changes was implemented with independent reviews as documented by the signatures on the DCNs, including the Design Authority.

A list of the design documentation and design verification documents that were created during the different phases of the project has been developed and is included in Appendix A " List of Project Design and Design Verification Documents." A current list of drawings, and specifications is contained in the Acceptance for Beneficial Use (ABU) checklist [SNF-6253].

Table 1. CSB Baseline Design Stage Criteria, Design Output, and Verification

Design Stage	Criteria	Design Output	Verification Reference
Pre-Conceptual Design & Conceptual Design	SNF Project CSB, Functions and Requirements HNF-SD-SNF-FRD-010	Staging and Storage Facility Feasibility Study Final Report WHC-SD-W379-ES-002	Informal Review documented by EDT signoff
		CSB Trade Study Final Report WHC-SD-W379-ES-003	Informal Review documented by EDT
		Spent Nuclear Fuel Canister Storage Building Conceptual Design Report WHC-SD-W379-CDR-001	Formal Review: SNF CSB Conceptual Design Report Review Committee Report WHC-SD-W379-DR-001
Preliminary & Definitive Design Stage	Performance Specification for the Spent Nuclear Fuel Canister Storage Building HNF-S-0425 Specification for the MCO Handling Machine HNF-S-0468 Statement of Work for MCO Welding A20-SOW-001	CSB Facility Drawings Procurement Specifications	Design Package Reviews: See Table 2
		Calculations	FDI Files containing Independent Design Reviews
		MHM Design Vender File VI-50100	Formal Review: MHM 100% Design Package in vendor file #VI-50100 and letters: MHM-BTR-092-R.1, DESH-9761988.1; MHM-BTR-101, DESH-9860199; and MHM-BTR-111, DESH-9851598.
Design & Construction Phases	Performance Specification for the Spent Nuclear Fuel Canister Storage Building HNF-S-0425 Specification for the MCO Handling Machine HNF-S-0468	Design Change Notices (DCN) and As-builts	Informal Review documented by DCN signoff
		Procurement Specifications Construction Specifications	Independent Review Specifications: See Table 2
		Safety Documentation	Independent Review (EDT)

	CSB System Test Specifications: SNF-W379-TS-001 – SNF-W379-TS-025-1 Statement of Work for MCO Welding A20-SOW-001	Testing Documentation Fatory Acceptance Test Procedure for MCO Welding A20-15220-28 Field Demonstration Test Procedure for MCO Welding A20-15220-30 Factory Acceptance Test Report for MCO Welding A20-15220-29 Field Demonstration Test Procedure Report for MCO Welding A20-15220-31	Independent Reviews of Test Specifications, Pre-operational Test Procedures, and Test Summary Reports: See Appendix A

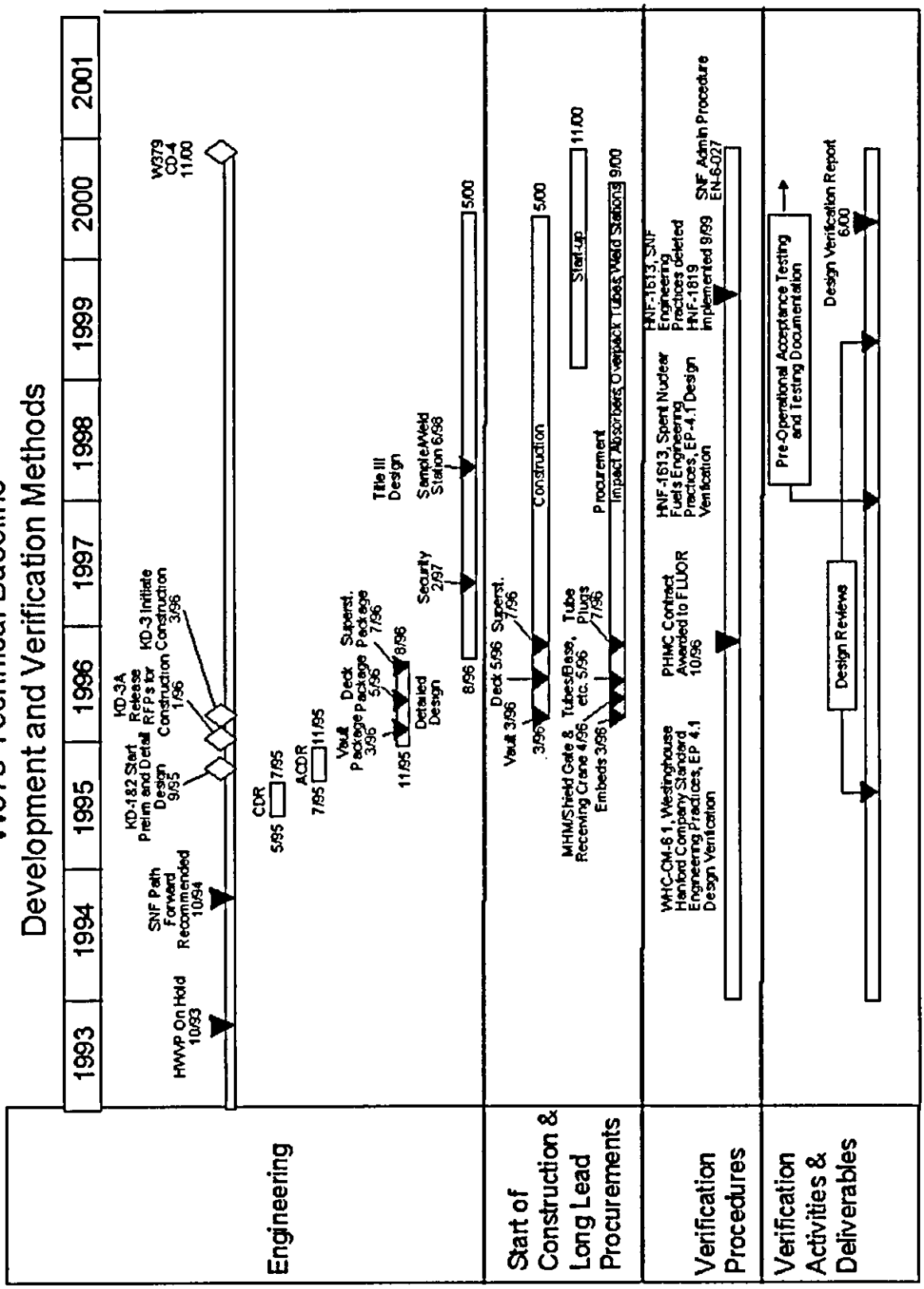

Figure 1. CSB Technical Baseline Development and Associated Verification Methods

3.1 HISTORY OF DESIGN VERIFICATION ACTIVITIES

3.1.1 PRE-CONCEPTUAL PHASE

In October 1994, WHC published the Hanford Spent Nuclear Fuel Project Recommended Path Forward, WHC-EP-0830, outlining a recommended approach for expedited removal of spent fuel from the K Basins. An essential part of this recommended approach was the use of a new facility to safely store the spent nuclear fuel.

The entire pre-conceptual phase was conducted under the direct responsibility of the DOE prime contractor (WHC) with many of the feasibility studies subcontracted to an A/E (ICF Kaiser/FDI). In order to support an evaluation of adapting the HWVP storage facility for use with the SNF project, WHC initiated a Staging and Storage Facility (SSF) Feasibility Study, WHC-SD-W379-ES-002, with Fluor Daniel Incorporated (FDI) in January 1995, and a CSB Trade Study, WHC-SD-W379-ES-003, was performed in May 1995. HNF-SD-SNF-FRD-010, SNF Project CSB Functions and Requirements, documented the upper level functions and requirements in June 1995. Verification activities in this phase consisted of informal reviews of the documents produced during this design stage. The signatures of the reviewers, including Safety, Quality Assurance, the Design Authority, etc. on the Engineering Data Transmittals (EDTs) document the design verification.

The mission for Project W379 was accepted by DOE-RL in DOE-RL letter [95-NMD-081DOE-RL], K Basins Path Forward Approval of Mission Need.

3.1.2 CONCEPTUAL PHASE

The conceptual design was started in May 1995 concurrent with a CSB trade study, WHC-SD-W379-ES-003, that was intended to determine the most suitable site to store the K-Basin Spent Fuel. The CDR, "Spent Nuclear Fuel Canister Storage Building Conceptual Design Report," WHC-SD-W379-CDR-001, was issued July 24, 1995. This CDR provided the technical basis for the initial project cost baseline. The CDR underwent a formal design review and a design review report of the CDR, WHC-SD-W379-DR-001, was issued in September 1995.

The HWVP FDC and the Technical Data Package (TDP) were the source of design requirements during the conceptual design as a CSB Performance Specification was being developed. The CDR in conjunction with the "Hanford SNF Project Recommended Path Forward," WHC-EP-0830, provided the basis for proceeding with the Advanced Conceptual Design (ACD) in August 1995. A final version of the Performance Specification, WHC-S-0425, Rev. 0, was used during the ACD stage. The performance specification underwent an informal review as documented on EDT #613003. The information developed during the Advanced Conceptual Design was rolled directly into the detailed design when capital funding was received in late 1995. A revised estimate based on the ACD effort was documented in FDI correspondence FRF-2717 dated October 9, 1995.

3.1.3 PRELIMINARY AND DEFINITIVE DESIGN STAGE

Detailed design efforts for the SNF CSB were initiated after capital funding was received at the end on November 1995. It was determined that phased releases of design media would support the aggressive construction schedule while allowing for the required design reviews. The facility was divided into three main packages and several smaller packages for design reviews and releases for construction. The three primary packages making up the CSB are the Vault, the Deck, and the Superstructure. The Vault package was issued on March 21, 1996, the Deck package was issued on May 10, 1996, and the Superstructure package was issued on July 26, 1996. A Detailed Design report was issued in August 1996 (FRP-061) to document the detailed design phase of the CSB. It contained the project background; the facility and engineering descriptions from each design discipline; a cost estimate; a schedule; the Design Basis Document; the system design description; the list of calculations; the list of design documents; and equipment, piping, and valve lists.

As verification that the design met the requirements, the DCPM required FDI to complete a design requirement compliance matrix. The first matrix was completed in April 1996 for baseline verification of the vault design against Performance specification WHC-S-0425 (Interoffice Correspondence, File 106 dated 4/12/96). The Compliance matrix was revised in July 1996 for the entire Canister Storage Building (FRT-2694).

Design verification requirements were met during detailed design by following the process outlined in the DCPM. Verification included interim design reviews, group reviews, squad checks, and client reviews/independent design reviews. Figure 2. contains Exhibit 8.0-1 of the DCPM, which diagrams the design, and design verification process that includes independent reviews by the PHMC. These reviews are documented in the FDI Conference Notes (CNs) listed in Table 2. The checking and design verification outlined in the DCPM and followed during the project are as follows:

- Interim Design Review – evaluates design concepts to assure that the design criteria and operational, maintenance, safety, and constructability objectives are met. The interim review is performed with participants from DOE, DESH, Construction Management, and Fluor Daniel.

- Group Review – an internal process that supports records of working documents that are maintained by the originating discipline.

- Squad Check – process used to perform technical design reviews of drawings and specifications in order to assure the adequacy of design and that necessary design requirements for interfacing disciplines have been clearly specified. Design documents are squad checked prior to release as approved for construction.

Independent Design Review (Client Review) – includes a graded quality assurance program that is used to ensure the quality and adequacy of design drawings, specifications, and other detailed design services to be furnished by Fluor Daniel. The reviewer may be from the same company/organization, but was not involved as a participant, supervisor, technical reviewer or advisor in the work being reviewed and to the extent practical has freedom to do an impartial review. The independent reviews of the design packages are as outlined in Table 2. These independent reviews include a list of the PHMC reviewers. These reviews are documented in FDI Conference Notes (CNs).

Table 2. Design Package Independent Reviews

Design/Procurement Packages	**Systems in Package**	**Design Review Comments**	**Design Review Completion Record**
Embed Package	Vault Embeds	FDI Log #CN-1069, File104.2, 2/28/96	FDI Log #CN-1071, File104.2, 3/1/96
CSB Vault Package	Vault Structure, Rebar, Concrete, etc.	FDI Log #CN-1078, File 104.2, 3/20/96	FDI Log #CN-1079, File104.2, 3/21/96 CN-1123 (Seismic)
MHM Shield Gate*	Portable shield gate between MHM and Deck	FDI Log #CN-1082, File104.2, 4/4/96	FDI Log #CN-1084, File104.2, 4/4/96
CSB Receiving Crane	Receiving Crane	FDI Log #CN-1083, File 104.2, 4/04/96	FDI Log #CN-1085, File 104.2, 4/04/96
CSB Deck Package	Deck, Rebar, Concrete, etc.	FDI Log #CN-1092, File104.2, 5/6/96	FDI Log #CN-1094, File104.2, 5/9/96 CN-1123 (Seismic)
CSB Tubes, Base, Covers, Absorbers, Cart Package	MCO storage tubes, tube bases, tube covers, Impact absorbers, etc.	FDI Log#CN-1096, File 104.2, 5/28/96	FDI Log # CN-1098, File 104.2, 5/31/96
CSB Superstructure Package	HVAC, instrument air and compressed air systems, HEPA room, distribution control room, change out room roofing, siding, fire protection systems, lighting, communication/PAX system, helium supply system, electrical distribution system, UPS system and battery room, control room.	FDI Log#CN-1109, File 104.2, 7/25/96	FDI Log #CN-1110, File 104.2, 7/26/96

Design/Procurement Packages	Systems in Package	Design Review Comments	Design Review Completion Record
Tube Plug Package	Storage Tube Plugs	FDI Log #CN-1111 and 1099, File 104.2, 7/29/96 and 6/10/96	FDI Log #CN-1112, File 104.2, 7/30/96
CSB/HCSA Design*	Hot Conditioning System	FDI Log #CN-1127, File104.2, 10/14/96	FDI Log #CN-1128, File104.2, 10/17/96
Security and Safeguards Package	Security Systems	FDI Log #CN-1134 File 104.2, 2/28/97	FDI Log #CN-1136 File 104.2, 2/28/97, and Formal Design Review documented in Letter FDH-9655540 R1
P&IDS	P&ID	FDI Log #CN-1150 File 104.2, 8/8/97	FDI Log #CN-1150 File 104.2, 8/8/97
Canister Impact Absorber	Impact Absorbers for Inside Tubes	FDI Log #CN-1196 File 104.2, 9/2/98	FDI Log #CN-1196 File 104.2, 9/2/98
MCO Sampling Station	MCO Sampling System	FDI Log #CN-1188 & 1189, File 104.2, 6/18/98 & 6/22/98	FDI Log #CN-1190 File 104.2, 6/29/98
HEPA Filter	Exhaust Fan and HEPAs for Sample Weld Station	FDI Log #CN-1199 File 104.2, 9/23/98	FDI Log #CN-1199 File 104.2, 9/23/98
Weld Station	MCO Cover Cap Welding System	Letter 02-SCB-CCA-001 Letter 02-SCB-CCA-006 Letter 03-SCB-CCA-016 Letter 02-SCB-CCA-014	MCO Welding Final Design Package, A20-15220-11
Overpack Storage Tube and Plugs	Overpack Storage tubes and Plugs	FDI Log #CN-1225 File 104.2, 3/02/99	FDI Log #CN-1232 File 104.2, 4/29/99
Tube Plug Adapter	Tube Plug Adapter for MHM Grapple	FDI Log #CN-1233 File 104.2, 5/13/99	FDI Log #CN-1234 File 104.2, 5/20/99
Transfer System Impact absorber*	Impact Absorber for use During MCO Off-Load	FDI Log #CN-1335 File 104.2, 5/21/99	-N/A
High security gate	CSB Building Gate	FDI Log #CN-1236 File 104.2, 6/17/99	-

Design/Procurement Packages	Systems in Package	Design Review Comments	Design Review Completion Record
Rolling Gate	CSB Building Gate	FDI Log #CN-1243 File 104.2, 7/12/99	-
Guide Ring Funnel*	Alignment Funnel/Interface for Storage Tube	FDI Log #CN-1247 File 104.2, 7/19/99	-N/A
CSB Operations Building	Operations Personnel Trailers	FDI Log #CN-1238 File 104.2, 6/28/99	-
Frog Tooling Design package	Tool for Handling Rail Frogs	FDI Log #CN-1250 File 104.2, 9/7/99	-
Shield hatch	Shield Covers for Cask Receiving Pit and Sample/Weld Station Pit	FDI Log #CN-1252 File 104.2, 9/23/99	-
Containment Tent	Enclosure for Receipt of or High pressure Casks (Off Normal)	FDI Log #CN-1259 File 104.2, 11/8/99	-
Block Diagram	Process Block Flow Diagrams	In Process	H-2-123400, Sheets 1-12

*Note: These features were subsequently removed from the scope of the SNF CSB Sub-project.

The vendor-supplied designs were reviewed by FDI/DESH and documented in FDI conference notes as listed in Table 2. Comments from all of the PHMC package reviews are located in the FDI conference notes. The largest procurement package (MHM) underwent a formal design review and is documented in the MHM 100% Design package, vendor file #VI-50100. After the formal design review, changes were made to the MHM Design Requirements. The modified design was independently reviewed and documented in the following letters: [MHM-BTR-092-R.1], [DESH-9761988.1]; [MHM-BTR-101], [DESH-9860199]; and [MHM-BTR-111], [DESH-9851598]. Independent reviews of the seismic analysis for the MHM are documented in [FDP-591], [DESH-9853642], and [DESH-9760886].

Other documentation of design verification activities, e.g., independent reviews, informal/formal design reviews, and alternate calculations, performed on the CSB SSCs is contained in the following documents.

Independent reviews conducted on the CSB design documentation and CSB SSCs are documented in:

- 99-SNF/CES-001, Interoffice Correspondence, "MCO Machine - Shield Skirt/Concrete Deck Interface - Technical Evaluation," C. E. Swenson to A. S. Daughtridge, dated November 2, 1999, containing an unreleased copy of HNF-5297, "Radiation Exposure from the Gap Under the Multi-Canister Overpack (MCO) Handling Machine," S. R. Gedeon, FDNW, October 1999."

- CN-1123, "Design Review of SNF CSB Deck Structural Calculations and RCR's," Fluor Daniel, Inc., 1996.

- DESH-9760886, "Review of Soil and Building Structural Interaction on Seismic Response Spectra for CSB Receiving and Multi-Canister Overpack Handling," DE&S Hanford, Inc., 1997.

- DESH-9853642, "Review Comments to Seismic Analysis and Structural Calculations," DE&S Hanford, Inc., 1998.

- FDP-591, "Multi-Canister Overpack Handling Machine Seismic Analysis Review Report," Fluor Daniel, Inc., 1998.

Formal reviews have been completed and documented in the following:

- FDH-9655540, "Security Concept and Design Criteria, 100% Design Review for the Canister Storage Building and Hot Conditioning System Annex," letter; E. S. McGinley, FDH, to F. G. Hudson, DESH, dated May 19, 1997.

- SNF-5222, Rev. 0, "SNF MCO Design Review Completion Report," L. H. Goldmann, Fluor Daniel Hanford, 1999; containing HNF-SD-SNF-RPT-011, Rev 1A, "SNF Project Design Basis Capacity Study," K. J. Cleveland, Fluor Daniel Northwest, 1999.

- SNF-5465, "SNF MCO Design Verification Summary," L. H. Goldmann, Fluor Daniel Hanford, 1999.

Design compliance matrices have been completed and informally reviewed as documented on the EDTs as follows:

- 00-SNF/CES-005, "Project Number W-379 - Multi-Canister Overpack Handling NOG-1 Compliance Matrix," SNF Project Internal Correspondence, C. E. Swensen to G. D. Bazinet, May 11, 2000.

- HNF-4742, Rev. 0, "CSB Compliance Assessment, DOE Order 6430.1A, General Design Criteria," D. M. Black, Fluor Daniel Northwest, 1999.

- HNF-4776, Rev. 0, "CSB Compliance Assessment, SNF Project NRC Equivalency Criteria," D. M. Black, Fluor Daniel Northwest, 2000.

- SNF-5790, Rev. 0, "Design Compliance Matrices to ANSI and OSHA," S. A. Krieg, FDH, 2000.

- SNF-6442, Rev. 3, Appendix D, "MCO Welding Compliance Planning Matrix," D. L. Nearing, Wastren, 2003.

Alternate calculations have been completed as follows:

- EDT-625800, "Preliminary Analysis of MCO Loading During CSB Startup." A. L. Pajunen, DESH, December 1, 1998 (Contains Independent analysis by Q Metrics on natural convective cooling). Alternate calculation of CSB-HV-0010, "CSB Vault Air Temperatures".

- SNF-5930, Rev. 0, "Structural Analysis of MCO for Accidental Movement of MHM During MCO Lifting Operations," G. D. Bazinet, NHC, and G. Abatt, March 2, 2000 (Contains Independent Analysis of MCO Critical Failures by M&D Associates). Alternate calculation of CSB-S-0007 "Storage Tube Analysis & MCO Drop", CSB-S-0067 "MCO Drop Impacts on the Standard Storage Tubes", and CSB-S-0068 "MCO Drop Impacts on the Overpack Storage Tubes".

Computer code validation and verification:

- FDP-815, "Validation and Verification of Computer Codes Used For Spent Nuclear Fuel CSB," letter S. L. Petersen FDNW, to A. S. Daughtridge, DESH, dated March 11,1999.

Informal reviews have been completed and documented on EDTs on the following:

- HNF-3553, Annex A, Rev. 0., Spent Nuclear Fuel Project SAR – Annex A Canister Storage Building." R.P. DiPiazza, 2000.
- HNF-3553, Vol. 1, Rev. 0A., Spent Nuclear Fuel Project Final Safety Analysis Report." L. J. Garvin, 2000.
- HNF-3672, Rev 0., "Canister Storage Building Safety Requirements." D.E. Krahn, 2000.
- HNF-6025, Rev. 0," Emergency Preparedness Hazards Assessment," L.R. Campbell, dated May 24, 2000.
- HNF-SD-SNF-CSER-005, "Criticality Safety Evaluation Report for the MCO," S. F. Kessler, FFS, 2000.
- HNF-SD-SNF-FHA-002, Rev. 2., "Final Fire Hazards Analysis for the Canister Storage Building," ARES report, 2000.*
- SNF-6449, Rev. 0, "FMEA/RAM Analysis for the MHM," EDT 628719, 6/1/00.

*Note: MCO Welding is covered in HNF-SD-SNF-FHA-001, Rev. 2B, "Final Fire Hazards Analysis for the Canister Storage Building," S. C. Wallace, September 19, 2002.

The following documents underwent an informal review with the FSAR as documented in the EDT:

- SNF-3907, Rev. 0, "SNF Project CSB Human Factors Engineering (HFE) Analysis: Results and Findings," R. P. DiPiazza, 1999.
- SNF-4831, Rev. 0, "Human Factors Engineering and Ergonomics Analysis for the CSB: Results and Findings," R. P. DiPiazza, 1999.
- SNF-3328, Rev. 2, "Canister Storage Building Design Basis Accident Analysis Documentation," R. D. Crowe, M. G. Piepho, et.al., FH, 2000.
- HNF-SD-SNF-HIE-001, "Canister Storage Building Hazard Analysis Report," L.J. Garvin, 1997.

3.1.4 CONSTRUCTION AND STARTUP PHASE

Verification of the CSB SSCs meeting their associated requirements during the construction and start-up phases of Sub-project W379 can be broken into five types of verification:

- Review of vendor supplied designs
- Factory Acceptance Tests (FATs)
- Construction Acceptance Tests (CATs)
- Pre-operational Acceptance Tests (PATs)
- As-Built Verification

Each of the 23 systems of the CSB is described in Table 3 along with their associated design verification. This testing verifies the design of the CSB SSCs by ensuring that the systems are within dimensional bounds; perform the required control or actuation; provide the required flow and/or pressure drop; or otherwise perform their required function. The systems and their required testing are outlined in the W379 Test Specifications. Below is a description of the testing process used on the CSB.

The Design Authority, Design Agent, construction contractor, or vendors, assist in the preparation and/or review of the detailed FAT test procedures and acceptance criteria. FATs typically occur at the vendor's site and verify that the SSC meets the requirements of the procurement specification. FATs can be dimensional in nature, test component actuation, simulate inputs and logic controls, provide load tests, hoist speeds, leak tests, etc. Factory acceptance tests are approved by the Design Agent and the Design Authority and are controlled by the construction contractor.

During the construction phase, the Start-up organization, with input from the Design Agent and Design Authority, developed the Test Specifications. The Test Review Board (TRB), formerly the Joint Test Group (JTG), and the Design Authority performed an independent review of the Test Specifications (see JTG/TRB meeting minutes listed in Appendix A). The Test Specifications reviewed the adequacy

of the FATs and developed the requirements for the CATs and PATs. The CATs are approved by the Design Agent and the Design Authority and are controlled by the construction contractor.

The Pre-operational Acceptance Test procedures that were developed contain the traditional Acceptance Testing Procedure (ATP) content with the physical and functional testing content of traditional Operational Testing Procedures (OTP). These PAT procedures also underwent independent reviews by the TRB and informal review by Design Authority as listed in Appendix A.

A compilation of the qualification testing of each of the CSB sub-systems is, or will be, documented in a Test Summary Report or Test Results Package. The Test Summary Report is the culmination of a process to document the portions of the system needing testing, the procedure for executing the tests, and the test results. The Test Summary Reports also undergo an independent review by the TRB. A list of the Test Summary Reports and the references of the independent reviews is contained in Appendix A. In accordance with SNF Project Administrative Procedure AP 10-025-04, *Review, Approval, and Disposition of Test Results*, interim acceptance of test results prior to completion of the test results package may be accomplished using a **Test Acceptance Certification Document** certifying that the test is complete as presented and that the test acceptance criteria are met. The test results package that follows will constitute the final record of testing completion.

As-built verification for essential drawings was performed for both the MHM and the balance of the CSB in accordance with the Verification Plan for As-Builting Canister Storage Building, SNF Desk Instruction (CSB-DI-001) and the MHM As-Built Verification Plan . C.E. Swenson, (SNF-6448, Rev.1).

Table 3. CSB Systems and Design Verification

SYSTEM #	SYSTEM DESCRIPTION	VERIFICATION
1,18	**Electrical Distribution System** A safety support system comprised of normal electric power and uninterruptible power systems. The normal electric power distribution system conveys one-line connections between the Hanford Site Power and CSB. UPS function is to supply uninterrupted, reliable power to SNF CSB instrumentation distribution panels. *Safety Conditions:* Classified General Service.	Design Reviewed: Superstructure Package Tested: UPS W379-PAT-018
2	**Instrument/Service Air System** The CSB instrument and plant air system comprises two 2-stage, oil-free, air-cooled, rotary screw compressors operating in alternating lead-fashion to deliver compressed air at the compressor discharge. *Safety Conditions:* Classified General Service.	Design Reviewed: Superstructure Package Tested: W379-PAT-002
3	**Fire Protection System** The CSB structural system, roof, and exterior wall system are made of noncombustible materials. In any interior areas that have finishes, the finishes have a flame spread index less than 25 when tested in accordance with ASTM E84. *Safety Conditions:* Classified General Service.	Design Reviewed: Superstructure package
4	**Liquid Waste Collection System** The liquid waste collection system is designed to collect water condensate from HVAC air handling unit cooling coils and instrument air compressors, and provide for transfer of the condensate to approved containers for disposal. *Safety Conditions:* Classified General Service.	Design Reviewed: Superstructure package Tested: W379-PAT-004
5	**Communications System** The design of the plant communications system provides the cabling and/or raceway system equipment for the telephone, public address, intercom, and radio communications systems within the CSB to the communications equipment interface point. *Safety Conditions:* Classified General Service.	Design Reviewed: Independent review of U.S. West Telephone System and Public Address System Design Tested: Construction Acceptance Testing summarized in Test Summary Report W379-TSR-005

SYSTEM #	SYSTEM DESCRIPTION	VERIFICATION
6,7	**Heating, Ventilating and Air Conditioning System** The HVAC system is designed to provide, along with physical barriers, part of the CSB contamination confinement system and contamination control within the CSB. The HVAC system provides a controlled pressure gradient flow of air from outside the CSB inward through uncontaminated areas to potentially contaminated areas of the building and out through HEPA filters and a monitored exhaust. The HVAC system also provides climate control to ensure that environmental conditions in the CSB are maintained in the required ranges for personnel and equipment. *Safety Conditions:* Classified General Service.	Design Reviewed: Superstructure package Tested: Operating Area: W379-PAT-006 Support Area: W379-PAT-007 Stack Monitoring Phase 1: W379-PAT-010-1 Stack Monitoring Phase 2: W379-PAT-010-2
8	**Sanitary Water System** The sanitary water system is designed and limited to supplying clean water for possible future sanitary use (e.g., toilets, sinks, showers, and drinking fountains) if required. *Safety Conditions:* Classified General Service	Design Reviewed: Superstructure package
9	**Backup Power System** The backup power system designed for CSB will not be installed and connected at this time. *Safety Conditions:* No safety-class or safety-significant has been identified.	N/A
10,11	**Health Protection System** The health protection system is designed to monitor and warn plant personnel of hazardous radioactive conditions that may occur as a result of malfunctions or accidents, provide contamination control, and provide limited computer-activated database management and status reporting. An airborne emission monitoring system is designed to provide continuos stack monitoring for radionuclides and alpha/beta particulate. *Safety Conditions:* Classified General Service.	Design Reviewed: Superstructure package Tested: W379-PAT-011-1
12	**Transportation Cask Receiving System** The receiving crane is designed to offload an MCO transportation cask from a transport trailer and transfer the cask to the cask receiving pit. The receiving crane and appurtenances offload the MCO transportation cask from the transport trailer. After an MCO has been removed from the cask by the MHM, the receiving crane retrieves the cask, including an empty MCO, and places the cask back on the transport trailer. *Safety Conditions:* The major components have been classified in the following categories: A, B, safety-significant, and general service.	Design Reviewed: Superstructure package Tested: W379-PAT-012 W379-PAT-012-1
13	**Transportation Cask Servicing System** The transportation cask servicing system is designed for checking the pressure of the transportation cask and, if necessary for recovery operations, taking a sample of the gases inside the cask and purging the gases from the cask. The cask servicing system can be used by personnel to check the pressure of the received cask. Gases inside the cask are purged or vented with helium to ensure that potential hydrogen concentrations are diluted below flammable concentrations. *Safety Conditions:* The major components have been classified in the following categories: safety-significant, and general service.	Design Reviewed: Superstructure Package, Cask Receiving Crane Package Tested: W379-PAT-013
14	**Overpack Storage Tube Vent and Purge System** Overpack storage tube operations are designed to safely monitor a suspect leaking MCO or a damaged MCO. An MCO will be placed in an overpack storage tube for up to 1 year until monitoring activities determine the leak rate, if any, of gases escaping from the mechanically sealed MCO or from the damaged MCO. *Safety Conditions:* The major components have been classified in the following categories: A, safety-significant, and general service.	Design Reviewed: Superstructure Package, Purge Vent System Tested: W-379-PAT-014-1 W-379-PAT-014-2
15	**MCO Handling Machine System** The MHM is designed for safe handling of an MCO in the operations area of the CSB. The MHM removes an MCO from the cask in the cask receiving pit and carries the MCO to a standard storage tube for interim storage, to the sampling/weld station for sampling/weld operations, or to an overpack storage tube. *Safety Conditions:* The major components have been classified in the following categories: A, B, safety-significant, and general service.	Design Reviewed: MHM Package Tested: W-379-PAT-015-1 W-379-PAT-015-2 W-379-PAT-015-3 W-379-PAT-022-1 W-379-PAT-025-1
16	**Vault Cooling System** The CSB contains an array of storage tubes that are cooled using passive, naturally circulating air to remove the decay heat from the SNF contained in MCOs in the storage vault. *Safety Conditions:* The major components have been classified in the following categories: A and general service.	Design Reviewed: Superstructure and Vault Package Tested: W379-PAT-016

SYSTEM #	SYSTEM DESCRIPTION	VERIFICATION
17	**Security System** The designed security system for the CSB includes: locking doors and an alarm system, closed-circuit television cameras, special access hardware; telescoping doors and heavy rolling shield gates, concrete curbs around the perimeter of the operations, intrusion barriers, special outside access hardware, crash bars for emergency exit, security seals. *Safety Conditions:* Classified General Service.	Design Reviewed: Security System Package Tested: W379-PAT-017-1
19	**Roll-up Doors System** The Roll-up Doors System is designed to provide a sealed (air-locked) entryway in to SNF CSB for the MCO from the Cold Vacuum Drying Facility and other spent nuclear fuel from various sources.	Design Reviewed: Superstructure Package Tested: W379-PAT-019
20	**Fire Water Pump House System** The Fire Water Pump House System is designed to supply backup Sanitary Water to the SNF CSB Fire Protection System (the Wet Pipe Sprinkler System and Fire Department Hose Connections) and surrounding facilities, for supplemental fire suppression.	Design Reviewed: HWVP Design Package (04Q3660 & 04R3660 Fire Protection Drawings) Tested: W379-PAT-020 W379-PAT-020-1
21	**Distributed Control System** The DCS is designed to serve as the central monitoring and control system for CSB facility conditions, systems (particularly the health physics monitoring system), and processes (specifically the inert gas dilution of vented cask gases). *Safety Conditions:* Classified General Service.	Design Reviewed: Superstructure Package Tested: W379-PAT-021
22,23	**MCO Sampling/Weld System** The MCO sampling system is used for withdrawing a sample of gases from the monitored MCOs according to a predetermined schedule. Weld equipment will provide additional sealing of the MCO by welding a cap on the MCO. *Safety Conditions:* The major components have been classified in the following categories: B, C, and safety-significant.	Design Reviewed: Formal Design Review Sampling/Weld Station Package Tested: W-379-PAT-023 A20-15220-29 A20-15220-27 A20-15220-31

3.2 EVIDENCE THAT DESIGN REQUIREMENTS ARE MET

Current design requirements come from three sources: (1) the Canister Storage Building Performance Specification, [HNF-S-0425, Rev. 4]; (2) the Performance specification for the MHM, [HNF-S-0468, Rev 5]; and (3) the Spent Nuclear Fuel Project Stage and Store K Basin SNF in Canister Storage Building Functions and Requirements, [SD-SNF-FRD-010, Rev. 1].

Evidence that the design requirements in the Performance Specifications listed above are met is contained in Appendix B. Appendix B reviewed Project W379 for compliance to the latest requirements [HNF-S-0425, Rev. 4] and [HNF-S-0468, Rev 5]. Earlier evidence of the design requirements being met includes two Baseline Design Verification Compliance Matrices performed by Fluor Daniel Incorporated [FDI File 106] and FDI, [FRT #2694].

Evidence that the MCO Welding program has met design and procedural requirements is contained in Appendix D. Appendix D reviewed the latest procedural requirements [HNF-RD-1819, Rev. 0] and technical requirements documents.

Compliance of the design with DOE Order 6430.1A and NRC equivalency are documented in compliance documents [HNF-4742] and [HNF-4776]. Design compliance matrices to applicable American National Standards Institute (ANSI) requirements and Occupational Safety and Health Association (OSHA) requirements are contained in [SNF-5790]. Additionally, an ASME Nuclear

Overhead Gantry crane requirements (NOG-1) compliance matrix was completed on the MHM SNF Interoffice Correspondence [00-SNF/CES-005].

Additional verification and validation actions were conducted to of the design to provide an additional level of assurance for structures, systems, and components (SSCs) verified through testing and for those designated as safety class or safety significant. These are documented in:

- SNF-7030, *CSB Safety Function Verification Report* -- Design verification actions for all systems and components identified on the Safety Equipment List (SEL) were 100% validated using design media, supporting analysis, testing results, commercial grade dedication analysis, and safety analysis reports.

- SNF-7028, *CSB Facility Design Validation Assessment – Project W-379* – Where testing was designated as the verification method in this report, validation of all safety class and safety significant items was required. In addition, a sampling basis was used to validate verification tests for general service items.

3.3 EVIDENCE THAT DESIGN VERIFICATION REQUIREMENTS ARE MET

Requirements verification methods are defined in the FDI DCPM. Methods of verification for the requirements are proposed in two sources: (1) The Baseline Design Verification for the CSB, FDI Transmittal to WHC, [FRT-2694], July 1996; and (2) the Test Review Board Meeting minutes. These sources were used to create the Design Requirements Compliance matrix (Appendix B) that listed the verification method used for each of the requirements in the CSB and MHM specifications. Those verification methods included:

- Independent Review
- Alternate Calculations
- Qualification Testing
- Formal Design Review
- Informal Review

Evidence that Sub-project W379 performed the required design verification is contained in the Design Verification Status Questionnaire contained in Appendix C and supported by the List of Project Design and Design Verification Documents in Appendix A and Design Requirement Compliance Matrix in Appendix B.

4.0 CONCLUSION

The Canister Storage Building (CSB) subproject has performed thorough and appropriate design verification activities throughout the project life cycle. Proper planning was performed and a graded approach was used based on safety and other project risks. Design verification was performed in accordance with the design agent's Design Control Procedures Manual, as approved by CSB engineering, and included independent, informal, and formal reviews as well as alternate calculations and qualification testing. At all phases of the design, verification activities were conducted in a graded manner appropriate to the complexity and importance to safety of the design being verified.

5.0 REFERENCES

00-SNF/CES-005, "Project Number W-379 - Multi-Canister Overpack Handling NOG-1 Compliance Matrix," SNF Project Internal Correspondence, C. E. Swensen to G. D. Bazinet, May 11, 2000.

95-NMD-081DOE-RL, Letter J.D. Wagoner, DOE-RL, to Dr. A.L. Trego, Westinghouse Hanford Company, K Basins Path Forward Approval of Mission Need, dated June 13, 1995.

97-SNF-117, "RAM Analysis for the MHM," Letter S. A. Daughtridge, Duke Engineering & Services, to N. H. Williams, Fluor Daniel Hanford, DESH-97606888, dated November 26, 1997.

99-SNF/CES-001, Interoffice Correspondence, "MCO Machine - Shield Skirt/Concrete Deck Interface - Technical Evaluation," C. E. Swenson to A. S. Daughtridge, dated November 2, 1999, containing an unreleased copy of HNF-5297, "Radiation Exposure from the Gap Under the Multi-Canister Overpack (MCO) Handling Machine," S. R. Gedeon, Fluor Daniel Northwest, October 1999.

AP-EN-6-027-01, "Design Verification Process," Fluor Daniel Hanford, 1999.

CN-1123, "Design Review of SNF CSB Deck Structural Calculations and RCR's," Fluor Daniel, Inc., 1996.

CSB-DI-001, "Verification Plan for As-Builting Canister Storage Building," desk instruction dated November 15, 1997.

DESH-9760886, "Review of Soil and Building Structural Interaction on Seismic Response Spectra for CSB Receiving and Multi-Canister Overpack Handling," Duke Engineering & Services Hanford, 1997.

DESH-9853642, "Review Comments to Seismic Analysis and Structural Calculations," Duke Engineering & Services Hanford, 1998.

EDT-612984, "H-2-825867 and H-2-825868, SNF Project Process Flow Diagram Summary," A.L. Pajunen, Westinghouse Hanford Company, 1995.

EDT-625800, "Preliminary Analysis of MCO Loading during CSB Startup." A. L. Pajunen, Duke Engineering & Services Hanford, December 1, 1998 (Contains Independent analysis by Q Metrics on natural convective cooling).

EDT-627041, Independent Analysis of MCO Critical Failures by M&D Associates.

FDH-9655540 R1 "100% Design review for the Canister Storage Building and Hot Conditioning System Annex." Letter, E. S. McGinley, Fluor Daniel Hanford, to F. G. Hudson, Duke Engineering & Services Hanford, dated May 19, 1997.

FDH-9655540, "Security Concept and Design Criteria, 100% Design Review for the Canister Storage Building and Hot Conditioning System Annex," letter; E. S. McGinley, Fluor Daniel Hanford, to F. G. Hudson, Duke Engineering & Services Hanford, dated May 19, 1997.

FDI DCPM Document; Spent Nuclear Fuel Canister Storage Building Design Control Procedures Manual.

FDP-591, "Multi-Canister Overpack Handling Machine Seismic Analysis Review Report," Fluor Daniel, Inc., 1998.

FDP-815, "Validation and Verification of Computer Codes Used For Spent Nuclear Fuel CSB," letter S. L. Petersen Fluor Daniel Northwest, to A. S. Daughtridge, Duke Engineering & Services, dated March 11,1999.

File 106, Fluor Daniel Internal Log, "Vault Baseline Design Verification;" Interoffice Correspondence, dated April 12, 1996.

FRF-2717, "Technical Baseline and Design to Cost CS & SR Cost Data," Letter, R. S. Poultier, Fluor Daniel, Inc., to M. K. Mahaffey, Westinghouse Hanford Corporation, dated October 9, 1995.

FRF-2717, "Technical Baseline and Design to Cost CS & SR Cost Data," Letter, R. S. Poulter, Fluor Daniel, Inc., to M. K. Mahaffey, Westinghouse Hanford Corporation, dated October 9, 1995.

FRP-061, "Spent Nuclear Fuel Canister Storage Building Detailed Design Report," Transmittal letter, E. R. Jacobs, Fluor Daniel, Inc., to M. K. Mahaffey, Westinghouse Hanford Corporation, dated August 23, 1996.

FRT-2661, "CSB Interim Design Report," Fluor Daniel, Inc., dated February, 1996.

FRT-2694, "Baseline Design Verification for the SNF CSB," Fluor Daniel, Inc., dated June 24, 1996.

HNF-1613, Rev. 1, "Spent Nuclear Fuels Engineering Practices," W. C. Miller, Numatec Hanford Corporation, 1999. [This document deleted and superseded by the SNF Project Administrative Procedures]

HNF-4742, Rev. 0, "CSB Compliance Assessment, DOE Order 6430.1A, General Design Criteria," D. M. Black, Fluor Daniel Northwest, 1999.

HNF-4776, Rev. 1, "CSB Compliance Assessment, SNF Project NRC Equivalency Criteria," D. M. Black, Fluor Federal Services, 2000.

HNF-6025, Rev. 0," Emergency Preparedness Hazards Assessment," L.R. Campbell, Fluor Hanford, Inc., 2000.

HNF-PRO-1819, "Engineering Requirements," Fluor Hanford, Inc..

HNF-S-0425, Rev. 4, "Performance Specification for the Spent Nuclear Fuel Canister Storage Building," G. D. Bazinet, Numatec Hanford Company, 2000.

HNF-S-0468, Rev 5, "Specification for the MCO Handling Machine," C. E. Swenson, Fluor Hanford, Inc., 1999.

HNF-SD-SNF-CSER-005, Rev. 5B, "Criticality Safety Evaluation Report for the MCO," S. F. Kessler, Fluor Federal Services, 2000.

HNF-SD-SNF-FHA-002, Rev. 2, "Final Fire hazards Analysis for the Canister Storage Building," G. D. Bazinet, Numatec Hanford Company, 2000.

HNF-SD-SNF-FRD-010, Rev. 2, "SNF Project Stage and Store K Basin SNF in CSB, Functions and Requirements," M. J. Klem, COGEMA, 2000.

HNF-SD-SNF-HIE-001, Rev. 3, "Canister Storage Building Hazard Analysis Report," T. B. Powers, Fluor Federal Services, 2000.

HNF-SD-SNF-OCD-001, Rev. 4B, "SNF Project Product Specification," A. L. Pajunen, Fluor Hanford, Inc., 2000.

HNF-SD-SNF-RPT-011, Rev. 2, "SNF Project Design Basis Capacity Study," K. J. Cleveland, Fluor Federal Services, 2000.

HNF-SD-SNF-TI-015, Rev. 6, "SNF Project Technical Databook," M. A. Reilly, Duke Engineering & Services Hanford, 1998.

SNF-3328, Rev. 2, "Canister Storage Building Design Basis Accident Analysis Documentation," R. D. Crowe, M. G. Piepho, et.al., Fluor Hanford, Inc., 2000.

SNF-3907, Rev. 0, "SNF Project CSB Human Factors Engineering (HFE) Analysis: Results and Findings," R. P. DiPiazza, XWest, 1999.

SNF-4831, Rev. 0, "Human Factors Engineering and Ergonomics Analysis for the CSB: Results and Findings," R. P. DiPiazza, XWest, 1999.

SNF-5222, Rev. 0, "SNF MCO Design Review Completion Report," L. H. Goldmann, Fluor Daniel Hanford, Inc., 1999.

SNF-5465, Rev. 0A, "SNF MCO Design Verification Summary," L. H. Goldmann, Fluor Hanford, Inc., 2000.

SNF-6253, Rev. 1, "Canister Storage Building Acceptance for Beneficial Use Index – Roadmap of Supporting Documents," G. D. Bazinet, Numatec Hanford Company, 2000.

SNF-6448, Rev. 1, "MHM As-Built Verification Plan," C. E. Swenson, Fluor Hanford, Inc., 2000.

SNF-7028, Rev. 1, "CSB Facility Design Validation Assessment – Project W-379," B. Knutson, et al, Parsons Infrastructure & Technology Group, Inc., 2000.

SNF-7030, Rev 1, "CSB Safety Function Verification Report," R. M. Yanochko, et al, Fluor Hanford, Inc., 2000.

SNF-CO-9911443, "CSB As-Built Verification Program Review," letter S. L. Petersen, Fluor Daniel Northwest, to A. S. Daughtridge, Duke Engineering and Services, dated March 29, 1999.

VI-50100,Vender File with MHM 100% Design Package.

WHC-CM-6.1, "Standard Engineering Practices," EP 4.1, "Design Verification," Westinghouse Hanford Company.

WHC-EP-0830, Rev. 0, "Hanford Spent Nuclear Fuel Project Recommended Path Forward," J. C. Fulton, Westinghouse Hanford Company, 1994.

WHC-SD-W379-CDR-001, Rev. 0, "Spent Nuclear Fuel Canister Storage Building Conceptual Design Report," C. E. Swenson, Westinghouse Hanford Company, 1996.

WHC-SD-W379-DR-001, Rev. 0, "SNF CSB Conceptual Design Report Review Committee Report," W. P. Dana, Westinghouse Hanford Company, 1995.

WHC-SD-W379-ES-002, Rev. 0, "Staging and Storage Facility Feasibility Study Final Report," M. D. Conner, Westinghouse Hanford Company, 1996.

WHC-SD-W379-ES-003, Rev. 0, "CSB Trade Study Final Report," M. D. Conner, Westinghouse Hanford Company, 1995.

A20-SOW-001, Rev. 4, "MCO Closure Welds Statement of Work," J. Snyder, Flour Hanford, Inc., 2003

A20-15220-011, "Final Design Package," M. Frazier, Amer Industrial Technology, 2003

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APPENDIX A

LIST OF PROJECT DESIGN, CONSTRUCTION, AND DESIGN VERIFICATION DOCUMENTS

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SUGGESTED DOCUMENTS to be provided by Project to Boeing for design verification		Document Name and Number	Type of Verification	Verification Reference
Procedural Document				
	Specific procedures developed by the Project related to verification work	EN-6-027-01 "Design Verification Process" Spent Nuclear Fuel Project Administrative Procedure, Fluor Daniel Hanford	N/A	
		EN-6-012-01 "As-Built Verification Plan Development Process" Spent Nuclear Fuel Project Administrative Procedure, Fluor Daniel Hanford	N/A	
		EN-6-012-00 "Spent Nuclear Fuel As-Built Verification Plan Development Process" Spent Nuclear Fuel Project Administrative Procedure, Fluor Daniel Hanford	N/A	
	AE procedures related to their internal personnel qualification process	"Spent Nuclear Fuel Canister Storage Building Design Control Procedures Manual (DCPM)," Fluor Daniel Incorporated (FDI proprietary document)	N/A	
		A20-15220-24 "Contractor Welder Qualifications" Amer Industrial Technology submittal 24		
	Engineering Practices	WHC-CM-6.1 EP 4.1 "Design Verification" WHC Engineering Procedure	N/A	
		HNF-1613, Rev. 1 "Spent Nuclear Fuels Engineering Practices" W. C. Miller, NHC, September 30, 1999. DOCUMENT DELETED AND SUPERSEDED BY SNF PROJECT ADMINISTRATIVE PROCEDURES	N/A	ECN-654630
		HNF-PRO-1819 "PHMC Engineering Requirements" Project Hanford Management Systems Procedure	N/A	
Project Management Documents				
	Project Execution Plan or equivalent	HNF-3552, Rev. 1 "Spent Nuclear Fuels Project Execution Plan" N. H. Williams, June 22, 2000	Informal Review	ECN-659134
		"K Basins Path Forward Approval of Mission Need" Letter, J. D. Wagoner, DOE-RL, to A. L. Trego, WHC, 95-NMD-081, dated June 13, 1995	N/A	
	Path Forward	WHC-EP-0830, Volumes 1-3 "Hanford Spent Nuclear Fuel Project Recommended Path Forward" J. C. Fulton, WHC, 1994	N/A	Public Release
	Cost Baseline document	FRF-2717 "Technical Baseline and Design to Cost CS & SR Cost Data" Letter, R. S. Poulter, FDH, to M. K. Mahaffey, dated October 9, 1995	N/A	
	Schedule baseline document	BCR-SNF-98058, -1999006; SNF TPA Baseline. December 1998.	N/A	
	Open Issue List	SNF Project Corrective Action Report (SNF Engineering); SNF Data Tracking System (T. Collins); Construction Punch List (FDI - J. Koeberg); Operations Punch List (PHMC - K. Freeman).	N/A	
Verification Planning Documents				

SUGGESTED DOCUMENTS	Document Name and Number	Type of Verification	Verification Reference
Verification Plans	CSB-DI-001 "Verification Plan for As-Building Canister Storage Building" SNF CSB Sub-Project Desk Instruction, Mahaffey, November 15, 1997	N/A	
	SNF-6448, Rev. 1 "As-Built Verification Plan Spent Nuclear Fuel Canister Storage Building MCO Handling Machine," October 19, 2000	N/A	
	"As-Built Verification Plan Spent Nuclear Fuel Canister Storage Building MCO Handling Machine - Electrical," Rev. 0A, dated April 5, 2000., is included in SNF-6448, Rev. 0	N/A	
Test Planning Documents			
Test Planning form	SNF Start-up Preoperational Acceptance Test Status Matrix (not a released document, but a tool used by start-up organization)	N/A	N/A
Test Plans	SNF-W379-PAT-002 Instrument/Service Air System Test	Independent Review TRB/JTG	TRB MM 12/16/97 & 3/17/98
	SNF-W379-PAT-004 Liquid Waste Collection System Test	Independent Review TRB/JTG	TRB MM 2/17/98
	SNF-W379-PAT-006 Operating Area HVAC System Test		In Process
	SNF-W379-PAT-006-1 Operating Area HVAC System Test Deficiencies (Retest)		In Process
	SNF-W379-PAT-007 Support Area HVAC System Test	Independent Review TRB/JTG	TRB MM 9/1/98
	SNF-W379-PAT-010-1 HVAC Stack Monitoring Equipment Test	Independent Review TRB/JTG	TRB MM 8/14/98 & 9/10/98
	SNF-W379-PAT-010-2 HVAC Stack Monitoring Equipment Test	Independent Review TRB/JTG	TRB MM 11/6/99
	SNF-W379-PAT-011-1 Health Protection System Test	Independent Review TRB/JTG	TRB MM 7/21/98
	SNF-W379-PAT-011-2 Health Protection System Test	Independent Review TRB/JTG	
	SNF-W379-PAT-012 Cask Receiving Crane Test	Independent Review TRB/JTG	TRB MM 4/19/99
	SNF-W379-PAT-013 MCO Servicing & Floor Crane Test	Independent Review TRB/JTG	TRB MM 4/19/99
	SNF-W379-PAT-014-1 MCO Tube Purge Cart Test	Independent Review TRB/JTG	
	SNF-W379-PAT-014-2 MCO Overpack Plugs/Tubes Test	Independent Review TRB/JTG	
	SNF-W379-PAT-015-1 MHM Logic Test	Independent Review TRB/JTG	TRB MM 4/19/99
	SNF-W379-PAT-015-2 MHM Load Test	Independent Review TRB/JTG	TRB MM 4/27/99
	SNF-W379-PAT-015-3 MHM Operational Demonstration Test	Independent Review TRB/JTG	TRB MM 4/27/99
	SNF-W379-PAT-017 Security System Test	Independent Review TRB/JTG	TRB MM 3/24/98
	SNF-W379-PAT-018 Uninterruptible Power Supply System Test	Independent Review TRB/JTG	TRB MM 3/10/98
	SNF-W379-PAT-019 Rollup Doors Test	Independent Review TRB/JTG	TRB MM 6/2/98
	SNF-W379-PAT-020 Fire Water Pumphouse System Test	Independent Review TRB/JTG	TRB MM 5/5/98
	SNF-W379-PAT-021 Distributed Control System Test	Independent Review TRB/JTG	TRB 3/17/98
	SNF-W379-PAT-023 MCO Sample Station Test	Independent Review TRB/JTG	TRB MM 9/15/99

SUGGESTED DOCUMENTS (to be produced by Project to demonstrate design verification)	Document Name and number	Type of Verification	Verification Reference
	SNF-W443-PAT-001 Cask Transportation System Trailer CSB Test	Independent Review TRB/JTG	TRB MM 5/11/99
	A20-15220-26 FIT Plan for MCO Welding	Informal Review	
	A20-15220-28 Factory Acceptance Test Procedure for MCO Welding	Informal Review	
	A20-15220-30 Field Demo Test Procedure for MCO Welding	Informal Review	
Test Specifications	SNF-W379-TS-001 Electrical Distribution System Test Specification	Independent Review TRB/JTG	TRB MM 1/20/98 (Rev. 0), 3/9/99 (Rev. 1)
	SNF-W379-TS-002 Instrument/Service Air System Test Specification	Independent Review TRB/JTG	TRB MM 10/27/98
	SNF-W379-TS-003 Fire Protection & Detection System Test Specification	Independent Review TRB/JTG	TRB MM 10/6/98
	SNF-W379-TS-004 Liquid Waste Collection System Test Specification	Independent Review TRB/JTG	TRB MM 1/27/98
	SNF-W379-TS-005 Communication System Test Specification	Independent Review TRB/JTG	TRB MM 4/28/98
	SNF-W379-TS-006 Operating Area HVAC System Test Specification	Independent Review TRB/JTG	TRB MM
	SNF-W379-TS-007 Support Area HVAC System Test Specification	Independent Review TRB/JTG	TRB MM 1/27/98
	SNF-W379-TS-010 HVAC Stack Monitoring Equipment Test Specification	Independent Review TRB/JTG	TRB MM 3/17/98, 6/23/98 (Rev 0), 3/16/99 (Rev. 1)
	SNF-W379-TS-011 Health Protection System Test Specification	Independent Review TRB/JTG	TRB MM 4/14/98
	SNF-W379-TS-012 Cask Receiving Crane Test Specification	Independent Review TRB/JTG	TRB MM 3/17/98
	SNF-W379-TS-013 MCO Servicing & Floor Crane Test Specification	Independent Review TRB/JTG	TRB MM
	SNF-W379-TS-014-1 MCO Tube Purge Cart Test Specification	Independent Review TRB/JTG	TRB MM 4/27/99
	SNF-W379-TS-014-2 MCO Overpack Plugs/Tubes Test Specification	Independent Review TRB/JTG	TRB MM
	SNF-W379-TS-015 MCO Handling Machine System Test Specification	Independent Review TRB/JTG	TRB MM 11/17/98 (Rev. 0), 4/27/99 (Rev.1)
	SNF-W379-TS-016 Vault Cooling System Test Specification	Independent Review TRB/JTG	TRB MM
	SNF-W379-TS-017 Security System Test Specification	Independent Review TRB/JTG	TRB MM 2/17/98
	SNF-W379-TS-018 Uninterruptible Power Supply System Test Specification	Independent Review TRB/JTG	TRB MM 1/20/98
	SNF-W379-TS-019 Rollup Doors Test Specification	Independent Review TRB/JTG	TRB MM 4/14/98
	SNF-W379-TS-020 Fire Water Pumphouse System Test Specification	Independent Review TRB/JTG	TRB MM 12/16/97
	SNF-W379-TS-021 Distributed Control System Test Specification	Independent Review TRB/JTG	TRB MM 1/20/98

SUGGESTED DOCUMENTS (to be produced by Project to demonstrate design verification)	Document Name and number	Type of verification	Verification Reference
	SNF-W379-TS-023 MCO Sample Station Test Specification	Independent Review TRB/JTG	TRB MM 9/2/99
	Building/Balance of Equipment (TBD)		In process
	SNF-W443-001 Cask Transportation System Trailer CSB Test Specification	Independent Review TRB/JTG	TRB MM 5/11/1999
	SNF-8991 MCO Weld System Performance Specification	Informal Review	
Design Documents			
Feasibility Studies	WHC-SD-W379-ES-002, Rev. 0 "Staging and Storage Facility Feasibility Study Final Report" M. D. Conner, WHC, January 4, 1996	Informal Review	EDT-614752
	Letter Report: MCO Collar Mockup Weld Shrinkage Date	Informal Review	
	FDH-9857265, Contract No. DE-AC06-96RL13200 - Sealing Strategy White Paper, September 2, 1998	Informal Review	
Trade Studies	WHC-SD-W379-ES-003, Rev. 0 "Canister Storage Building Trade Study Final Report" M. D. Conner, WHC May, 1995	Informal Review	EDT- 614752
Design Document List	WHC-SD-W379-CDR-001, Rev. 0 Spent Nuclear Fuel Canister Storage Building Conceptual Design Report, January 4, 1996 (EDT-614752)	Formal Review	WHC-SD-W379-DR-001, Rev. 0. SNF CSB CDR Review Committee Report. W. P. Dana, WHC, December 15, 1995 (EDT-614726)
	SNF-6154, Rev. 0 Spent Nuclear Fuel Canister Storage Building Detailed Design - Design Basis Document, July 20, 2000	Informal Review	EDT-629815
	FRT-2661, Rev. 1 CSB Interim Design Report E. R. Jacobs, FDI, April 1, 1996	N/A	
	FRP-061 Spent Nuclear Fuel Canister Storage Building Detailed Design Report. Transmittal letter, E. R. Jacobs, FDI, to M. K. Mahaffey, WHC, dated August 23, 1996	N/A	
	Detailed Design Package for the CSB Vault	Independent Review	See Design Review Completion Report section below
	Detailed Design Package for the CSB Deck	Independent Review	See Design Review Completion Report section below
	Detailed Design Package for the CSB Superstructure	Independent Review	See Design Review Completion Report section below
	FDH-9655540 Canister Storage Building and Hot Conditioning System Annex Security Concept and Design Criteria. B&W Protec, Inc., 1997	Formal Review	Security Concept and Design Criteria, 100% Design review for the Canister Storage Building and Hot Conditioning System Annex. Letter, E. S. McGinley, FDH, to F. G. Hudson, DESH, FDH-9655540 R1, dated May 19, 1997.
	VI-50100 MHM 100% Design Package	Formal Review	Vender File VI-50100 and letters DESH-9761988.1, MHM-BTR-092 DESH-9800197, BTR-101 DESH-9851598, BTR-111

SUGGESTED DOCUMENTS (to be produced by Project to demonstrate design verification)	Document Name and number	Type of verification	Verification Reference
	WHC, SD-HWV-FDC-001, Rev. 5I HWVP Project Functional Design Criteria J. Kalia, WHC, 1993	Informal Review	ECN-400304 ECN-400239
	WHC-SD-HWV-DP-001, Rev. 6U HWVP Project Technical Data Package. J. Kalia, WHC, 1994	Informal Review	ECN-400249
	A20-15220-11 Final Design Report for MCO Welding	Informal Review	
Requirements Documents	HNF-SD-SNF-FRD-010, Rev. 2 SNF Project CSB Functions and Requirements M. J. Klem, October 18, 2000	Informal Review	ECN-654458
	HNF-S-0425, Rev. 4 Performance Specification for the Spent Nuclear Fuel Canister Storage Building, June 20, 2000	Informal Review	Original EDT 613003, ECNs 191382, 6266377, 191397, 1911408, 191418, 648619, 654452. (Replaces SD-SNF-FRD-014)
	HNF-S-0468, Rev. 5 Specification for the MCO Handling Machine. C. E. Swenson, April 23, 1999	Informal Review	ECN-652275 ECN-651423 ECN-645103
Calculation Verification	See FDI Calculation list	Independent Review on Calculations Requiring Independent review	See Calculation list with Independent Design Reviews
Supporting Documents	SNF-6130, Rev. 1 CSB Procurement Specifications SNF-6131, Rev. 1 CSB Construction Specifications	Independent Review	See Design/Procurement Package Reviews as listed in Design Review Completion Report section below
Drawings	See H-2-116004, sheets 1-5 for Drawing List	Independent Review	See Design Package Reviews as listed in Design Review Completion Report section below
	H-2-825867 & H-2-825868 Spent Nuclear Fuel Project Level 0 Process Flow Diagram	Informal Review	EDT-612984, A.L. Pajunen, Westinghouse Hanford Company, 1995.
	H-2-123400, sheets 1-12, Rev. 0, Process Block Flow Diagram	Informal Review	EDT-627196
As-built Program	Canister Storage Building As-Built Verification Program Review. Letter, S. L. Petersen, FDNW, to A. S. Daughtridge, DESH, SNF-CO-9911443, dated March 29, 1999 (File 102.1.1R)	N/A	
	Canister Storage Building Field Verification Program to Validate Accuracy of Field Information for Development of As-Built Drawings. Letter, A. S. Daughtridge, DESH, to S. L. Petersen, FDNW, DESH-9951340, dated March 1, 1999	N/A	
	Canister Storage Building Verification Program. Letter, S. L. Petersen, FDNW, to A. S. Daughtridge, DESH, SNF-CO-9911426, dated March 15, 1999	N/A	

SUGGESTED DOCUMENTS (Not prescribed by Project Procedures for design verification)		Document Name and number	Type of verification	Verification Reference
		Facility Walkdowns	Independent Review	Verification Walkdowns: DVPC-99-001, As-Built Verification walkdown of CSB Sampling/Weld Station Summary; 98-001, Electrical Distribution Components; 98-002, Cask Receiving Crane; 98-004, Fire Protection System; 98-005, HVAC System; 98-006, Security Systems; 98-007, Overall Facility Packages 1-3; 97-001, 13.8kV Conduit/Duct Bank; 97-002, Firewater and Sanitary Water Lines.
	As-Built Drawings	See Essential drawing on ABU Checklist	Informal Review	DA signature as released into Hanford System
		No Essential drawings: See Vendor Information File for As-Built Drawings for MCO Welding		
Verification Documents:				
	List of reviewers	Calculations	Independent Review	See FDI Calculation files with IDR required
		PHMC Design Reviews		See Design Review Completion Reports below
	Computer software verification	FDP-815 Validation and Verification of Computer Codes Used For Spent Nuclear Fuel Canister Storage Building Letter, S. L. Petersen, FDNW, to A. S. Daughtridge, DESH, dated March 11, 1999, FDI Log #FDP-815, File 102.5E.	N/A	
	Requirement Compliance matrices			
		SNF-5790, Rev. 0 Design Compliance Matrices to ANSI and OSHA S. A. Krieg, April 3, 2000	N/A	EDT-627197
		HNF-4742, Rev. 0 Canister Storage Building Compliance Assessment, DOE Order 6430.1A, General Design Criteria. D. M. Black, FDNW, June 29, 1999.	N/A	EDT-626885
		HNF-4776, Rev. 1 Canister Storage Building Compliance Assessment, Spent Nuclear Fuel Project NRC Equivalency Criteria - HNF-SD-SNF-DB-003. D. M. Black, May 9, 2000.	N/A	ECN-656340
		00-SNF/CES-005, "Project Number W-379 Multi-Canister Overpack Handling NOG-1 Compliance Matrix," SNF Project Internal Correspondence, C. E. Swensen to G. D. Bazinet, May 11, 2000, (Not released)	N/A	
		Baseline Design Verification for the SNF CSB. FDI Log #FRT-2694, 7/24/96	N/A	
		Vault Baseline Design Verification. FDI Log File 106, Interoffice Correspondence, 4/12/96	N/A	
		SNF-6442, Rev. 3 Spent Nuclear Fuel Project Canister Storage Building Design Verification Report, Appendix D, Compliance Matrix, Febuary 2, 2003	N/A	
	Design Review Comments (RCR) issued by reviewers			

SUGGESTED DOCUMENTS to be provided by Project to demonstrate design verification			Document Name and Number	Type of Verification	Verification Reference
			SNF-5222, Rev. 0 Formal Design Review of Sample Weld Station SNF MCO Design Review Completion Report. L. H. Goldmann, November 30, 1999.	Formal Review	EDT-628351
			SNF-5465, Rev. 0A SNF MCO Design Verification Summary (with Appendix B Verification Report Checklist). L. H. Goldmann, November 30, 1999.	Formal Review	EDT-628352 ECN-658759
			Formal Design Review of Monitoring Equipment, May 5, 2000	Formal Review	EDT-629021
			Embed Package FDI Log #CN-1069, File104 2, 2/28/96	Independent Review	
			CSB Vault Package FDI Log #CN-1078, File 104 2, 3/20/96	Independent Review	
			MHM Shield Gate FDI Log #CN-1082, File104.2, 4/4/96		Deleted from scope
			CSB Receiving Crane FDI Log #CN-1083, File 104 2, 4/04/96	Independent Review	
			CSB Deck Package FDI Log #CN-1092, File104 2, 5/6/96	Independent Review	
			CSB Tubes, Case, Covers, Absorbers, Cart Design FDI Log#CN-1096, File 104.2, 5/28/96	Independent Review	
			CSB Superstructure Package FDI Log#CN-1109, File 104.2, 7/25/96	Independent Review	
			Tube Plug Package FDI Log #CN-1111 and 1099, File 104.2, 7/29/96 and 8/10/96	Independent Review	
			CSB/HCSA Design Package FDI Log #CN-1127, File104 2, 10/14/96		Deleted from scope
			Security and Safeguards Package FDI Log #CN-1134 File 104.2, 2/28/97	Independent Review	
			P & IDS FDI Log #CN-1150 File 104 2, 8/8/97	Independent Review	
			Canister Impact Absorber FDI Log #CN-1196 File 104 2, 9/2/98	Independent Review	
			MCO Sampling Station FDI Log #CN-1188 & 1189, File 104.2, 6/18/98 & 6/22/98	Independent Review	
			HEPA Filter FDI Log #CN-1199 File 104.2, 9/23/98	Independent Review	
			Weld Station FDI Log #CN-1212 File 104 2, 1/14/99	Independent Review	
			Overpack Storage Tube and Plugs FDI Log #CN-1225 File 104 2, 3/02/99	Independent Review	
			Tube Plug Adapter FDI Log #CN-1233 File 104 2, 5/13/99	Independent Review	
			Transfer System Impact Absorber FDI Log #CN-1335 File 104 2, 5/21/99	Independent Review	
			High security gate FDI Log #CN-1236 File 104 2, 6/17/99	Independent Review	
			Rolling Gate FDI Log #CN-1243 File 104 2, 7/12/99	Independent Review	
			Guide Ring Funnel FDI Log #CN-1247 File 104.2, 7/19/99		Deleted from scope
			CSB Operations Building FDI Log #CN-1238 File 104 2, 6/28/99	Independent Review	
			Frog Tooling Design package FDI Log #CN-1250 File 104 2, 9/7/99	Independent Review	
			Shield hatch FDI Log #CN-1252 File 104.2, 9/23/99	Independent Review	
			Containment Tent FDI Log #CN-1259 File 104 2, 11/8/99	Independent Review	
			Block Diagram	In Process	
		Design Review Completion Documentation	U S. West Telephone System and Public Address System Review	Independent Review	Reference not located.

SUGGESTED DOCUMENTS to be produced by Project to demonstrate design verification	Document Name and number	Type of Verification	Verification Reference
	SNF-11951, Rev. 0 MCO Cover Cap Assembly Welding 60% Design Verification, September 11, 2002	Formal Review	EDT-634178
	SNF-12232, Rev. 0 MCO Cover Cap Assembly Welding 90% Design Verification, September 19, 2002	Formal Review	EDC-02-12237
	SNF-5222, Rev. 0 Formal Design Review of Sample Weld Station SNF MCO Design Review Completion Report. L. H. Goldmann, November 30, 1999.	Formal Review	EDT-628351
	SNF-5465, Rev. 0A SNF MCO Design Verification Summary (with Appendix B Verification Report Checklist). L. H. Goldmann, November 30, 1999.	Formal Review	EDT-628352 ECN-658759
	Formal Design Review of Monitoring Equipment, May 5, 2000	Formal Review	EDT-629021
	Embed Package FDI Log #CN-1071, File104.2, 3/1/96	Independent Review	
	CSB Vault Package FDI Log #CN-1079, File104.2, 3/21/96	Independent Review	
	MHM Shield Gate FDI Log #CN-1084, File104.2, 4/4/96	Independent Review	Deleted from scope
	CSB Receiving Crane FDI Log #CN-1085, File 104 2, 4/04/96	Independent Review	
	CSB Deck Package FDI Log #CN-1094, File104.2, 5/9/96	Independent Review	
	CSB Tubes, Case, Covers, Absorbers, Cart Design FDI Log # CN-1098, File 104 2, 5/31/96	Independent Review	
	CSB Superstructure Package FDI Log #CN-1110, File 104.2, 7/26/96	Independent Review	
	Tube Plug Package FDI Log #CN-1112, File 104 2, 7/30/96	Independent Review	
	CSB/HCSA Design Package FDI Log #CN-1128, File104 2, 10/17/96	Independent Review	Deleted from scope
	Security and Safeguards Package FDI Log #CN-1136 File 104.2, 2/28/97	Independent Review	
	P & IDS FDI Log #CN-1150 File 104.2, 8/8/97	Independent Review	
	Canister Impact Absorber FDI Log #CN-1196 File 104 2, 9/2/98	Independent Review	
	MCO Sampling Station FDI Log #CN-1190 File 104 2, 6/29/98	Independent Review	
	HEPA Filter FDI Log #CN-1199 File 104 2, 9/23/98	Independent Review	
	Overpack Storage Tube and Plugs FDI Log #CN-1232 File 104 2, 4/29/99	Independent Review	-
	Tube Plug Adapter FDI Log #CN-1234 File 104 2, 5/20/99	Independent Review	
	Transfer System Impact Absorber	Independent Review	-
	High security gate	Independent Review	-
	Rolling Gate	Independent Review	-
	Guide Ring Funnel		Deleted from scope
	CSB Operations Building	Independent Review	-
	Frog Tooling Design package	Independent Review	-
	Shield hatch	Independent Review	-
	Containment Tent	Independent Review	-
	Block Diagram	Informal Review	EDT-627196
Completed Design Review Checklists Checklist			
	CSB Vault Package Design Review Checklist. Project File 1.2, DSI from J. D. Phillips, to M K. Mahaffey, dated 3/20/96.		
	MHM Shield Gate		Deleted from scope

SUGGESTED DOCUMENTS (to be produced by Project to demonstrate Design Verification)	Document Name and number	Type of Verification	Verification Reference
	CSB Deck Package Design Review Checklist. No reference, dated 5/14/96		
	CSB Tubes, Case, Covers, Absorbers, Cart Package Design Review Checklist. No reference, dated 6/10/96		
	CSB Superstructure Package. No reference, dated 7/26/96		
	CSB/HCSA Design Package Design Review Checklist. No reference, dated 10/18/96		Deleted from scope
	Guide Ring Funnel		Deleted from scope
Alternate calculation notes	See FDI Files and Calculation list with Independent Design Reviews		
Alternate Calculations			
	HNF-SD-SNF-FHA-002, Rev. 2 Final Fire Hazards Analysis for the Canister Storage Building G. D. Bazinet, August 28, 2000.	Informal Review	ECN-654453
	HNF-SD-SNF-HIE-001, Rev. 3 Canister Storage Building Hazard Analysis Report T. B. Powers, March 16, 2000	Informal Review	ECN-656344
	SNF-3328, Rev. 2 Canister Storage Building Design Basis Accident Analysis Documentation R. D. Crowe, M. G. Piepho, and others.	Informal Review	ECN-656349
	HNF-SD-SNF-CSER-005, Rev. 5B Criticality Safety Evaluation Report for the MCO S. F. Kessler, FFS, March 16, 2000.	Informal Review	ECN-646342
	SNF-3951, Rev. 0 Hydrogen Combustion in an MCO During Interim Storage M G. Plys, DESH, February 16, 1999	Informal Review	EDT-625804
	SNF-3907, Rev. 0 SNF Project CSB Human Factors Engineering (HFE) Analysis: Results and Findings R. P. DiPiazza, 1999	Informal Review	EDT-626890
	SNF-4831, Rev. 0 Human Factors Engineering and Ergonomics Analysis for the CSB: Results and Findings R. P. DiPiazza, 1999	Informal Review	EDT-626889
	HNF-6025, Rev. 0 CSB Hazards Assessment, May 24, 2000	Informal Review	EDT-623872
	CSB ALARA Analysis, Rev 10 (release TBD)	Informal Review TBD	EDT-629817 for Rev. 9 (SNF-6132 calculation [CSB-AL-0009])
	99-SNF/CES-001, Interoffice Correspondence, "MCO Machine - Shield Skirt/Concrete Deck Interface - Technical Evaluation," C. E. Swenson to A. S. Daughtridge, dated November 2, 1999, containing an unreleased copy of HNF-5297 Radiation Exposure from the Gap Under the Multi-Canister Overpack (MCO) Handling Machine S. R. Gedeon, FDNW, October 1999	Informal Review	Sign off coversheet and attached interoffice correspondence regarding review.
	HNF-SD-SNF-RPT-011, Rev. 2 SNF Project Design Basis Capacity Study K. J. Cleveland, FDNW, and A. L. Pajnunen, FH, August 17, 2000 (Witness Model)	Alternate Calculation	ECN-661453

SUGGESTED DOCUMENTS	Document Number and Number	Type of Evaluation	Verification Reference
	WHC-SD-SNF-RPT-005, Rev. 0 SNF CSB Construction Restart Recommendation Report Released by J. D. Phillips, WHC, March 28, 1996. Report Prepared by ARES Corporation. Transmitted by letter, R. L. Fritz, ARES, to M. K. Mahaffey, WHC, 96RL0336, dated March 28, 1996	Informal Review	EDT-607666
	WHC-SD-SNF-RPT-006, Rev. 0 SNF CSB Recommendation on Selected Initiation of Construction Activities Released by J. D. Phillips, WHC, March 28, 1996. Report Prepared by ARES Corporation. Transmitted by letter, R. L. Fritz, ARES, to M. K. Mahaffey, WHC, 96RL0309, dated March 28, 1996	Informal Review	EDT-607666
	Canister Storage Building Phase II Construction Continuation Recommendation Report ARES Report transmitted by letter, R. L. Fritz, ARES, to M. K. Mahaffey, DESH, 96RL1205, dated December 9, 1996	Independent Review by ARES	
	SD-WM-ANAL-0205 Hanford Site Stored SNF Vulnerability Assessments R. A. Cox, WHC, December 6, 1993.	Informal Review	EDT-155563
	HNF-SD-SNF-TI-015, Rev. 6 Spent Nuclear Fuel Project Technical Databook M. A. Reilly, DESH, October 23, 1998	Informal Review	ECN-648624
	HNF-SD-SNF-OCD-001, Rev. 4B Spent Nuclear Fuel Project Product Specification A. L. Pajunen, FH, October 10, 2000	Informal Review	ECN-662251
Structural Analyses	SNF-5930, Rev. 0 Structural Analysis of MCO for Accidental Movement of MHM During MCO Lifting Operations G. D. Bazinet, NHC, and G. Abatt, March 2, 2000.	Informal Review	EDT-627041
	Preliminary Analysis of MCO Loading During CSB Startup A. L. Pajunen, DESH, December 1, 1998 (No document number in RMIS). Independent analysis by Q Metrix on natural convective cooling	Alternate Calculation underwent Informal Review	EDT-625800
Failure Modes and Effects Analyses	SNF-6449, Rev. 0 Transmittal of FMEA and RAM Analysis for the MCO MHM Document, June 1, 2000	Informal Review	EDT-628719
	ESL/R-97-036 Failure Modes and Effects and Hazard Analysis of MCO Hoist and Grapple C. E. Swenson, DESH, December 1, 1997 (Report provided by FWEC)	Informal Review	Reviewed in "Hoisting System Design Review" DESH letter, C. E. Swenson to R. J. Roberts, MHM-BTR-101, DESH-9850197, dated January 9, 1998. (Vendor File VI 50100)
	ESL/R-97-043 Failure Modes and Effects and Hazard Analysis of MCO Hoist and Grapple Control System C. E. Swenson, DESH, December 1, 1997 (Report provided by FWEC)	Informal Review	Reviewed in "Hoisting System Design Review" DESH letter, C. E. Swenson to R. J. Roberts, MHM-BTR-101, DESH-9850197, dated January 9, 1998. (Vendor File VI 50100)
	CSB Deck FMEA Letter, P. J. Bedell, FDI, to M. K. Mahaffay, DESH, FDT-059, September 24, 1997.	Informal Review	Letter, P. J. Bedell, FDI, to M. K. Mahaffay, DESH, FDT-059, September 24, 1997.

SUGGESTED DOCUMENT(S)	Document Name and Number	Type of Verification	Verification Reference
Verification Documents Related to Qualification Testing			
	Test Report for W379-TSR-001		In Process
	Test Report for W379-TSR-002	Independent Review TRB/JTG	TRB MM 9/22/98
	Test Report for W379-TSR-003		In Process
	Test Report for W379-TSR-004	Independent Review TRB/JTG	TRB MM 6/8/98
	Test Report for W379-TSR-005		In Process
	Test Report for W379-TSR-006		In Process
	Test Report for W379-TSR-007		In Process
	Test Report for W379-TSR-010-1	Independent Review TRB/JTG	TRB MM 3/16/99
	Test Report for W379-TSR-010-2	Independent Review TRB/JTG	TRB MM 5/21/99
	Test Report for W379-TSR-011		In Process
	Test Report for W379-TSR-012	Independent Review TRB/JTG	TRB MM 9/8/98
	Test Report for W379-TSR-013		In Process
	Test Report for W379-TSR-014-1		In Process
	Test Report for W379-TSR-015-1		In Process
	Test Report for W379-TSR-015-2		In Process
	Test Report for W379-TSR-015-3		In Process
	Test Report for W379-TSR-015-4		In Process
	Test Report for W379-TSR-016		In Process
	Test Report for W379-TSR-017-1		In Process
	Test Report for W379-TSR-017-2		In Process
	Test Report for W379-TSR-018	Independent Review TRB/JTG	TRB MM 5/28/98
	Test Report for W379-TSR-019	Independent Review TRB/JTG	TRB MM 7/31/98
	Test Report for W379-TSR-020		In Process
	Test Report for W379-TSR-020-1		In Process
	Test Report for W379-TSR-021		In Process
	Test Report for W379-TSR-022-1		In Process
	Test Report for W379-TSR-023		In Process
	Test Report for W379-TSR-024-1		In Process
	Test Report for W379-TSR-025-1		In Process
	Test Report for W433-TSR-001-1		In Process
	A20-15220-27 FIT Report for MCO Welding	Independent Review	
	A20-15220-29 Factory Acceptance Test Report for MCO Welding	Independent Review	
	A20-15220-31 Field Demo Test Procedure Report for MCO Welding	Independent Review	

APPENDIX B

DESIGN REQUIREMENT COMPLIANCE MATRIX

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Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
1	1	Scope	General Information						X	N/A	N/A
2	2	Applicable documents	General Information						X	N/A	N/A
3	3.1.1	Functional definition	General Information						X	N/A	N/A
4	3.1.2.1	Location	Site Location		X					Independent Design Review (IDR) of vicinity and project area maps H-2-117071 in CSB/HCS design review. The Drawing has IDR signoffs.	Closed
5	3.1.2.2	Facility Description	General Facility Description		X					Independent Design Review of Building Sections H-2-117798 in CSB/HCS design review. Drawings have IDR signoffs and HNF-3553, Vol. 2 Sect. A2.3 (CSB SAR) has a textual description of the facility.	Closed
6	3.1.3	Interface Definitions 3.1.3.1.1 Interfaces with the SNF packaging and transportation systems	The CSB must interface with other SNF Project elements	X						Interfaces verified in the following ICDs: IC-004, IC-005, IC-006, IC-083, IC085, IC-086, IC-087, IC-129, IC-131, IC-132, IC-133, IC-135, IC-139, IC-233	Closed
		3.1.3.1.2 Interface with SNF transporter					X			W-443-PAT-001 and associated Test Summary Report (TSR). Also, validated in SNF-7028 Appendix "A".	Closed
		3.1.3.1.3 Interface with SNF transportation cask					X			PAT-012 and TSR. Also, validated in SNF-7028 Appendix "A".	Closed

Line #	Spec Section HNF-S-0425	Function/Requirement	Verification/Validation						Reference Document/Comments	Status
			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
	3.1.3.1.4 Interface with SNF MCO					X			PAT-015-3 and TSR. Also, validated in SNF-7028 Appendix "A".	Closed
	3.1.3.1.5 Interface with SNF MCO Overpack Storage Tubes			X					The overpack tube package contains various conference notes that document the review of the overall design and is comprised of CN# 1183, 1197, 1208, 1224, 1228, 1231, & 1232. Specifically CN # 1197 with drawing H-2-120395 shows the tube construction and CN # 1208 with drawing H-2-120918 shows the tube plug assembly detail inclusive of the interface points. Also the IDR of the superstructure package also completed a review of relevant system interfaces for the facility.	Closed
	3.1.3.1.6 Interface with Fast Flux Test Facility SNF Transloading Systems					X			Qualification test to be developed as part of future FFTF transloading activities. Also, validated in SNF-7028 Appendix "A".	Closed
	3.1.3.2 Interfaces with Hanford Site infrastructure and utilities						X		Informal review of MOU with Site Utilities. Dyncorp MOU-002.	Closed
	3.1.3.3 Other Programs						X		Informal review of FFTF drawings. The CSB FSAR (SNF-3553, Annex A) does not specifically preclude the storage of other materials within the CSB and an effort has begun to authorize storage of Spent Nuclear Fuel that is currently being stored in T-Plant.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
7	3.1.4	Operational philosophy	Transition from construction to operation and facility operation shall be in accordance with DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities. No lost time accidents shall be a primary goal. Exposures to radiation and toxic materials shall be held as low as reasonably achievable (ALARA) consistent with good industry practice and DOE Regulations and Orders	X				X		Formal Design Review (FDR) of Sample Weld Station package that included a revision of the ALARA report, and Informal Review of ALARA report Rev. 9 on EDT. ALARA Analysis -09 provides an estimate of doses from normal CSB operations and indicates that exposures are within specified limits. Also SNF project procedure OS-1-006 "Employed Zero Accident Council" has the function of reducing the probability of occurrence of work place accidents. All operations within the CSB are to be conducted per specific operating procedures (both technical and administrative) that have been approved prior to work activities being conducted. Approved procedures are kept (at least) in a computer database that can be accessed by CSB personnel from HLAN computers.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			Operations will be conducted with direct visual access and with personnel wearing the appropriate clothing and using appropriate protection devices. Permanent or temporary shielding, the appropriate distance and staytime are utilized to reduce personnel exposure to ALARA. The operating staff will be housed adjacent to the main facility in temporary structures. There are no fulltime occupied areas within the building during the 40-year interim storage period. However, fulltime occupation will be required during the approximate 3 years of MCO receipt/shipping and MCO welding operations. Other than monitoring, the only operations would be responses to off-normal events.		X					Independent review of HNF-5297, "Radiation Exposure from the Gap Under the MCO Handling Machine," S. R. Gedeon, FDNW, 1999 by FDH as documented in Internal Letter Report, "MCO Machine – Shield Skirt/Concrete Deck Interface – Technical Evaluation," C. E. Swenson to A. S. Daughtridge, dated November 2, 1999. This document indicates that the dose from under the skirt is ALARA when the shield blocks are in place. This document has been reviewed and signed off. Also procedures are in place to ensure that personnel have been trained in the use of appropriate protective equipment given the type of work being performed. All operations within the CSB are to be conducted per specific operating procedures (both technical and administrative) that have been approved prior to work activities being conducted. Approved procedures are kept (at least) in a computer database that can be accessed by CSB personnel from HLAN computers.	Closed
8	3.1.5	Loadout and shipment to repository.	Not to preclude loadout at a later date						X	N/A	N/A
9	3.2.1.1.1	Receive MCO shipment rate.	The SNF CSB shall receive shipments of MCOs from CVD Facility at the established rate of 1 shipment every 24 hours. The average		X	X				Independent review of H-2-123400 of Block diagram package and alternate calculation by process analysis. See HNF-SNF-RPT-011 Rev.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			shipping time between CVD Facility and CSB is 14 hours. The MCO shipping window between CVD Facility and CSB is limited to 234 hours to avoid accumulation of 2.5% hydrogen in the cavity of the transport cask as defined in HNF-SD-TP-SARP-017, Rev. 1, Safety Analysis Report for Packaging (on site) Multi-Canister Overpack Cask (1999).							1a, SNF Project Design Basis Capacity Study, K. J. Cleveland, 1999. NOTE: This requirement has been changed in accordance with the Rev. 2 of the SARP. The SARP Rev. 2 stipulates that a 135 day shipping window exists between CVDF and CSB, with an average shipping time of 8 hours. Actual experience with the first 6 MCO shipments provide assurance that the 8 hour shipping time is reasonable. Both the SARP Rev. 2 and HNF-SD-SNF-RPT-011, Rev. 2 have been independently reviewed.	
10	3.2.1.1.2	Receive and handle MCO shipment timeline.	The SNF CSB handles one MCO shipment in approximately 24 hours. Receiving and handling of the MCO shipment starts with the transporter entering the SNF CSB and ends when the transporter is dispatched from the SNF CSB (H-2-123400, Sheet 4 and 7). It includes all the functions listed in Section 3.2.1.1.3 below. The term transporter, as used in this specification, refers to a truck-based transporter.		X	X				Independent review of H-2-123400 of Block diagram package and alternate calculation by process analysis. See HNF-SNF-RPT-011 Rev. 1a, SNF Project Design Basis Capacity Study, K. J. Cleveland, 1999. These documents have been reviewed and complete the requirement. Note the that SNF-RPT-011 report is now Rev. 2.	Closed
11	3.2.1.1.3	Capability to receive and handle MCO shipments.	The capability to receive and handle the MCO shipment shall implement the following functions: a. Transporter access to the CSB site by means of a new road connected to the Hanford Site roadway system.		X					IDR of site map H-2-117071 in CSB/HCS package. Drawing has IDR signoffs.	Closed

Line #	Spec Section HNF-S-0425	Function/Requirement	Verification/Validation						Reference Document/Comments	Status
			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		b. Deliver the transporter/cask at all facilities involved in the receiving and handling of K Basin SNF shipments.						X	Operations function not applicable.	N/A
		c. Move the transporter/cask within the CSB site to the receiving area.		X					The IDR of the superstructure package verified the interfaces associated with this activity (among others). Also the operational sequence for this activity is outlined in drawing H-2-123400, sheet 4.	Closed
		d. Isolate the transporter/cask to protect the environment.		X					Compliance with this requirement is meet within the design and operations of the CSB facility. This was verified through inspection of the building architectural plan (H-2-117795), operational sequence block diagrams (H-2-123400), and the CSB FSAR. These documents show that when the MCO transporter arrives at the CSB it is brought into the facility envelope, unloaded, and remains inside the facility until cleared for return to the CVDF.	Closed
		e. Unload the MCO and the cask off the transporter and position for further handling.				X			Validated in SNF-7028 Appendix "A". Also reference W379-PAT-012-1.	Closed
		f. Check the pressure of the gas in the cask annulus and sample the gas if high pressure is detected. (Note: Cask pressure may be checked before unloading off transporter.)				X			Validated in SNF-7028 Appendix "A". Also reference W379-PAT-013.	Closed
		g. Open the cask lid and remove the MCO using the MHM.	X			X			FDR of MHM package and operational demonstrations. Also, validated in SNF-7028 Appendix "A".	Closed
		h. Perform radiological surveys of the transporter and cask to assess contamination levels.						X	Operations function not applicable.	N/A

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			i. Perform visual inspections of the transporter, cask, and cask lifting attachments to assess their condition and determine maintenance needs. Note: A leakage rate test of the cask in accordance with ANSI N 14.5 (ANSI 1987) is required annually or after replacement of O-ring seals based on requirements of HNF-SD-TP-SARP-017, Rev. 1.						X	Operations function not applicable.	N/A
			j. Retrieve and move a clean, empty MCO to the loading area, and perform visual inspection of MCO for cracks or damage. Load accepted MCO into the cask/transporter and install cask lid on the transporter.				X			Validated in SNF-7028 Appendix "A". Also reference W379-PAT-015-3	Closed
			k. Dispatch the transporter/cask from the SNF CSB facilities.						X	N/A	N/A
12	3.2.1.2.1	Receive clean, empty MCOs at the shipment rate.	The SNF CSB shall receive clean, empty MCO shipments at the rate of 3 units per shipment based on preliminary shipping and handling efficiency studies (1 or 2 MCOs/container and 2 or more containers per shipment)						X	General Information not applicable.	N/A
13	3.2.1.2.2	Receive and handle empty MCO shipment timeline.	The SNF CSB shall handle one empty MCO shipment in 4 hours. Handling of the empty MCO shipment starts once the truck-trailer accesses the SNF CSB site and ends when the truck-trailer is dispatched from the SNF CSB site. It includes all the functions listed in Section 3.2.1.2.3 below.		X					IDR of H-2-123400 in Block Diagram Package. This document has been reviewed and complete the requirement. Further information regarding the steps required can be found in SD-SNF-RPT-011, Rev. 2, "SNF Project Design Basis Capacity Study". Both documents have been independently reviewed.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
13a	3.2.1.2.3	Capability to receive and handle empty MCO shipments	The capability to receive and handle the empty MCO shipment shall implement the following functions: a. Conventional truck-trailer access to the CSB site by means of a new road connected to the Hanford Site roadway system.		X					IDR of site map H-2-117071 in CSB/HCS package. Drawings have IDR signoffs.	Closed
			b. Move the truck-trailer within the CSB site to the receiving area.						X	Operations function not applicable.	N/A
			c. Receive and handle empty MCO shipments from the truck-trailer at the CSB .		X					IDR of H-2-123400 in Block Diagram Package. This document has been reviewed and complete the requirement. Further information regarding the steps required can be found in SD-SNF-RPT-011, Rev. 2, "SNF Project Design Basis Capacity Study". Both documents have been independently reviewed.	Closed
			d. Unload the empty MCOs off the truck-trailer, place on storage cart(s), and position cart(s) in the receiving area.		X					IDR of H-2-123400 in Block Diagram Package. This document has been reviewed and complete the requirement. Further information regarding the steps required can be found in SD-SNF-RPT-011, Rev. 2, "SNF Project Design Basis Capacity Study". Both documents have been independently reviewed. This document has been reviewed and complete the requirement. Further information regarding the steps required can be found in SD-SNF-RPT-011, Rev. 2, "SNF Project Design Basis Capacity Study". Both documents have been independently reviewed.	Closed
			e. Move cart(s) with the new, empty MCOs and place in lag-storage.		X					IDR of H-2-123400 in Block Diagram Package	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			f. Lag-store empty MCOs.		X					IDR of H-2-123400 in Block Diagram Package. This document has been reviewed and complete the requirement. Further information regarding the steps required can be found in SD-SNF-RPT-011, Rev. 2, "SNF Project Design Basis Capacity Study". Both documents have been independently reviewed.	Closed
			g. Dispatch the truck-trailer from the SNF CSB.						X	Operations function not applicable.	N/A
13b	3.2.1.2.4	The capability to receive and handle the MCO canister cover assembly shipments	The capability to receive and handle the new MCO canister cover assembly shipment shall implement the following functions: a. Conventional truck-trailer access to the CSB site by means of a new road connected to the Hanford Site roadway system. b. Move the truck-trailer within the CSB site to the sampling/weld station receiving area. c. Receive and handle canister cover assembly shipments from the truck-trailer at the CSB. d. Unload the canister cover assemblies off the truck-trailer and position in the receiving area. e. Lag-store canister cover cap assemblies. g. Dispatch the truck-trailer from the SNF CSB.		X		X			Validated in SNF-7028 Appendix "A".	Closed
14	3.2.1.3.1	Handle MCO for interim storage timeline.	The SNF CSB shall provide facilities and equipment to allow operators to place a MCO in interim storage in the established time period. Handling the MCO for interim storage starts after end cap welding and weld seal leakage testing and ends when the MCO is positioned and configured for interim storage. It includes all the functions listed in Section		X					IDR of H-2-123400 in Block Diagram Package	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			3.2.1.3.4 below, with the exception of Paragraph f.								
15	3.2.1.3.2	Interim store MCO capacity.	The SNF CSB shall provide interim storage for up to 440 MCOs in standard tubes and 6 damaged or failed MCOs in overpack tubes for up to 40 years (See Section 3.2.2.1.1).		X					IDR of H-2-119276 in Deck package. This document has been reviewed and complete the requirement. Further information regarding the steps required can be found in SD-SNF-RPT-011, Rev. 2, "SNF Project Design Basis Capacity Study" and in the CSB FSAR. All documents have been independently reviewed.	Closed
16	3.2.1.3.3	Handle MCO for final disposition timeline.	Handling the MCO for final disposition starts with retrieving the MCO from its interim storage location and ends when the MCO has been prepared for loading into a shipping cask for transfer to final disposition. It includes all the functions listed in Section 3.2.1.3.4 below. Packaging for repository shipment is not included.		X					IDR of H-2-123400 in Block Diagram Package. The process steps in Block Diagrams H-2-123400 do not specifically cover the retrieval of the MCOs for final disposition there are steps covering other MCO retrieval operations. These operations should be similar to those required for removal and placement on the appropriate transporter.	Closed
17	3.2.1.3.4	Capability to handle, interim store, and prepare MCO.	The capability to handle, interim store, and prepare the MCO for transfer to final disposition shall implement the following functions: a. Maintain the MCO radiation dose to ALARA throughout the receiving, handling, interim storage, and preparation for final disposition operations.	X						FDR of ALARA Report in Sample Weld Station Package. The ALARA Analysis -09 indicates that operations to be performed within the CSB facility are ALARA.	Closed
			b. Move, position, and retrieve the MCO within the SNF CSB facilities.				X			Validated in SNF-7028 Appendix "A". Also reference PAT-015-3.	Closed

Line #	Spec Section HNF-S-0425	Function/Requirement	Verification/Validation						Reference Document/Comments	Status
			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		c. Prepare the MCO for interim storage, maintain the integrity of the MCO throughout the interim storage period, and prepare the MCO for transfer into a shipping cask for final disposition. The Maintain MCO Integrity function is described in Section 3.2.1.6.	X						IDR of H-2-123400 in block diagram package. The process steps in Block Diagrams H-2-123400 do not specifically cover the retrieval of the MCOs for final disposition there are steps covering other MCO retrieval operations. These operations should be similar to those required for removal and placement on the appropriate transporter.	Closed
		d. Configure the MCO for interim storage. Configuring the MCO consists of welding a cover cap onto the MCO collar prior to MCO insertion into the storage tube (See Appendix A). Note: The gas inside approximately six preselected MCOs will be monitored before sealing of the MCO. The monitored MCOs will be moved to the sample station and checked for internal gas pressure and sampled (as necessary) a total of 8 times during the first 24 months of storage. After each sampling event, the monitored MCOs will be returned to their storage tubes. After an engineering evaluation of the monitoring results, the monitored MCOs will then be welded and reinserted into the storage tubes.	X		X				FDR of Weld Station Package and Alternate Calculation by Witness Model. (SNF-RPT-011, Rev. 1a, SNF Project Design Basis Capacity Study) FDR of Weld Station Package does not specifically addresses this requirement. The process steps in Block Diagrams H-2-123400 Sheet 5 specifically address the preparation of the MCO for interim storage. Also SNF-RPT-011, Rev. 2 used these steps in an alternate calculation of the utilization of the CSB systems.	Closed
		e. Interim store the MCO for up to 40 years (extendable to 75 years).		X					IDR of superstructure, vault, and deck. Design calculation, CSB-S-0008, completed a design life analysis for the CSB to meet the requirements of the CSB performance specification. This calculation looked at the CSB structure having a life of 75 years with a 40 year life being applied to the systems and components.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			f. Prepare the MCO for transfer to final disposition.				X			Future task.	Open
18	3.2.1.4	Control MCO surrounding environment.	The SNF CSB shall include all the necessary ventilation, cooling system(s), and enclosures to control the MCO surrounding environment during MCO transfer in the MHM, storage in overpack and standard tubes, short term monitoring, and welding operations. The MCO surrounding environment shall maintain the MCO wall temperature of <132 °C (270 °F), which corresponds to the SNF centerline temperature of <157 °C (315 °F).		X					Independent review of Heat Transfer Analysis, Calculation # CSB-HV-0001 and check on Welding-Glycol Cooling System, -HV-0012.	Closed
19	3.2.1.5	Monitor MCO surrounding environment.	The SNF CSB shall include all the necessary provisions to monitor the MCO surrounding environment during the storage operation. The capability to monitor the MCO surrounding environment shall implement the following functions: a. Monitor the temperature and flow rate of the MCO cooling media; b. Monitor contamination of the MCO surrounding environment; and c. Monitor personnel radiation exposure.		X					The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements. Monitoring devices have been incorporated into the design of the CSB and procedures are in place the define regular maintenance and proper operations of such devices.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
20	3.2.1.6	Maintain MCO integrity.	The SNF CSB shall include all the necessary provisions to maintain the integrity of the MCO during the short-term monitoring, welding and interim storage, including receipt, staging for transfer, and transfer. The capability to maintain the integrity of the MCO shall implement the following functions: a. deleted						X	General Information not applicable.	N/A
			b. Provide a structurally welded cover cap as an outer confinement barrier.	X						FDR of Sample Weld Station Package and MCO Design Review. SNF-5222 and SNF-5465. Additional description of this operations can be found in the CSB FSAR, MCO SARP, and the Design Capacity Study, SD-SNF-RPT-011.	Closed
			c. Perform radiological surveys of the MCO top surface.						X	Operations function not applicable.	N/A
			d. Decontaminate the top surface of the MCO (portable equipment).						X	Operations function not applicable.	N/A
			e. Perform physical inspections of the MCO top surface (ports and weld areas).						X	Operations function not applicable.	N/A

Line #	Spec Section HNF-S-0425	Function/Requirement	Verification/Validation						Reference Document/Comments	Status
			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		f. Store failed MCOs (inside overpack storage tubes).			X				Failed MCO Calculation. HNF-2155, Rev. 1 A description of the overpack storage tubes and their usage can be found in the CSB FSAR (HNF-3553 Annex A) specifically in sections A2.6.5 "Confinement during Overpack Storage Tube Operations" and A2.4.3.1 "Storage Tubes". This document has been independently reviewed and approved by DOE. Also the overpack storage tubes are displayed in drawing H-2-119276 "Structural CSB Vault Operating Floor Plan", this drawing has been independently reviewed and confirmed against the As-Built condition of the facility.	Closed
		g. Provide fail-safe methods that prevent inadvertent dropping of an MCO during transfer and extraction/addition to a storage tube, sample/weld station, or service station pit.	X	X	X				FDR MHM, IDR Receiving crane. The accident analysis that was completed in the CSB FSAR includes consideration of the potential drop scenarios and lists various mitigation potentials (Section A3.4.2.1.5). Note should be made that both the receiving crane and MHM structures and hoists are safety significant and have been designed to protect against potential drops and to NRC equivalency important-to-safety (i.e., ASME NOG-1) criteria. The FDR of the MHM and IDR of the receiving crane completed engineering discipline reviews of the equipment in light of the performance criteria in HNF-0425 and HNF-0468, CSB and MHM performance specifications.	Closed

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			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		h. The MCO shall be kept dry and free of moisture on the outside so the risk of corrosion of any of the MCO welds is kept to the absolute minimum.		X					IDR of Specification Environmental Conditions and 6430.1a waiver for sprinklers. In order to comply with this requirement an exemption for the deployment of fire water sprinkler systems over the operating area within CSB was sought and granted from DOE (Document 96-SFD-320). As the MCOs are to be stored dry, a fire water sprinkler system would be the only source of water into the MCO storage tubes. Therefore this exemption allowed the design to eliminate the need for fire water sprinklers.	Closed
		i. The MCO shall be kept free of halogens, sulfur, and liquid metal compound, low melting point metals, and other deleterious materials so the MCO maintains its structural proportions, and remains sound and suitable for service.		X					The IDR of the Vault, Deck, and Superstructure packages, as well as the CSB FHA (SD-SNF-FHA-002), provide indication that only a small quantities of chemicals would be used in the CSB operating area. Further, the MCO Design Report (SNF-DR-003) provides documentation that the MCO is compatible with the specified environmental conditions for the duration of storage.	Closed

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21	3.2.1.7	Accommodate operations personnel and activities.	The SNF CSB or surrounding temporary or existing facilities shall include all the necessary accommodations to facilitate SNF CSB operations and maintenance activities during the short term monitoring, welding, and storage operations. These include: a. Receive and store materials, and supplies necessary for its operation and maintenance.		X					IDR of Support Building and Superstructure packages. Specifically the Superstructure package has a Baseline Design Verification checklist that contain the performance specification requirements. It identified that this requirement is satisfied with the current design of the facility. The receiving area is shown clearly on drawing H-2-117795. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
			b. Provide for the maintenance of both radioactive and non-radioactive equipment to support operations and to minimize downtime. The radioactive equipment maintenance area shall include appropriate minimal portable decontamination capability of small items with portable equipment.		X					The Baseline Design Verification checklist that is part of the Superstructure package indicates that this space is available in the load in/Load out area as presented on drawing H-2-117795. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed

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		c. Provide operational support facilities and equipment, such as truck loading and unloading areas, cranes, and MCO handling equipment.		X					IDR of Support Building and Superstructure packages. Specifically the Superstructure package has a Baseline Design Verification checklist that contain the performance specification requirements. It identified that this requirement is satisfied with the current design of the facility. The receiving area is shown clearly on drawing H-2-117795. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed

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		d. Provide operational support services such as electrical power, site-generated power, uninterruptible power, communications, and compressed gases.		X					IDR of Support Building and Superstructure packages. Specifically the Superstructure package has a Baseline Design Verification checklist that contain the performance specification requirements. It identified that this requirement is satisfied with the current design of the facility. The receiving area is shown clearly on drawing H-2-117795. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
		e. Provide change rooms for contamination control including lockers and health physics areas.		X					The location of the change rooms and health physics areas is delineated on the drawing H-2-117795, which documents the as-built condition and has been reviewed.	Closed
		f. Provide offices and work space in temporary facilities in noncontaminated areas.		X					The location of the office and work space areas is delineated on the drawing H-2-117795, which documents the as-built condition and has been reviewed.	Closed

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		g. Provide facility hardware and process equipment to perform the MCO cover cap welding in the CSB Annex. Hardware includes addition of cranes and hoists, modifications to CSB Annex and pits, utility services, heating, ventilation, and air conditioning (HVAC) and distributed control system (DCS), and the addition of shielding. Process equipment will be provided by others and includes MCO internal gas sampling/verification apparatus, MCO cover cap welding machines, non destructive examination/testing (NDE/T) equipment, and enclosures with ventilation and local shielding (see Appendix A).	X						FDR Sample Weld Station package	Closed
		h. Provide an HVAC system to ensure the safe operation of the facilities. The HVAC system shall be designed to maintain airflow from non-contaminated to progressively contaminated areas. Separate HVAC supply systems for contaminated and non-contaminated areas will be provided. The HVAC system(s) shall meet applicable requirements in DOE Order 6430.1A, General Design Criteria (DOE 1989); ASME N509-1989, Nuclear Power Plant Air-Cleaning Units and Components (ASME 1989); ASME N510-1989, Testing of Nuclear Air Treatment Systems (ASME 1989); and HNF-5173, PHMC Site Radiological Control Manual.		X					IDR Superstructure Package, HVAC P&ID, and HVAC Block Diagram. SNF-7109, Rev 1 Engineering report CSB HVAC Conformance to ASME N509/N510. The bulk of this requirement is covered in SNF-7109. Discussion of the HVAC system is provided in the CSB FSAR, HNF-3553 Section 2.7.2. A compliance matrix was developed for the requirements of DOE Order 6430.1a and is contained in HNF-4742, CSB Compliance Assessment with DOE Order 6430.1a.	Closed

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			i. Provide a health protection system (HPS) to monitor and protect personnel and the environment from radioactive and hazardous materials. The HPS shall include instrumentation for sampling, and monitoring; an alarm of radiation, contamination, and hazardous conditions; and an alarm for environmental releases.		X					The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements. Further the CSB and SNF FSAR (SNF-3553, Vol.1 and 2) outline the radiological protection and monitoring programs that would satisfy this requirement.	Closed
22	3.2.1.8	Manage the disposal of incidental waste.	The generation of solid waste as a result of the SNF CSB operations shall be minimized. SNF CSB operations include sampling of transport cask and MCO atmospheres, monitored MCO gas pressure sensor replacement, weld cleaning and inspection, grinding of failed MCO cover cap welds, limited decontamination with portable equipment, loaded HEPA filters, routine maintenance, and equipment services. The management of these waste will comply with HNF-SD-SNF-RD-001, Rev 2A, SNF Project Standards/Requirements Identification Document and be performed in the following manner: a. Collect and control the waste during operations to prevent the spread of contamination and limit personnel and environmental exposure to as low as reasonable achievable.		X					Independent Design Review of P&ID Liquid Waste Collection, H-2-123395; Piping drawing for condensate collection, H-2-125160; HVAC Support Area (humidifier), H-2-129417; Mechanical CSB MCO Service Station, H-2-129417; Mechanical CSB MCO Service Station, H-2-120902. The referenced drawings show the collection of wastes from operation. There are operating procedures in place that govern the packaging, characterization, and disposal of hazardous wastes currently in place. These procedures include but are not limited to OP-46-001, -003, -008, and -009.	Closed

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			b. Characterize waste to determine its radioactive and hazardous constituent quantities to allow for the proper sorting, classification, handling, packaging, and accountability prior to transport for disposal. c. Package and accumulate waste for treatment, storage, and/or disposal by others. Packaging, accumulation and shipping of waste will be in accordance with all applicable federal, state, and local regulations.								
23	3.2.2.1.1	Design life.	The SNF CSB structure safety class (SC) concrete, storage tubes needed to accomplish interim storage for 40 years shall have a potential for service life extension projected to 75 years. The design life for systems, structures, and components needed to accomplish interim storage mode operations shall be 40 years based on safety, operability, maintainability, reliability, sourcing, and life cycle cost.		X					Independent Design Review of Calculation. CSB-S-0008. This document has been completed and signed off.	Closed
24	3.2.2.1.2	Design basis.	SNF CSB structures, systems, and components shall be designed based on safety classification as determined in Section 3.2.2.1.2.3. The safety classification determines physical design criteria, based on Design Basis Accidents and hazards, including natural hazards phenomena.		X					IDR of design packages with licensing involvement. The CSB FSAR (SNF-3553, Annex A) Chapter 4 outlines the design and classification of the structures, systems, and components per applicable guidance (i.e., HNF-PRO-704, Letter 97-SFD-172).	Closed
25	3.2.2.1.2.1	Minimum capacity.	The SNF CSB shall provide storage for up to 440 MCOs. In addition, it shall be capable of storing 6 damaged/failed MCOs.		X					IDR of H-2-119276 in Deck package. Drawings have IDR signoffs and HNF-3553, Vol. 2 Sect. A2.3 (CSB SAR) has a textual description of the facility	Closed

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										Design calculation, CSB-S-0008, completed a design life analysis for the CSB to meet the requirements of the CSB performance specification. This calculation looked at the CSB structure having a life of 75 years with a 40 year life being applied to the systems and components.	
26	3.2.2.1.2.2	Design feed.	The SNF CSB shall provide storage for MCOs that contain uranium metal-form nuclear fuel materials as described in this section and in Tables 3.2.2.1.2.2-1 and 3.2.2.1.2.2-2 below. With the exception of ALARA calculations, design calculations that address localized effects shall be based on the attributes shown under "Maximum." Design calculations to address localized effects would typically include those that establish the load capacity of a crane that handles MCOs or that establish the extent of a radiation area or radiological buffer area where radiation levels are controlled by individual MCOs, as opposed to general building backgrounds. For ALARA calculations, which are typically performed with project-average source terms (see below), the design basis shall be calculated as 80% of the attributes shown under "Average" and 20% of those shown under "Maximum." This additional conservatism is intended to accommodate any increases to source terms, time durations, etc., that may accrue as the project evolves.					X		Informal review of ALARA Report, Rev. 9. An engineering and technical review has shown that the results of Rev. 9 of the ALARA Report are sufficiently conservative and valid. However, the report will be revised to make the ALARA analysis consistent with the new source terms. The documentation that is referenced by CSB-AL-009 and ultimately SD-SNF-TA-008, "SNF Process Initial Project Dose & Resource Assessment", also referenced earlier documentation as the source of the dose rates used in the ALARA analysis. These references could not be located. However it should be noted that CSB-AL-009 was revised in part to update the dose rates with current estimates using comparison analysis. Therefore it is believed that this document satisfies the intent of the requirement. ALARA analysis CSB-AL-009 is a revision that incorporates changes to the crew size, process sequences, and a slight change in	Closed

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										source term due to radioactive decay. A comparison is included in the analysis that outlines the overall effect of the source term change.	
27	3.2.2.1.2.3	Classification of structures, systems, and components.	The SNF CSB shall use a deterministic value of 5 rem in safety analysis for the onsite worker at the boundary of the controlled area (defined as 100 meters from the facility release point) for design basis accidents to assist in determining Safety Significant structures, systems, and components (SSCs). All other safety analysis shall comply with safety classification requirements as stated below and in accordance with HNF-PRO-704, Hazards and Accident Analysis Process (Rev. 1) 1999. SNF CSB SSCs shall be assigned a safety classification according to the following criteria and methodology, which are based on the potential consequence of failure. Items that fall into more than one class shall be assigned to the higher requirement. In addition, SSCs shall be identified "important to safety" in accordance with Section 3, Definitions, of 10 CFR 72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste (CFR 1994). Once SSCs important to safety have been identified, the graded approach to an SSC shall be applied using the guidance provided in NUREG/CR-6407, Classification of Transportation Packaging and Dry Spent Fuel Storage Systems (NRC 1996).					X		Informal review of Safety classification forms (FDI Letter FDP-1158) in EDT 627200. The CSB FSAR (SNF-3553, Annex A) Chapter 4 outlines the design and classification of the structures, systems, and components per applicable guidance (i.e., HNF-PRO-704, Letter 97-SFD-172). Also completed was the Informal review of Safety classification forms (FDI Letter FDP-1158) in EDT 627200.	Closed

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28	3.2.2.1.2.3.1	Criteria for Safety Classification	Criteria for safety classification (safety class (SC)), safety significant (SS), and general service (GS) are given in HNF-PRO-704 and WHC-SD-SNF-DB-003. Items important to safety (ITS) use the graded approach described in NUREG/CR-6407.		X					Verified by independent review of FSAR, HNF-3553. Specifically see sections A2.2, A2.6.2 and 4. These sections indicate compliance with the requirement. Note that all Authorization Basis documentation has been approved and implemented.	Closed
29	3.2.2.1.2.3.2	Risk Guidance	Risk evaluation guidance in accordance with HNF-PRO-704, Hazard and Accident Analysis Process (1999), should be used to identify and establish SC and safety significant SSCs. The following Radiological Risk Guidelines (Table 3.2.2.1.2.3.5-1) define offsite and onsite risk guidelines for all credible frequencies. The radiological risk guidelines apply to only doses that result from direct exposure to the passing plume (i.e., inhalation and submersion). The Toxic Chemical Risk Guidelines (Table 3.2.2.1.2.3.5-2) apply to the airborne pathway only for the determination of risk for toxic chemical releases.		X					Informal reviews of HNF-SD-SNF-HIE-001, Revs. 0 and 1; CSB Hazard Analysis Report; and SNF-3328, Rev. 2, Canister Storage Building Design Basis Accident Analysis Documentation.	Closed
30	3.2.2.1.2.3.3	Correlation of safety classification to performance categories.	Safety classification of SSCs shall be correlated to the Performance Categories defined in DOE Order 5480.28, Natural Phenomena Hazards Mitigation (DOE 1993) in accordance with WHC-SD-GN-RD-30011, Correlation of NPH Performance Categories with SSC Safety Classifications (WHC 1994).					X		Informal review of Safety classification forms (FDI Letter FDP-1158) in EDT 627200	Closed
31	3.2.2.1.2.4	Design basis security	Design parameters for the security system were based on physical security and protective force requirements, material control and accountability requirements, operational		X			X		Informal Review by vulnerability assessment (classified) and FDR of Security System package.	Closed

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			security procedures and administrative controls traceable to DOE directives. All security system components are classified as general service (GS) and are designed and qualified as performance Category 1 per HNF-PRO-097, Engineering Design and Evaluation.								
32	3.2.2.1.2.5	Design criteria.	The SNF CSB shall be designed in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989); WHC-SD-SNF-DB-009, Rev. 4, Canister Storage Building Natural Phenomena Design Loads (WHC-1996); Uniform Building Code (ICBO1994), SDC-4.1, Standard Architectural-Civil Design Criteria, Design Loads for Facilities (RL 1993); ANSI/ANS 57.1-1992, Design Requirements for Light Water Reactor Fuel Handling Systems (ANSI/ANS 1992); ANSI/ANS 57.9-1992, Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type) (ANSI/ANS 1992); and, Spent Nuclear Fuel Canister Storage Building Design Basis Document, Rev. 1. The SSCs needed to accomplish the SNF CSB mission during the interim storage mode of operations shall be designed for permanent installation. The SSCs needed to accomplish the short term MCO monitoring and welding mission shall be designed for temporary installation and eventual removal.		X			X		Informal Review of the design in the 6430.1a Compliance evaluation, HNF-4742, and IDR of the design packages	Closed

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33	3.2.2.1.2.6	Design flexibility.	The SNF CSB shall be designed to facilitate modifications to allow the SNF CSB to support other Hanford SNF programs. The following flexibility features shall be provided: a. Capability to extend storage to other nuclear materials by similar use of remaining vaults.					X		Informal Review of Shippingport fuel at T-Plant in SAR. SNF-5133. The CSB FSAR Annex A (SNF-353) covers the potential for the interim storage of other nuclear materials, specifically it calls out the SSFCs from T-plant and states these will not change the hazard classification. Further there is an approved addendum to SNF-3553 (Addendum A) that specifically addresses the storage of T-Plant SSFCs in CSB but this document has not yet been implemented.	Closed
			b. Capability so that future additional features will allow storage of vitrified high level radioactive waste canisters.		X					IDR of Superstructure Package The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements. The CSB FSAR Annex A (SNF-3553) covers the potential for the interim storage of other nuclear materials and specifically states that vitrified waste is a possibility. However, before such material may be stored within the CSB the Authorization Basis documentation would need to be updated.	Closed

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			c. Capability to receive an ISC, SWC, and T-3 transportation casks on transporters at the CSB and accommodate transloading of the FFTF SNF assemblies from an ISC to a T-3 transportation cask.		X					IDR of Superstructure Package. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements. The CSB FSAR Annex A (SNF-3553) covers the potential for the interim storage of other nuclear materials and specifically states that vitrified waste is a possibility. However, before such material may be stored within the CSB the Authorization Basis documentation would need to be updated.	Closed
34	3.2.2.1.3	Design basis accidents.	The SNF CSB shall be designed to withstand the effects of design basis accidents (DBAs), as delineated in DOE Order 6430.1A, General Design Criteria (DOE 1989); DOE Order 5480.23, Nuclear Safety Analysis Reports (DOE 1992), and DOE-STD-3009-94, Preparation Guide for U.S. Department of Energy Non-reactor Nuclear Facilities Safety Analysis Report (DOE 1994), with confinement of radioactive and toxic materials within allowable limits. All Safety SSCs items, and non-Safety SSCs items required to prevent failure of Safety SSCs items, shall withstand the following DBAs in a manner that preserves the safety function.		X					Independent Review in SNF-3328, Rev. 2, Canister Storage Building Design Basis Accident Analysis Documentation	Closed

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			3.2.2.1.3.1 Design basis fire.			X				Alternate Calculation in FHA by Hueges Ass. Inc. HNF-SD-HNF-FHA-002, Rev. 2. The DBA fire was evaluated in several documents that have been independently reviewed and approved. These documents are SD-SNF-FHA-002, Final Hazard Analysis for the CSB; SBF-3328, CSB Design Basis Accident Analysis Documentation; and SNF-3553, Annex A CSB FSAR. No alternate calculation was found however, the above documentation provides adequate reasoning to show that the requirement has been meet through independent review.	Closed
			3.2.2.1.3.2 Design basis power failure.						X	N/A	N/A
			3.2.2.1.3.3 Design basis earthquake.		X					IDR of structural calculations: CSB-S-0001A, CSB-S-0012, CSB-0024, & CSB-S-0029. Of these CSB-S-0029 covers a redesign of the building to encompass higher tornado loading criteria and also recalculates the seismic, wind, and volcanic impacts.	Closed
			3.2.2.1.3.4 Design basis wind and tornado.		X					IDR of structural calculations: CSB-S-0012 & CSB-S-0029. CSB-S-0029 covers a redesign of the building to encompass higher tornado loading criteria and also recalculates the seismic, wind, and volcanic impacts.	Closed
			3.2.2.1.3.5 Design basis flood.		X					CSB-C-0001 for the design basis flood has been checked.	Closed
			3.2.2.1.3.6 Volcanic eruption considerations.		X					IDR on Structural Calculations. CSB-S-0001 through -0012.	Closed
35	3.2.2.1.4	Abnormal operations	The SNF CSB design shall include provisions to monitor and alarm on detection of abnormal		X		X			The GEMS system, Fire Detection System, and HVAC systems went through a IDR and are	Closed

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		detection.	conditions such as radioactive particulate release, liquid and gaseous release, abnormal radiation levels, fires, and overheating or pressurization. The facility design shall incorporate the requirements of ANSI/ANS-8.3-1986, Criticality Accident Alarm System (ANSI/ANS 1986) if required by the safety analysis. Process and facility systems shall be designed to ensure safe channeling of energy and material flows (e.g., seal pots, fault-to-ground electrical circuitry, siphon breaks, etc.).							further verified by PAT-010-1 and 010-2 on the GEMS system, PAT-003 on the Fire Detection System, and –006 on the HVAC system. Informal review of Human Factors review in SNF 3907 and SNF 4831. Also, validated in SNF-7028 Appendix "A".	
36	3.2.2.1.5	Nuclear criticality safety.	The SNF CSB design shall incorporate a criticality safety value of 0.95 for Keff and shall comply with DOE Order 5480.24, Nuclear Criticality Safety (DOE 1992) as implemented by WHC-CM-4-29, Nuclear Criticality Safety (WHC 1988).		X					Independent Review in Criticality Analysis. HNF-SD-SNF-CSER-005, Rev 5B	Closed
37	3.2.2.1.6	Radiological Design and Radiation Exposure Analysis.	In addition to meeting the general design criteria provided in DOE Order 6430.1A (DOE 1989), the radiological design of the CSB shall meet the ALARA requirements of 10 CFR 835, Occupational Radiation Protection (CFR 1999), and HNF-5173, Rev. 0, PHMS Radiological Control Manual. See section 3.2.2.1.7, below, for contamination control criteria. The radiological design (including shielding, confinement, any provision for remote operations, etc.) for different facility areas and/or operations shall be evaluated against the requirements of HNF-5173, Article 128 (Facility Modifications and Radiological					X		The ALARA Analysis -09 indicates that operations to be performed within the CSB facility are ALARA. Portions of this requirement refer to the incorporation of various design guidance documents to reduce exposures ALARA. It is difficult, to the extreme, to provide document references indicating that the design was completed with incorporation of such guidance. Therefore the ALARA analysis that was completed must be relied upon to indicate that exposures involving normal CSB operations are ALARA and the CSB FSAR indicates that potential accidents are also kept ALARA. The implementation of 10 CFR 835,	Closed

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			Design Considerations) and the ALARA design objectives of 10 CFR 835, Subpart K. All facility design and control actions taken to maintain occupational exposures ALARA shall be documented in accordance with Paragraph 835.704(b) of 10 CFR 835. The design shall consider the guidance provided by WHC-SD-GN-DGS-30011, Radiological Design Guide. Guidelines for achieving exposure levels that are ALARA are contained in PNL 6577, Health physics Manual of Good Practices for Reducing Exposure to Levels that are as Low as Reasonably Achievable (ALARA) (Munson 1988). WHC-IP-1043, WHC Occupational ALARA Program (WHC 1995) describes FDH/DESH implementation of the ALARA program. Section 3.2.2.1.6.2, below, provides additional guidance for implementation of 10 CFR 835 requirements.							however, is specifically covered in HNF-SP-1145, "Fluor Daniel Hanford Radiation Protection Program, Implementation of Title 10, Code of Federal Regulations, Part 835." Also there are project procedures in place that require a radiological review be completed for new and/or modified facilities and equipment (RP-12-009, "Radiological Review Process").	
38	3.2.2.1.6.1	Source Terms for CSB Shielding Calculations	Table 3.2.2.1.2.2-1 of this document provides MCO radionuclide inventory listings for various SNF Project design feeds. Section 3.2.2.1.2.2 describes each feed and (depending on the purpose of a given calculation) specifies which feed, or combinations of feeds, must (as a minimum condition) be input to CSB shielding calculations. Note that all the isotopic activity listings in Table 3.2.2.1.2.2-1 are on a "per-MCO" basis whereas it may sometimes be necessary to base					X		Informal Review of ALARA Report, Rev. 9. ALARA Analysis -09 was completed to update the analysis for several changes. One of these changes was to the overall source term and the correction of the decay calculation to the new startup date. A comparison with earlier ALARA studies is given as Table 11 in ALARA Analysis -09.	Closed

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		a shielding calculation on the isotopic content of a single fuel basket. While the table does not specifically include listings for Ci content per unit mass of fuel, it does provide listings for the total fuel mass. It also provides detailed references to the original source documents. Therefore the necessary information may either be obtained from Table 3.2.2.1.2.2-1 (by dividing the total mass of uranium per MCO into the total Ci of 137Cs per MCO, etc.) or it may be obtained directly from the original source listings that are referenced in the table notes. Reconciliation of Existing Shielding Calculations with Revised Source Terms. As a result of changes to some of the assumptions and methodology that drove the source term listings in earlier versions of the reference document (HNF-SD-SNF-TI-015) used for Table 3.2.2.1.2.2-1, some of the values in this revision (Rev. 4) are different (when normalized to the same decay dates) than those that were listed in previous revisions of this document. Consequently, most of the existing CSB shielding calculations were performed using source terms that are no longer supported by this document. Therefore it will be necessary to reconcile existing calculations results with the current source term listings.								

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			Note that this does NOT necessarily mean that the existing calculations must be revised, although that would be an acceptable option. In most cases it should be possible to reconcile dose rates from existing calculations with those that would result from the current source term listings by simply adjusting the existing dose rates upward, based on the ratio of 137Cs contents (normalized to the same decay date), and downward, based on additional decay to the latest official project start-up date.								
39	3.2.2.1.6.2	Guidance for Implementation of 10 CFR 835.	Section 835.2 of 10 CFR 835, Occupational Radiation Protection (1999), provides the following definition of ALARA: ALARA means "As Low As is Reasonably Achievable," which is the approach to radiation protection to manage and control exposures (both individual and collective) to the work force and to the general public to as low as is reasonable, taking into account social, technical, economic, practical and public policy considerations. As used in this part, ALARA is not a dose limit but a process which has the objective of attaining doses as far below the applicable limits of this part as is reasonably achievable. Appendix A of SNF Project Administrative Procedure RP-12-009-01 (Radiological Review Process) provides an overview of ALARA design requirements, and Appendix B provides guidance for implementation of 10 CFR 835.					X		Informal review of ALARA Report, Rev. 9. The ALARA Analysis -09 provides an assessment of the average and maximum potential exposures for the CSB and shows that the potential doses comply with these requirements.	Closed

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			Section 1.0 of Appendix A states that "...the highest level requirements specifically related to ALARA considerations in design are in 10 CFR 835." Section 1.1 of Appendix A provides the following quotes from 10 CFR 835.1001: (a) Measures shall be taken to maintain radiation exposure in controlled areas ALARA through physical design features and administrative control. The primary methods used shall be physical design features (e.g., confinement, ventilation, remote handling, and shielding). Administrative controls and procedural requirements shall be employed only as supplemental methods to control radiation exposure. (b) For specific activities where use of physical design features are [sic] demonstrated to be impractical, administrative controls and procedural requirements shall be used to maintain radiation exposures ALARA. Section 1.2 of Appendix A provides the following quotes from 10 CFR 835.1002: (a) Optimization methods shall be used to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls. (b) The design objective for controlling personnel exposure from external sources of								

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			radiation in areas of continuous occupational occupancy (2000 hours per year) shall be to maintain exposure levels below an average of 0.5 mrem (5 microsieverts) per hour and as far below this average as is reasonably achievable. The design objectives for exposure rates for potential exposure to a radiological worker where occupancy differs from the above shall be ALARA and shall not exceed 20 percent of the applicable standards in Section 835.202. Under the heading "835.1002, Facility Design and Modification," Appendix B provides the following explanation of the term "objective" as it relates to evaluation of shielding designs against 10 CFR 835: The term "objective" is not defined in the regulations and needs some explanation. An objective is a goal; something which one is trying to meet. It is not a design requirement that must be met. However, the objective must still be accounted for in the design process by making a conscious attempt to meet it. In this case, it is necessary to attempt to meet the objectives in the Subpart K and to document why the objective is or is not met. It is necessary to document the attempt to meet the objective, because 10 CFR 835.704(b) requires that facility design actions required by 10 CFR 835.1002 be documented. It is clear that it is not defensible to interpret								

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			the objectives as fixed limits that must be met, since this would defeat the overall requirement (above) for radiation exposure to be kept as low as reasonably achievable. It is clearly possible, in principle, for it to be impractical (not ALARA) to meet the objectives in a given case. On the next page, under the subheading "Design Objective for External Radiation Control," Appendix B provides the following discussion: The design objective (not limit) for the control of external radiation exposure in areas continuously occupied is to maintain exposure levels below 0.5 mrem/hr and ALARA. Therefore, it is not enough to have an objective of not greater than 0.5 mrem/hr, but it must also be ALARA. The use of this design objective and the rational for the final decisions will be documented as required by Paragraph 835.104(b) (see below). The design objective (not limit) for the control of external radiation exposure is areas not continuously occupied is to be no greater than 20% of the basic exposure limits and ALARA. These limits are for annual does to individuals; therefore, the objective discussed here is for the maximally exposed individual working full-time in the facility on a task or set of tasks. [Again]..., it is not enough to have an objective								

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			of not greater than 20% of the limit, but it must also be ALARA. The use of this design objective and the rationale for the final decisions will be documented as required by Paragraph 835.704(b) (see below). Note that it is not required that either of these objectives be met when the design is done. It is required, however, that a conscious effort be made to meet them and to document why it is ALARA if they are not met.								
40	3.2.2.1.6.3	Radioactive material packaged for transportation.	Dose rate limits for radioactive material packaged for onsite transportation is identified in HNF-PRO-157 and HNF-5173. These documents shall be used for all material shipped and stored at the Hanford Site.						X	N/A for the CSB. Shipping cask underwent design review in other SNF Sub-Project.	N/A
41	3.2.2.1.7	Contamination control.	The SNF CSB design shall confine contamination to the vicinity of the source and minimize contamination spread. Confinement shall be achieved by ventilation control (differential pressure), by directing air from uncontaminated areas toward areas of higher contamination, by high-efficiency particulate air (HEPA) or equivalent filtration or equivalent back flow isolation, and by the use of controlled personnel traffic patterns. The cross-contamination of work areas by airflow shall be minimized.		X		X			IDR on Superstructure Package, Tent Enclosure Package. Qualification test on HVAC system, PAT-006. Also, validated in SNF-7028 Appendix "A".	Closed

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42	3.2.2.1.8	Component failure.	The SNF CSB design shall be such that no single credible component failure or loss of normal power will result in unacceptable safety consequences. Safety classification is performed per HNF-PRO-704, Hazard and Accident Analysis Process, Rev. 1 (1999). Unacceptable safety consequences include the following:								
			a. Exposure of personnel to ionizing radiation in excess of 10 CFR 835, Occupational Radiation Protection (CFR 1999).					X		Informal Review of SNF-3328, Rev. 2, Canister Storage Building Design Basis Accident Analysis Documentation. Other supporting documentation for this requirement includes ALARA Analysis -09 and CSB FSAR (SNF-3553).	Closed
			b. Exposure of personnel to toxic chemical agents in excess of ceiling threshold limit (CTL) value of the American Conference of Governmental Industrial Hygienists.					X		Informal Review of CSB Hazard Analysis Report HNF-SD-SNF-HIE-001. The hazard analysis was done per HNF-PRO-704 which uses the ACGIH TLV as part of the guidelines. Therefore the hazards analysis complies with this requirement.	Closed
			c. Instantaneous release of radioactivity from the facility in excess of 5,000 times the derived concentration guide (DCG) values specified in WHC-CM-7-5, Environmental Compliance, (WHC 1988), Appendix C, at point of discharge.		X					Independent Review in Notice of Construction (NOC). The hazard consequence analysis that was completed and documented in the CSB Design Basis Accident Analysis, SNF-3328, and CSB FSAR, SNF-3553 Annex A, indicates compliance with this requirement. These documents have been reviewed and approved.	Closed

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			d. Fire (other than localized minor fire such as caused by shorting of electrical equipment).					X		The fire hazards analysis that was completed for the CSB (HNF-SD-SNF-FHA-002, Rev. 2) indicates compliance with this requirement. This document has been reviewed and approved.	Closed
			e. Criticality.		X					Independent Review in Criticality Analysis. HNF-SD-SNF-CSER-005, Rev 5B	Closed
			f. Explosion.					X		Informal Review in SNF-3328, Rev. 2, Canister Storage Building Design Basis Accident Analysis Documentation	Closed
			The effects of component failure, including control and monitoring, and utilities failure (such as power sources, air and vacuum supplies) shall be evaluated for unacceptable consequences.					X		Informal Review of RAM Analysis (In Release Process). Ref DESH-9760688 Reliability, Availability, Maintainability Analysis for the MHM. Letter, A. S. Daughtridge, DESH, to N. H. Williams, FDH, date November 26, 1997.	Closed
43	3.2.2.1.9	General configuration.	The building configuration shall be considered under twelve major areas: the storage vault area, the operation deck area, the load-in/load-out area, the systems controls area, the equipment decontamination area, the health physics support and personnel decontamination area, the MCO/cask service area, radioactive maintenance area, the non-radioactive maintenance area, new MCO lag receipt area, the HVAC equipment area, and the waste (solid and liquid) handling area. Additionally, an annex to the CSB will house the MCO sampling and welding facilities (See Appendix A). A temporary support structure located near the CSB will be used for administrative support and welfare of personnel.						X	General Information not applicable.	N/A

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			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		The structure and layouts of the facility shall conform to DOE Order 6430.1A, General Design Criteria (DOE 1989), NFPA 70, National Electrical Code (NFPA 1993), NFPA 101, Life Safety Code (NFPA 1994), and the Uniform Building Code (ICBO 1994). Control devices for access to High Radiation Areas shall conform to the requirements of Section 1601 of 10 CFR 20, Standards for Protection Against Radiation (CFR 1994).					X		Informal Review HNF-4742, Rev. 0 Canister Storage Building Compliance Assessment, DOE Order 6430.1A, General Design Criteria.	Closed
		Utilization of the existing design and construction of the HWVP Canister Storage Building will be maximized as much as possible. Expedited and optional building modularization construction methods will be done in the re-design of the facility for spent nuclear fuels.		X					Independent Constructability review inWHC-SD-SNF-RPT-005, Rev. C SNF CSB Construction Restart Recommendation Report	Closed

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44	3.2.2.1.9.1	Storage vault area.	The storage vault will be designed to contain up to 440 MCOs stacked two levels high with an impact absorber below each MCO. An intermediate impact absorber between the stacked MCOs is required to prevent damage to the top surface and critical components of the MCO. Six overpack tubes shall be provided for damaged/failed MCOs. The damaged/failed MCO shall be a "maximum" case from Table 3.2.2.1.2.2-2. The impact absorbers will be designed to decelerate a dropped MCO from the full-up position in the MHM to the bottom of the storage tube. The HWVP CSB design contains three vaults, each with a maximum of 220 steel storage tubes. All three-vault operating deck areas will have storage tube openings in the deck. One storage vault for SNF CSB will have a storage tube for every normal opening in the operation deck. Each storage tube will be designed to support and maintain storage configuration in any abnormal or naturally occurring event. Confinement is required for overpack storage tubes only according to DOE Order 6430.1A, General Design Criteria (DOE 1989). The storage vault will have natural connective cooling, to ensure the MCOs and structural materials are within the allowances of the design codes and the MCO Description as contained in Table 3.2.2.1.2.2-1, MCO Material and Radionuclide Inventory (05/31/98).		X			X		Independent Review of vendor submittal for impact absorber and qualification test and test report on prototype impact absorbers. Informal Review of Q Metrix independent analysis of natural connective cooling. EDT 625800, and IDR on calculation CSB-HV-001.	Closed

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45	3.2.2.1.9.2	Operation deck area.	The operation deck area within the existing footprint will contain plug openings for placement and removal of MCOs in the vault storage tubes. The deck will provide adequate personnel shielding for workers on the deck and structural support for normal, abnormal loads, and upset (impact) loads based on design basis accidents in accordance with HNF-S-0426, Rev. 6. The operation deck area will be serviced by an integral MHM and crane of sufficient capacity to safely lift the fully loaded MCO weight, and that includes safety features designed to prevent an MCO drop onto the operation deck. The operating deck area will have conditioned air and illumination for workspace requirements. Confinement will be maintained consistent with design basis accidents and safety analysis results.	X	X		X			Independent review of the shielding analysis, structural analysis, and drop analysis. There was an IDR of the Deck package, HVAC, and FDR of the MHM. There was qualification testing of the HVAC system (PAT-006), and a lighting test.	Closed
46	3.2.2.1.9.3	Load-in/load-out area.	The Load-In/Load-Out Area will include the flexibility to receive SNF loaded and empty/clean MCOs and impact absorbers by conventional truck-trailer. An overhead gantry-receiving crane will be included with a capacity of 60 tons to handle the fully loaded MCO and transport cask. A 10-ton capacity auxiliary hoist is required to handle the cask lid. The receiving crane is used to move empty MCOs and impact absorbers from the truck trailer. Proximity to a non-radioactive maintenance area will be provided.		X		X			IDR of the receiving crane as well as qualification testing (PAT-012). Also, validated in SNF-7028 Appendix "A".	Closed

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			The Load-In/Load-Out area shall include the flexibility to receive ISCs, the SWC, and T-3 transportation cask by conventional truck. The overhead handling crane (Receiving Crane) within the Load-In/Load-Out area shall have the lifting capacity and lifting height capability to accommodate a fully loaded ISC on its transporter, a SWC on its transporter, T-3 transportation cask, and a fully loaded T-3 transportation cask. The Load-In/Load-Out Area shall include provisions for future addition of a caisson (nominally 12 feet in diameter and 20 feet deep) adjacent to the MCO/Cask Service Area.				X			The load-in/load-out had an IDR as part of the Superstructure package and qualification testing in W443-PAT-001. Validated in SNF-7028 Appendix "A".	Closed
47	3.2.2.1.9.4	Systems controls area.	There will 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.		X					IDR was performed on the Support Building package, See Control Area Layout, H-2-121110; P&ID HVAC Support Equipment, H-2-129587	Closed
48	3.2.2.1.9.5	Equipment decontamination area.	Space for limited decontamination area within the radioactively controlled area will be included. Equipment components that may need decontamination includes HVAC components, smaller crane components, smaller MCO/cask handling components, and miscellaneous MCO/Cask service components. This will be located within close proximity to the MCO/Cask service area. Equipment and systems for decontamination of large components and casks are not intended at the SNF CSB.		X					IDR on the FFTF pit and the Maintenance pit as part of the Superstructure package. The Baseline Design Verification checklist that is part of the Superstructure package indicates that this requirement has been deleted.	Closed
49	3.2.2.1.9.6	Health physics support and	An area for health physics work controls (not office administration) will be provided		X					IDR of the Superstructure package, see Step off pad, HP Service Area.	Closed

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		personnel decontamination area.	including personnel decontamination functions and change rooms for contaminated work areas. The area will be located in close proximity to the radioactive activities surrounding the MCO/Cask services and limited Decontamination areas.							The location of the change rooms and health physics areas is delineated on the drawing H-2-117795, which documents the as-built condition and has been reviewed.	
50	3.2.2.1.9.7	MCO/cask service area.	The MCO/cask service area is a shielded area that will enable MCO handling, transportation cask pressure check, gas sampling and cask lid removal, MCO shield plug visual inspection, and MCO transfer from a transport cask to a facility storage tube by the MHM. The MCO service area will have capability for airspace separation from other areas during MCO cask depressurization and gas sampling. The service area may be a smaller area within the operations area. The receiving crane will be utilized to handle the transport cask within the Load-In/Load-Out area. The receiving crane and gantry hoist will be used to move empty MCOs from the trailer to a lag storage area, move empty MCOs from the lag storage area into the empty transport cask, reinstall the cask lid, and move impact absorbers from the trailer for pickup and transfer to storage tubes by the MHM. Negative air pressure relative to adjacent areas and exhaust air function with HEPA filters will be provided. The MCO/cask Service Area shall have provisions to accommodate a SWC, SWC adapter, T-3 transportation cask, and T-3 cask adapter for FFTF SNF assembly. The SWC		X		X			IDR was performed on the Superstructure, Weld Sample Station, and Receiving Crane. Qualification testing was performed on the MHM by PAT-015-3, the receiving crane by PAT-012, and the HVAC system by PAT- 006. Provisions to accommodate the SWC and the T-3 transportation cask was verified in the Superstructure IDR. Also, validated in SNF-7028 Appendix "A".	Closed

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			and T-3 cask adapters will be in a vertical orientation below floor elevation of the Load-In/Load-Out Area.								
51	3.2.2.1.9.8	Radioactive maintenance area.	Space for a radioactive maintenance area for limited MHM maintenance will be provided adjacent to the operations deck area.		X					Verified in the IDR of the MHM maintenance pit in the Superstructure package. The Baseline Design Verification checklist that is part of the Superstructure package indicates that this space is available in the load in/Load out area as presented on drawing H-2-117795.	Closed
52	3.2.2.1.9.9	Non-radioactive maintenance area.	The non-radioactive maintenance area contains normal facility maintenance activities of a non-radioactive condition. Typical services will be HVAC equipment maintenance services, electrical equipment services, and testing equipment maintenance. Metal fabrication, welding, solvent handling, instrument calibration, and electrical testing will be some of the functions in the area. This will be provided in the support building separate from the operating area.		X					Verified in the IDR of the Superstructure. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements. Specifically see H-2-117795, sheet 1 for clean area location.	Closed
53	3.2.2.1.9.10	New MCO receipt and lag storage area.	An area within the non-radioactive truck shipment receipt area for interim holding of up to 5 new MCOs will be provided. An area for new MCO receipt and lag storage will be provided for all MCOs prior to use or shipment to the 100K area. A separate structure for storage of new MCOs will be provided or use of existing storage at the Hanford area will be used.		X					Verified in the IDR of the Superstructure. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed

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										Further the Baseline Design Verification checklist in the Superstructure package indicates that this requirement has been deleted.	
53a	3.2.2.1.9.11	Canister cover cap assembly receipt and lag storage area	An area within the sampling/weld loading/storage are will be provided for receipt and interim holding of a few cover cap assemblies.	X						The FDR of the Sample Weld Station package indicates that the storage of cover caps will be in the CSB south vestibule. Further the Space Allocation Drawing of the CSB (CN-1227) shows storage of these caps in the southern loading/staging area.	Closed
54	3.2.2.1.9.12	HVAC and storage vault cooling area.	An area will be provided for equipment to condition and duct air throughout the facility, short-term (6 years or less) skid-mounted equipment will be considered where possible. The vault is a separate area with natural draft features to cool air sufficient to maintain the MCOs at the required temperature.		X		X			Verified by IDR of calculation HV-001 for vault cooling; the IDR of the Vault package and Superstructure package, and qualification testing completed in PAT-006 and –007 for the HVAC system. Validated in SNF-7028 Appendix "A".	Closed
55	3.2.2.1.9.13	Waste handling area.	An area for the purposes of handling wastes will be provided. The capability to collect liquid and solid wastes for shipment to approved disposal facilities will be included in the waste handling area.		X		X			Verified by IDR of the Superstructure package, and qualification tested in W379-PAT-004. Validated in SNF-7028 Appendix "A".	Closed
56	3.2.2.1.9.14	Emergency generator area.	An area for emergency/backup generators will be provided. There is no safety requirement for an emergency generator system.						X	Requirement for back-up power deleted, see CSB Change Request #CR-006.	N/A
57	3.2.2.1.9.15	Exterior area.	The surrounding exterior area will have 2-lane service roads with an HS-20 load capacity that will serve vehicle traffic to the Load-In/Load-Out area, the HVAC area, the new MCO receipt and lag storage area, canister cover assembly receipt and lag storage area, and gas cylinder areas. All utilities will be supplied by the existing underground site utilities		X					Verified by IDR of Superstructure Package, see vicinity and project area maps H-2-117071 – 074.	Closed

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			constructed during HWVP site work. Access for future rail routing will be preserved from the 200E rail system.								
58	3.2.2.1.10	Service provisions.	Utilities and services such as, but not limited to, water, compressed air, light, closed-circuit television, and electrical outlets shall be provided for major operational areas as required. The design shall provide corrosion protection for outdoor/buried metallic equipment.		X					Verified by IDR of Superstructure. Drawing H-2-122742, sh1-4 shows the electrical utilities provided, and drawing H-2-125163 shows the compressed utilities provided. Cathodic protection systems are only provided for the fire water system (HNF-3553, Chapter A2.0)	Closed
59	3.2.2.1.11.1	Cranes and hoists.	Cranes and hoists shall conform to applicable sections of DOE/RL-92-36, Hoisting and Rigging Manual (RL 1993); ASME B30 Series, Miscellaneous Specifications for Cranes, Hoists, and Hooks (ASME 1989, 1990, 1991, 1992, 1993, 1994) and CMAA Specification #70, Specifications for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes (CMAA 1994). Cranes and hoists required for handling of nuclear or radioactive materials shall meet, in addition to the above, the applicable requirements to ASME NOG-1-1995, Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder) (ASME 1995). The MHM crane shall be maintained in a designated area at the MHM service trench in the load-in/load-out area or at another suitable	X			X	X		Verified by FDR of MHM and Receiving Crane; Informal Review of compliance by DA in MHM NOG-1 compliance matrix (SNF Internal Correspondence 00-SNF/CES-005); and qualification tested in PAT-012 and PAT-015., and FMEA of MCO Hoist and Grapple (ESL/R-97-036 and ESL/R-97-043). Also, validated in SNF-7028 Appendix "A".	Closed

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			location commensurate with operation and safety concerns. Maintenance platforms for repair of the crane shall be provided by the vendor and must fit within the space envelope of the facility. Allowance shall be provided for future adjustments of crane rail alignment and elevation, and for repair or replacement of the crane. Consideration shall be given in design and procurement to disassembly features such as plug-in units for drives and electrical connectors. Remote CCTV shall be provided in conjunction with the MHM crane.								
60	3.2.2.1.11.2	Finishes for decontamination.	Finishes for decontamination shall be in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989) where necessary.		X					Verified by IDR of Superstructure Package	Closed
61	3.2.2.1.11.3	Special coatings.	Special wall coatings that can be easily decontaminated shall be used on the walls, floors, and ceilings in the MCO cask service area and in other areas where infrequent decontamination is possible. The colors shall be gray undercoat and a white topcoat (or two-color equivalent) to identify chipped paint.		X					Verified by IDR of Superstructure Package. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements. Additional information regarding the finishes used are outlined in the CSB FSAR (SNF-3553, Annex A) under the Decontamination and Decommissioning chapter.	Closed
62	3.2.2.1.11.4	Security	The CSB security system is a dedicated stand-						X	Maintenance Function not applicable.	N/A

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			alone system, therefore, maintenance is performed by Project Hanford Security Engineering and Maintenance organization.								
63	3.2.2.1.12	Fire protection.	The fire protection system shall meet the requirements of DOE Order 6430.1A, General Design Criteria (DOE 1989); DOE Order 5480.7A, Fire Protection (DOE 1993); and the NFPA Codes and Standards. The design features of the CSB are to be in compliance with NFPA 69, Explosion Prevention Systems - Tentative Interim Amendment (NFPA 1995) to provide for the protection from hydrogen deflagration events.		X		X			Verified by IDR Superstructure Package; and qualification tested by PAT-003. Also, validated in SNF-7028 Appendix "A".	Closed
	3.2.2.1.12.1	Sprinklers.	The main water fire protection for the Support Area Building shall be by sprinkler system33 installed in accordance with NFPA 13, Installation of Sprinkler Systems (NFPA 1994) and DOE Order 6430.1A, General Design Criteria (DOE 1989). No uncontrolled combustibles will be allowed in the operational deck area. Backflow prevention devices shall be installed in accordance with AWWA Standards and shall be on the Washington State Department of Health approved list.		X		X			Verified by IDR Superstructure Package; and qualification tested by PAT-003. Also, validated in SNF-7028 Appendix "A".	Closed
	3.2.2.1.12.2	Halon.	Halon shall not be used.							No Halon in CSB.	N/A

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	3.2.2.1.12.3	Central alarms.	A Fire Alarm Control Panel shall be conveniently located in the building and shall be compatible with the site Radio Fire Alarm Report (RFAR) Box which interfaces with the 200 Area Fire Department Emergency Dispatch System. The alarm system shall be installed in accordance with NFPA 70, National Electrical Code (NFPA 1993) and NFPA 72, National Fire Alarm Code (NFPA 1993).		X		X			Verified by IDR Superstructure Package; and qualification tested by PAT-003.Also, validated in SNF-7028 Appendix "A".	Closed
64	3.2.2.1.13	Drains.	Contaminated and non-contaminated drains shall not be interconnected. Back flow prevention shall be provided. Curbs shall be provided around equipment to contain potential oil leakage or spills. The specifics for storm and chemical drains are as follows:		X					Verified by IDR Superstructure. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
	3.2.2.1.13.1	Storm drains.	Storm drains shall be installed in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989) standard callouts.		X	X				This requirement is discussed in the CSB FSAR (SNF-3553, Annex A) and in the storm drain calculation (CSB-C-0001). Further the DOE 6430.1A compliance matrix indicates that the CSB can withstand the maximum credible storm for the area which also indicates compliance.	Closed
	3.2.2.1.13.2	Chemical drains.	There are no chemical drains in the CSB.						X	N/A	N/A
65	3.2.2.1.14.1	Service vents.	Service vents shall be installed as required and shall not be cross-tied with process vents.		X					Verified by IDR Superstructure. The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110.	Closed

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										The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	
66	3.2.2.1.15	Communications.	A communications system shall be provided in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989), and DOE Order 5300.1C, Telecommunications (DOE 1988). All normally occupied parts of the facility shall have telephone conduits installed to accommodate communications.					X		Informal review of HNF-4742, "CSB Compliance Assessment, DOE Order 6430.1A, General Design Criteria". Design drawing H-2-12247 sh. 1, rev. 6 shows the location of the telephone circuits by room.	Closed
	3.2.2.1.15.1	Telephone system.	Telephones shall be provided for internal and external communications in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989). 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.		X		X			Independent review of US West telephone system design and the Public Address System (Reference not located in document release system), and testing of the systems summarized in W379-TSR-005. Also, validated in SNF-7028 Appendix "A".	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
	3.2.2.1.15.2	Plant and security.	Exterior communications and alarm systems shall be designed in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989). Fire, security, and telephone systems shall be included. The CSB security system design conforms to the following codes, standards, and source documents: W-A-450C/GEN, Federal Specification Components for Interior Alarm Systems (1990), DOE M 5632.1C-1, Manual for Protection and Control of Safeguards and Security Interests (DPE 1994), DOE 5633.3B, Control and Accountability of Nuclear Materials (DOE 1994), and DOE 6430.1A, General Design Criteria (DPE 1989).		X		X			FDR of Security System and Qualification testing of the systems in PAT-017. Also, validated in SNF-7028 Appendix "A".	Closed
	3.2.2.1.15.3	Intercommunication system.	An intercommunication system shall be included to provide communication between 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 intercommunication system shall be an integral part of the telephone system.		X					Independent review of US West telephone system design and the Public Address System (Reference not located in document release system), and testing of the systems summarized in W379-TSR-005. Design drawing H-2-12247 sh. 1, rev. 6 shows the location of the telephone circuits by room.	Closed
	3.2.2.1.15.4	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. A microphone for the control of the public address system shall be located in each main operation area.		X					Independent review of US West telephone system design and the Public Address System (Reference not located in document release system), and testing of the systems summarized in W379-TSR-005.	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
67	3.2.2.1.16.1	Lighting.	(a) High-pressure sodium vapor lighting and fluorescent lighting shall be used whenever possible. The interior lighting shall be installed in accordance with the IES Standard and DOE Order 6430.1A, General Design Criteria (DOE 1989), except in the remote areas where the minimum requirements shall be determined by the light intensity requirements for remote viewing. (b) Emergency lighting shall be in accordance with NFPA 101, Life Safety Code (NFPA 1994). (c) The operating deck shall be illuminated at all times with lighting of a minimum 2.2 lux (0.2 foot candles) at all floor level locations per DOE M 5632.1C-1, Manual for Protection and Control of Safeguards and Security Interests (DOE 1994).		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements. Drawings H-2-122742 Sh. 1,2,3, & 4 show the plan view of the locations of these type of fixtures. Reference lighting calculation (CSB-E-0004). The light intensity at the operating deck level is verified annually per surveillance procedure SP-20-014S.	Closed
68	3.2.2.1.16.2	Insulation.	The exterior wall insulation requirements shall be in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989). Identification of outside design temperatures shall be in accordance with SDC-5.1, Heating, Ventilation, and Air Conditioning (RL 1979). Identification of inside design temperatures shall be in accordance with DOE Order 6430.1A. Performance standards for all facilities shall be in accordance with 10 CFR 435, Energy Conservation Voluntary Performance Standards for New Buildings; Mandatory for Federal Buildings (CFR 1994).		X					The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
69	3.2.2.1.16.3	Equipment.	Economics and alternatives shall be considered in accordance with DOE Order 6430.1A where applicable. Electrical equipment shall conform to DOE Order 6430.1A, NEMA standards, NEC requirements, and ANSI/ASHRAE/IES 90A-1980.		X			X		Informal review of 6430.1a compliance in HNF-4742 and electrical equipment reviewed in IDR of Superstructure and independent review at receipt inspection.	Closed
70	3.2.2.1.16.4	Metering.	Energy metering shall be provided in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989).		X					Verified by IDR of Superstructure package. Informal review of DOE 6430.1a compliance in HNF-4742. Design drawing H-2-122733, sh. 3, Rev. 4 shows the electrical utility meter on the incoming facility power.	Closed
71	3.2.2.2	Heating, ventilating, and air-conditioning.	The SNF CSB design shall include a ventilation system to provide contamination confinement, to ensure contamination control, and to provide for dilution and removal of potential hydrogen and krypton from the work area in order to maintain acceptable concentrations within the SNF CSB. The ventilation system shall be in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989), DOE Order 5400.5, Radiation Protection of the Public and the Environment (DOE 1990), ASME N509-1989, Nuclear Power Plant Air-Cleaning Units and Components (ASME 1989), ASME N510-1989, Testing of Nuclear Air Treatment Systems (ASME 1989), and WAC-246-247, Radiation Protection-Air Emissions (1994). The total volume of air handled shall be that		X		X	X		Prevention of accumulation of Kr and H_2 is verified by IDR building HVAC system and informal review of ALARA analysis 96-02 for KR 85 and Fire Hazards Analysis WHC-SD-FHA-002, Rev. 1, for hydrogen. Qualification testing performed in PAT-006 PAT-007, PAT-010-1, and PAT-010-2. Airlocks and doors verified by IDR of Superstructure Package. HVAC design verified for redundancy and spare capacity in IDR of HVAC systems. Validated in SNF-7028 Appendix "A". The bulk of this requirement is covered in SNF-7109. Discussion of the HVAC system is provided in the CSB FSAR, HNF-3553 Section	Closed

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			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 the entrances to the building. Sufficient redundancy and/or spare capacity shall be provided as necessary to ensure adequate ventilation during normal operations and DBA conditions. Operation of the facility shall be in accordance with RL-98-30, Radioactive Air Emissions Notice of Construction Canister Storage Building (Revised Sealing Configuration for Spent Nuclear Fuel) Project W-379 (1998).							2.7.2. A compliance matrix was developed for the requirements of DOE Order 6430.1a and is contained in HNF-4742, CSB Compliance Assessment with DOE Order 6430.1a.	
72	3.2.2.2.1	Ventilation zones.	The definition of the ventilation zones shall be as specified in Table 3.2.2.2.1. The differential pressures specified shall be with respect to atmosphere and shall be considered minimum. Airlocks and other barriers shall be provided as required to separate zones to ensure ventilation balance and contamination control and to maintain pressure differentials. The operating area will be maintained at a negative pressure with respect to atmosphere. Electrical embeds providing access to Zone I may exit in Zone III by means of an inner barrier that provides two seals between the zones. The inner barrier shall require testing to qualify the integrity of the seals.		X		X			Airlocks, barriers, backflow devices, and dampers verified by IDR of the Superstructure package HVAC system was qualification tested in PAT-006 and -007. The negative pressure requirement is verified in PAT-006. Validated in SNF-7028 Appendix "A".	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			Building airflow shall be from nonradioactive zones to zones with low potential for contamination to zones with greater potential for contamination. Within a zone, air shall flow from less contaminated to more contaminated areas. If air is cascaded from one zone to another of higher potential for contamination, back flow protection between the zones shall be provided. Back flow protection between zones shall consist of HEPA filters or an equivalent back flow isolation device. Back flow protection in supply air systems shall be sufficient to prevent airborne releases to the environment. Dampers shall be provided as required to control and balance airflow's. Dampers must be accessible for operation and repair.								
73	3.2.2.2.2.1	Supply air	Supply air shall be conditioned in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989). Supply air inlets shall be located off the ground to minimize dust loading to the filters, and the effects of high winds, windblown trash, windblown vegetation, ash, snow, and ice. Supply air inlet locations shall minimize the possibility of recirculating facility exhaust air. Supply air systems shall be protected from birds and hoarfrost. Supply air filters shall be rated at a minimum of 85 percent efficiency (atmospheric dust spot) in accordance with ASHRAE 52.1-1992, Gravimetric and Dust-		X		X			Verified by the IDR of the Superstructure package. Air temperature maintenance verified by qualification tested in PAT - 006 and – 007. Validated in SNF-7028 Appendix "A".	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			Spot Procedures for Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter (ASHRAE 1992). The air temperature in man-accessible work areas shall be maintained for normal operating conditions. Consideration shall be given to the utilization of sensible heat from the exhaust stream to preheat incoming air in accordance with DOE Order 6430.1A, General Design Criteria (DOE 1989).								

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
74	3.2.2.2.2.2	Exhaust air.	Releases 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 (DOE 1989). Air emissions shall be in accordance with 40 CFR 61, National Emissions Standards for Hazardous Air Pollution (CFR 1994). The design, construction, and installation of equipment to control and monitor emissions shall utilize best available radionuclide control technology to meet the requirements of WAC-246-247, Radiation Protection - Air Emissions (WAC 1994), ANSI N13.1, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities, 40 CFR 60, Appendix A, Test Methods, and 40 CFR 52, Appendix E, Performance Specifications and Specification Test Procedures for Monitoring Systems for Effluent Stream Gas Volumetric Flowrate. The effluent monitoring requirements of 10 CFR 20, Standards for Protection Against Radiation (CFR 1994), 10 CFR 70.59, Effluent Monitoring Reporting Requirements (CFR 1994), and 10 CFR 835, Occupational Radiation Protection (CFR 1993) shall be reviewed to provide the necessary monitoring instrumentation.		X		X			Verified by the IDR of the Superstructure packages and qualification tested by PAT-010-1 and –010-2. Validated in SNF-7028 Appendix "A".	Closed

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			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		All release points of airborne emissions that have the potential for containing particulate radioactive contaminants shall be filtered using Best Available Radionuclide Control Technology (BARCT), as cited in WHC-CM-7-5, Environmental Compliance (WHC 1988), shall use a HEPA or equivalent filter. An installed HEPA or HEPA-equivalent filter shall have an efficiency of at least 99.95 percent of 0.3-micron particles and be testable. The adequacy of the filtration system (the number of filtration stages required) shall be determined by analysis to ensure the contamination in the effluents are ALARA and do not exceed the above emission limits.		X		X			Verified by the IDR of the Superstructure packages and qualification tested by PAT-010-1 and -010-2. Validated in SNF-7028 Appendix "A".	Closed

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			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		The HEPA filter assemblies shall comply with DOE Order 6430.1A and ASME N509-1989, Nuclear Power Plant Air-Cleaning Units and Components (ASME 1989). In place testing design requirements shall meet all the recommendations cited in DOE Order 6430.1A and ASME N510-1989, Testing of Nuclear Air Treatment Systems (ASME 1989). Design shall preclude excessive personnel exposure and the release of contaminants to the environment during testing. Design shall provide for measurement of supply and exhaust airflows. Final HEPA filter systems shall include the necessary fire protection provisions to comply with DOE Order 6430.1A and DOE Order 5480.7A, Fire Protection (DOE 1993). The local exhaust fans for confinement control shall be fabricated to facilitate decontamination. Multiple fans shall be provided downstream of the filters. Standby fans may be provided and their operation initiated by abnormal pressure(s) within the ventilation system. To ensure isolation, there shall be no common walls between supply and exhaust air tunnels or ducts. Leak proof dampers shall be provided for each section of HEPA filters such that each section can be isolated for filter replacement during normal operations.		X		X			Verified by the IDR of the Superstructure packages and qualification tested by PAT-010-1 and -010-2. Validated in SNF-7028 Appendix "A".	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			Provisions shall be made for representative sampling (shrouded probe) and continuous monitoring of particulate gaseous effluents in accordance with DOE Order 5480.4, Environmental Protection, Safety, and Health Protection Standards (DOE 1984), and DOE Order 5484.1, Environmental Protection, Safety, and health Protection Information Reporting Requirements (DOE 1981). Capability shall be provided for local and remote indication of gaseous effluent contamination levels and monitoring equipment alarm conditions. Stack height shall be sufficient to meet dispersion requirements for normal as well as DBA releases for process gaseous effluents. Process stacks mounted on the process building shall discharge air above the building wake per recommended practices to prevent recalculation of exhaust air to supply air intakes.		X		X			Verified by the IDR of the Superstructure packages and qualification tested by PAT-010-1 and –010-2. Validated in SNF-7028 Appendix "A".	Closed
75	3.2.2.2.3	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 (DOE 1989). 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.		X			X		Verified by Informal review of 6430.1a compliance, HNF-4742, and IDR of Superstructure package.	Closed
76	3.2.2.2.3.1	Computer	Computer room ventilation shall be designed to		X		X			Verified by IDR of Superstructure package and	Closed

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		rooms.	accommodate the requirements of the specific computer manufacturer's recommendation for temperature, humidity, and filtration.							qualification tested by PAT-007. Validated in SNF-7028 Appendix "A".	
77	3.2.2.3	Piping and vessels.	Regulatory Guide 1.26, Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Conditioning Components of Nuclear Power Plants (NRC 1976) shall be used to assist in assigning the appropriate code class to ASME Section III piping and vessels. The NRC positions in Regulatory Guide 1.84, Design and Fabrication Code Case Acceptability ASME Section III Division 1 (NRC 1993) and Regulatory Guide 1.85, Materials Code Case Acceptability ASME Section III Division 1 (NRC 1993) shall be reviewed on ASME Section III and ANSI/AISC N690-94, Specification for the Design, Fabrication, and Erection of Safety Related Structures for Nuclear Facilities, code cases before using such code cases for Safety Class applications. Where no NRC position is stated in regards to acceptance of a code case, that code case may be used as approved by the Code Committee.		X					The IDR of the Tube and Tube plug package has a Baseline Design Verification checklist that references CSB-RM-0006 for compliance with this requirement. Further, line items 10 and 11 of the CSB Compliance Assessment SNF Project NRC Equivalency Criteria (HNF-4776) also indicate that this requirement has been incorporated into design considerations.	Closed
78	3.2.2.3.1	Embedded and contaminated piping.	The SNF CSB embedded and contaminated lines, rack and piping shall be designed and installed in accordance with ASME B31.3-1990, Chemical Plant and Petroleum Refinery Piping (ASME 1990). Piping shall be designed for removal, or be permanently installed and provide a service life equal to that of the facility. Embedded piping installations shall meet Category 1 seismic requirements in						X	No embedded or contaminated lines.	N/A

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			accordance with Section 3.2.2.1.3.3 and hydraulic shock pressures. Piping and piping components shall be made of materials compatible with the operating conditions (i.e., chemical, and abrasives). Embedded lines must have adequate spares or be replaceable. SC piping must meet requirements of ASME Boiler and Pressure Vessel Code Section III, Rules for Construction of Nuclear Power Plant Components (ASME 1995).								
79	3.2.2.3.2	Other piping.	This piping shall be seismically designed in accordance with Section 3.2.2.1.3.3 as classified. Piping for sprinkler systems shall be in accordance with NFPA 13, Installation of Sprinkler Systems (NFPA 1994). Other piping such as cold chemical or instrument air shall be designed and installed in accordance with ASME B31.1-1992, Power Piping (ASME 1992), ASME B31.3-1990, Chemical Plant and Petroleum Refinery Piping (ASME 1990), or ASME/ANSI B31.9-1988, Building Services Piping Code (ASME/ANSI 1988) as defined in the scope of these codes and DOE Order 6430.1A, General Design Criteria (DOE 1989). Cylinder gas piping shall be designed and installed in accordance with Compressed Gas Association guidelines, CGA P-1-1991, Safe Handling of Compressed Gases in Containers (CGA 1991). Identification of piping shall be in accordance with the HPS and shall meet Occupational Safety and Health Administration (OSHA)		X		X			Verified by IDR of Superstructure package. He system qualification tested in PAT-002. Validated in SNF-7028 Appendix "A".	Closed

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			standards. The separation of potable water supplies from other water supplies and the use of back flow preventers shall be in the temporary administrative support structure in accordance with the Uniform Plumbing Code (ICBO 1991) and DOE Order 6430.1A. Any Safety Class piping must meet requirements of ASME Boiler and Pressure Vessel Code Section III, Rules for Construction of Nuclear Power Plant Components (ASME 1995).								
80	3.2.2.3.3	Contaminated vessels.	Contaminated vessels that contain fluids at pressures of 15 lb/in2 (gauge) and greater shall be designed and constructed in accordance with ASME Boiler and Pressure Vessel Code Section VIII, Rules for Construction of Pressure Vessels (ASME 1995), Division 1. This code also shall be used for design and fabrication of other vessels that contain fluids at pressures lower than 15 lb/in2 (gauge), except seal pots and agitator oil catch vessels. All vessels, designed and fabricated in accordance with ASME Section VIII, Division 1 requirements, shall be designed and fabricated with the intent to be code stamped, however code stamping is not required. This is to ensure quality of design and fabrication of the vessels. Any Safety Class vessels must meet the requirements of ASME Boiler and Pressure Vessel Code Section III, Rules for Construction of Nuclear Power Plant Components (ASME 1995).						X	There are no contaminated vessels.	N/A
81	3.2.2.3.4	Non-contaminated	Non-contaminated pressure vessels that contain fluids at pressures of 15 lb/in2 (gauge) and						X	There are non-contaminated vessels containing fluids.	N/A

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		vessels.	greater shall be designed and constructed in accordance with ASME Boiler and Pressure Vessel Code Section VIII, Rules for Construction of Pressure Vessels (ASME 1995), Division 1, however, code stamping will not be required. Atmospheric vessels shall be constructed in accordance with ASME Section VIII, Division 1; API Standard 650, Welded Steel Tanks for Oil Storage (API 1993); or other industry standard appropriate to the intended service. Code stamping of atmospheric vessels is not required. A means shall be provided to remove vessels from service and allow them to be accessed for inspection.								
82	3.2.2.3.5	Vessel and piping insulation.	Insulation for vessels and piping shall meet the requirements of DOE Order 6430.1A, General Design Criteria (DOE 1989), ANSI/ASHRAE/IES 90A-1980, Energy Conservation in New Building Design (ANSI/ASHRAE/IES 1980), or as applicable. Vessels and piping used for contaminated service shall be left uninsulated or utilize specially designed insulation to ensure that the outer surface can be decontaminated. All surfaces with elevated temperatures that could cause thermal currents and spread contamination must be insulated to 122° F (50° C) maximum temperature or cooled to 122° F (50° C).					X		This requirement is discussed in the CSB Compliance Assessment DOE 6430.1A (HNF-4742), item # 433. This document indicates compliance with the requirement and also points out that most of the piping used in CSB is not required to have insulation. Insulated piping is only located in the cask servicing and chiller areas.	Closed
83	3.2.2.3.6	Motor-operated valves.	The applicable design requirements of Generic Letter 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance 10 CFR						X	There are no motor-operated valves	N/A

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			50.54(f) (NRC 1989) shall be incorporated into Safety Class motor operated valves.								
84	3.2.2.4	Utilities.	Any sharing of common utilities and services and physical interaction between the modes of operation shall not impair the capability of the facility to perform its safety function.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
85	3.2.2.4.1	Steam.	There is no steam utility to be supplied to the CSB.						X	N/A	N/A
86	3.2.2.4.2.1	High pressure air.	This system 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.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
87	3.2.2.4.2.2	Instrument air.	This system shall have a dew point of -40 °C, and shall be free of moisture, oil (<1 ppm), and particulate. Safety Class instrument air systems shall incorporate applicable design requirements of Generic Letter 88.14, Instrument Air Supply System Problems Affecting Safety-Related Equipment (NRC 1988).		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the	Closed

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										project requirements.	
88	3.2.2.4.3	Water.	Safety Class open-cycle cooling water systems shall incorporate applicable design requirements of Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment (NRC 1989).						X	There is no open cycle cooling water.	N/A
89	3.2.2.4.3.1	Raw and sanitary water.	Raw and sanitary water shall be provided in accordance with WAC-246-290, Public Water Supplies (WAC 1995), and the AWWA and NFPA standards. 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 (DOE 1989), and WHC-CM-4-3, Industrial Safety Manual (WHC 1995) (for cross-contamination control). Sanitary water shall be used to supply the plant facilities water needs (e.g., water for domestic purposes) in the temporary administrative support structure. Water shall be provided for equipment needs. Raw water shall be supplied for fire protection purposes. The water required for fire suppression measures shall normally be supplied by the raw water system.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
90	3.2.2.4.4	Bottled gases.	Bottled gases shall be supplied as required for facility operation. Recommendations of CGA P-1-1991, Safe Handling of Compressed Gas in Containers (CGA 1991) shall be used as applicable.	X	X					Verified by IDR of Superstructure package and FDR of the Sample Weld Station package.	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
91	3.2.2.4.5	Electrical.	All electrical design shall conform to NFPA 70, National Electrical Code (NFPA 1993), C2-1993, National Electrical Safety Code (IEEE 1993), and DOE Order 6430.1A, General Design Criteria (DOE 1989). However, the use of aluminum conductors requires prior approval.						X	General Information not applicable.	N/A
			a. The SNF CSB shall be supplied with electrical power to meet all facility and operations requirements.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
			b. The process and facility power shall be supplied via medium-voltage switchgear, load centers (low-voltage switchgear), motor control centers, and distribution panels.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed

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		c. The uninterrupted power supply (UPS) system shall provide uninterruptible power to alarms, critical equipment, instrumentation, and other circuits. All security sensors, cameras, and video transmission equipment shall be provided a UPS with minimum of 8 hours run time at full load. Deck lighting must be on separate UPS, which will not be a part of the Security System.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
		d. Lightning protection/grounding shall be provided for this facility in accordance with requirements in DOE Order 6430.1A and NFPA 70.				X			Verified by qualification testing in PAT-001 and PAT-018. Validated in SNF-7028 Appendix "A".	Closed
		e. All electrical equipment and connections (e.g., lighting, conduit, etc.) for the operational areas shall be designed and installed to meet the requirements of NFPA 70.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed

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		f. Sensors and display devices shall be provided for the electrical distribution system (excluding the Security System). These sensors and devices shall be an integral part of the switchgear, switch panels, and motor control centers, and will have the capacity to interface with standard programmable controllers and desktop-type personal computers.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
		g. Emergency power is governed by the current safety basis. Standby power to support design features may be employed.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed

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		h. Section (e)(5) of 10 CFR 50.49, Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants (CFR 1994) and Regulatory Guide 1.89, Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants (NRC 1984) shall be used to determine the aging requirements for SC electrical equipment, non-SC equipment that could, upon failure, adversely impact SC equipment in performance of its safety function, and certain post-accident monitoring equipment as described in Regulatory Guide 1.97, Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident (NRC 1983).		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
		i. The electrical equipment qualification program shall include the testing requirements provided in Sections (f)(1-4) of 10 CFR 50.49, Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants (CFR 1994).				X			Verified by qualification testing in PAT-001 and PAT-018. Validated in SNF-7028 Appendix "A".	Closed

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			j. The requirements of IEEE Std. 484-1987, IEEE Recommended Practices for Installation Design and Installation of Large Lead Storage Batteries for Generation Stations and Substations (IEEE 1987) shall be incorporated into the design and installation of Safety Class batteries. The requirements of IEEE Std. 535-1986, IEEE Standard for Qualification of Class IE Lead Storage Batteries for Nuclear Power Generating Stations (IEEE 1986) shall be incorporated into the qualification of Safety Class lead storage batteries.		X						Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
			k. The requirements of IEEE Std. 603-1991, IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations (IEEE 1991) shall be incorporated into the design of Safety Class instrumentation and control systems.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
92	3.2.2.4.6	Liquid waste.	Liquid process waste is not produced in the CSB.						X	Not Applicable	N/A
93	3.2.2.4.7	Liquid effluents.	The effluent monitoring requirements of 10 CFR 20, Standards for Protection Against Radiation (CFR 1994), and 10 CFR 835, Occupational Radiation Protection (CFR 1999) shall be reviewed to provide the necessary monitoring instrumentation.		X		X			Verified by IDR Superstructure and qualification tested by PAT-004. Validated in SNF-7028 Appendix "A".	Closed

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	3.2.2.4.7.1	Cooling water.	Cooling water is not required for building HVAC and no cooling water sources which could leak into vault and flood it are allowed. A closed loop cooling system is required at the weld station to cool the MCO after welding (see Appendix A). The sampling/weld station cooling unit shall be designed to meet the requirements of ANSI/ARI 590, Positive Displacement Compression Water Chilling package (ANSI 1992).	X			X			Verified by FDR of Weld Station and qualification tested in PAT-003. Validated in SNF-7028 Appendix "A".	Closed
	3.2.2.4.7.2	Condensate.	Steam condensate is not required; however, condensate collection is required for HVAC system and compressed air equipment.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
	3.2.2.4.7.3	Sanitary sewer.	Sanitary sewer is not required for the SNF CSB. Sanitary Sewer is required for the temporary administrative support structure. The sanitary effluent sewer shall be designed for a seven-day, twenty-four-hour, three work-shift basis, and shall be sized for the maximum daily occupancy.		X					Verified by IDR of operations support facilities. This requirement is specifically meet by review of drawings H-2-117100 and H-2-117101 that were part of the Operations Support Facility package.	Closed
94	3.2.3.1	Reliability and availability.	To meet the plant capacity requirements established in Section 3.2.2.1.2.1, the following concepts shall be utilized: a. Maximize equipment interchangeability. b. Locate complex components including		X		X	X		Verified by informal of facility: CGI testing of relief valves and rupture disks and IDR of Sample Weld Station Effluent (Superstructure package). Validated in SNF-7028 Appendix "A".	Closed

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			electronic devices or those having a high probability of failure in non-radiation areas. c. Operate power transmission devices below 75% of manufacturer's rating. d. Select pumps to operate in the middle of their flow and head range. e. Provide adequate equipment materials for the operating environment. f. Utilize commercially available equipment. g. Identify equipment repair methods and egress routes. h. Provide lag storage for process flow interruptions affected by maintenance. i. Project Hanford Security Engineering is responsible for monitoring reliability and availability of the CSB security components.								
95	3.2.3.2	Operability.	The SNF CSB shall be designed to be satisfactory for humans to operate and maintain. Design considerations shall be given to the guidelines in DOE Order 6430.1a, General Design Criteria (DOE 1989), DOE draft standard, Human Factors Engineering Design Criteria, Volume 1 General Criteria (DOE 1992), and MIL-STD-1472E, Human Engineering Design Criteria for Military Systems, Equipment, and Facilities (DOD 1996). The NRC guidance of NUREG-0700, Guidelines for Control Room Design Reviews (NRC 1981) and SRP 18.1, Control Room, of NUREG-0800, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (NRC 1987) shall be reviewed against DOE Order 6430.1A to identify					X		Verified by informal review in Human Factors Engineering reports SNF-3907 and SNF-4831	Closed

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			appropriate additional NRC guidance for the design of the CSB. The reviews shall give consideration to the differences in complexity between power reactor control rooms and that of the CSB. In addition, the following concepts shall be utilized where practicable. a. Instrument readout shall be located at average eye elevation for ease of reading and controls. Such instruments shall be located to permit visual monitoring without drastic shifts of body position. Alarms and annunciates shall be located near the operational personnel and convey the proper action required. b. Equipment shall be accessible for ease of operation and maintenance. c. Valve handles shall be sized properly and located for ease of operation. d. Labels, legends, placards, signs, or markings shall be provided whenever it is necessary to identify, interpret, follow procedures, or avoid hazards, except where it is obvious to the observer. e. Facilities shall be designed for both men and women operators. f. Lighting levels shall be verified to be at or above that recommended for the type of location and work to be performed, including remote operations, in accordance with IES standards. g. Similar types of equipment which require operator monitoring shall be located in close proximity.								

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			h. Complex operator interactive equipment requiring operators to make interpretive judgments beyond their training levels shall be avoided.								
96	3.2.3.3	Maintainability.	Maintainability features and guidelines for the different maintenance conditions shall be utilized as appropriate. The design for such equipment shall include the following requirements. a. Locate higher failure rate assemblies so as to minimize replacement impact on other equipment. b. Be operable and/or serviceable by fixed or mobile crane. c. Be positioned for visibility by plan view from remote viewing equipment. d. Be portable where feasible. e. Consider temporary installations and services. f. Minimize the number and standardize, to the extent practicable, handling fixtures such as yokes, hooks, grapples, etc. g. Have legible identification according to the facility numbering scheme. For that equipment used in radioactive areas, but of such high value as to warrant decontamination and repair (i.e., cranes), the design shall, include the following requirements. h. Have protective coatings resistant to		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed

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			decontamination solutions. i. Minimize contamination traps such as ledges and crevices. j. Be portable where feasible. k. Utilize standard fastening devices l. Utilize fastening devices of dissimilar metal to prevent galling. m. Be capable of post-repair qualification. For all equipment used in the facility, the design shall, include the following requirements as much as possible. n. Utilize standardized equipment and components. o. Position consumables for ease of access. p. Provide lay down and work space. q. Provide adequate lighting. r. Provide for safe isolation by mechanical separation, valving, or electrical disconnection.								
97	3.2.3.4	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 MCO/Cask service area. The size of the area reserved for decontamination should be reviewed to ensure small appropriate equipment can be decontaminated, inspected, or repaired.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements. The Baseline Design Verification checklist that is part of the Superstructure package indicates	Closed

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										that this space is available in the load in/Load out area as presented on drawing H-2-117795.	
98	3.2.4	Environmental conditions.	The SNF CSB shall be designed for the prevailing environmental conditions shown in Table 3.2.4. [Reference: WHC-SD-TP-RPT-004, Environmental Conditions for On-Site Hazardous Materials Packages (WHC 1992)] as required by their designated safety function and the natural phenomena hazards design basis accidents specified in 3.2.2.1.3.		X					Verified by IDR of Superstructure package, Tube and Plug package, and receiving crane package. IDR of structural calculations: CSB-S-0001A, CSB-S-0012, CSB-0024, & CSB-S-0029. Of these CSB-S-0029 covers a redesign of the building to encompass higher tornado loading criteria and also recalculates the seismic, wind, and volcanic impacts. The conditions indicated in Table 3.2.4 are bounded by those used in the structural calculations.	Closed
99	3.3	Design and construction.	The design and construction of the SNF CSB shall be in accordance with the regulations, orders, directives, codes, and standards listed in Section 2.0, "Applicable Documents".		X					Reviews that have been completed verified that this has been incorporated. The IDRs of the design packages have checklists that are used to ensure that the requirements have been incorporated.	Closed
100	3.3.1	General requirements.	The design and construction of the SNF CSB shall comply with the programmatic requirements established in SNF-RD-PM-001, Spent Nuclear Fuel Program Requirements Document (DOE 1994).		X					Reviews that have been completed verified that this has been incorporated. The IDRs of the design packages have checklists that are used to ensure that the requirements have been incorporated.	Closed
101	3.3.1.1	General safety requirement.	The safety of the public and the worker, and the protection of the environment shall be the primary considerations in the design, construction, startup, and operation of the SNF CSB.		X					Reviews that have been completed verified that this has been incorporated. The IDRs of the design packages have checklists that are used to ensure that the requirements have been incorporated.	Closed
102	3.3.1.2	Regulatory compliance.	The SNF CSB shall be designed, constructed, and operated in full compliance with applicable Federal, State, and local laws and regulations for the protection of the public and worker		X					Reviews that have been completed verified that this has been incorporated. The IDRs of the design packages have checklists that are used to ensure that the requirements have been	Closed

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			health and safety, and environment.							incorporated.	
103	3.3.1.3	Facilities authorization basis.	The SNF CSB shall be designed, constructed, and operated to modern industry standards promulgated for new facilities having equivalent functions within the commercial nuclear industry. The SNF CSB shall achieve nuclear safety equivalence to comparable NRC-licensed facilities as described in section 1.0.					X		Verified by Informal review in NRC equivalency assessment, HNF-4476.	Closed
104	3.3.1.4	Accident radioactive releases.	The SNF CSB shall be designed, constructed, and operated such that after a design basis accident, potential exposure to radiation shall be within regulatory requirements, as specified in applicable sections of 10 CFR 72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste (CFR 1994), Subparts E, F, G, and H.		X					Verified by licensing review on IDRs. The CSB FSAR (SNF-3553, Annex A) and CSB Design Basis Accident Analysis (SNF-3328) document the potential exposures from design basis accidents are within applicable limits.	Closed
105	3.3.1.5	Occupational radiological exposure.	The SNF CSB shall be designed, constructed, and operated such that worker radiation exposures during normal operation and anticipated operational occurrences are within regulatory requirements, as specified in applicable sections of 10 CFR 20, Standards for Protection Against Radiation (CFR 1994), and 10 CFR 835, Occupational Radiation Protection (CFR 1999). Actions shall be taken to achieve the fundamental goal of reducing worker exposures to ALARA in accordance with HNF-5173, PHMC Site Radiological Control Manual (DOE 2000) and Regulatory Guide 8.8, Information Relative to Ensuring that Occupational Radiation Exposures at					X		The ALARA Analysis -09 provides an assessment of the average and maximum potential exposures for the CSB and shows that the potential doses comply with these requirements.	Closed

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			Nuclear Power Stations Will be as Low as Reasonably Achievable (NRC 1978).								
106	3.3.1.6	Worker safety and industrial hygiene.	The SNF CSB shall be designed, constructed, and operated such that worker exposures to occupational safety hazards are within the requirements of 10 CFR 835, Occupational Radiation Protection (CFR 1993), 29 CFR 1910, Occupational Safety and Health Standards (CFR 1994), and DOE Order 5480.10, Contractor Industrial Hygiene Program (DOE 1985).		X					The ALARA Analysis -09 provides an assessment of the average and maximum potential exposures for the CSB and shows that the potential doses comply with these requirements.	Closed
107	3.3.1.7	Safety documentation.	Safety Analysis Reports (SARs) and Technical Safety Requirements (TSRs), or Technical Specifications (per NRC regulations) as appropriate, shall be developed to establish facility bases and to control SNF facility operations.		X					Verified by independent review of FSAR. HNF-3553. All AB documentation has been approved and implemented. Further document HNF-SD-SNF-DB-003 shows that NRC equivalency has been completed.	Closed
108	3.3.1.8	NEPA compliance.	The SNF CSB shall be designed, constructed, and operated in full compliance with the National Environmental Policy Act (NEPA), as specified by implementing regulations 40 CFR 1500-1508, Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (CFR 1986) (on a governmental basis) 10 CFR 1021, National Environmental Policy Act Implementation Procedures (CFR 1994) (for DOE), 61FR10736, Record of Decision: Management of Spent Nuclear Fuel from the K Basins at the Hanford site and DOE/EIS-0245F, Management of Spent Nuclear Fuel from the K Basin at the Hanford Site (DOE 1996). The		X					Verified by Independent review of SNF Record Of Decision (6450-01-P dated 3/4/96)	Closed

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			transloading of FFTF SNF shall be operated in compliance with DOE/EA-1185, Management of Hanford Site Non Defense Production Reactor Spent Nuclear Fuel (DOE 1997).								
109	3.3.1.9	Pollution prevention and waste minimization.	The SNF CSB shall be designed, constructed, and operated to integrate the fundamental goals of: 1) reducing through source reduction and recycling the total release of hazardous materials to the environment, 2) establishing site-specific goals for the reduction of the generation of all types of wastes and pollutants from site operations, and establishing operational restrictions to meet ALARA objectives for radioactive materials in effluents in accordance with DOE/S-118, Pollution Prevention Program Plan 1996 (DOE 1996).		X					Verified in IDRs of design packages. Note that some of these packages contain a verification checklist to specifically address requirements and have approval signatures, however, this is not true of all the design packages. Also the essence of this requirement, waste minimization, is displayed in the CSB FSAR (SNF-3553, Annex A) and through the CSB operational and administrative procedures that are currently in place.	Closed
110	3.3.1.10	Use of recyclable materials.	Recyclable materials shall be incorporated into the design of the SNF CSB to the extent practical in accordance with 40 CFR 247, Comprehensive Procurement Guideline for Products Containing Recovered Materials (CFR 1996).		X					While there is no specific reference to the incorporation of 40 CFR 247 or identification of recyclable materials in the design packages it is obvious from a comprehensive review of these packages that the use of recyclable materials into the CSB design has been accomplished.	Closed
111	3.3.1.11	Inherent and passive features.	The SNF CSB design shall incorporate inherent and passive features to preclude the need for active, manpower intensive operations to the extent feasible and with client approval.		X					Verified in IDR of the Vault and other design packages. Note that some of these packages contain a verification checklist to specifically address requirements and have approval signatures, however, this is not true of all the design packages. Also the specific design features that are related to safety are detailed in the CSB FSAR (SNF-3553, Annex A).	Closed
112	3.3.1.12	Defense-in-depth design	The SNF CSB design shall utilize the fundamental principles of defense-in-depth		X					The CSB FSAR (SNF-3553, Annex A) and CSER (SNF-CSER-005) outlines how the	Closed

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		approach.	(i.e., redundancy and diversity) to assure that critical safety functions are achieved and that multiple barriers to the release of radioactivity are provided.							defense in depth approach was used in the design of the facility.	
113	3.3.1.13	Site related hazard.	The SNF CSB shall be designed to industry standards for resistance to seismic events, floods, and other natural phenomena in accordance with 3.2.2.1.3.							See 3.2.2.1.3	Closed
114	3.3.1.14	Safeguards and security.	The CSBs security system's primary purpose is to provide reasonable assurance that breaches of security boundaries are detected and that assessment information is provided to protective force personnel. In addition, the system is utilized by Operations to support reduced personnel radiation goals and to provide reasonable assurance that only authorized personnel are allowed to enter and exit the designated security areas per DOE M 5632.1C-1, Manual for Protection and Control of Safeguards and Security Interests (DOE 1994).	X			X			Verified by FDR Security System and PAT-017. (See also 3.2.2.1.11.4) Validated in SNF-7028 Appendix "A".	Closed
115	3.3.1.15	Emergency planning.	The SNF CSB shall be designed with the goal to eliminate the need for off-site evacuation and sheltering.					X		Verified by Informal Review of Emergency Preparedness Hazards Assessment, HNF-6025. The Emergency Preparedness Hazards Assessment, HNF-6025, and the hazards assessment in the CSB FSAR, SNF-3553 Annex A, indicate compliance with this requirement.	Closed
116	3.4	Documentation management.	Formal documentation controls shall be used to assure that requirements are clearly defined and controlled and that the SNF CSB satisfies the technical, safety and operational needs.					X		Informal Review of SNF Configuration Management Plan, WHC-SD-SNF-CM-001.	Closed

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117	3.5.1	Maintenance planning.	Preventative maintenance shall receive primary focus when undertaking facility maintenance planning. The project Hanford Security Engineering and Maintenance organization will perform servicing and maintenance to the CSB security system.						X	Not a design requirement	N/A
118	3.5.2	Mockups for training.	The SNF CSB may provide mockups for training aimed at reducing radiological exposure and easy repair or replacement of components during workflow situations, as necessary.						X	Not a design requirement	N/A
119	3.5.3	Support equipment.	The SNF CSB shall provide limited space and some routine maintenance equipment located and sized to facilitate work.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
120	3.6.1	Personnel.	The CSB operational workspaces will be designed for adequate number of personnel to meet the process operational flow of materials and related support requirements.		X			X		Verified by IDR of Superstructure package and Informal review of Witness Model. HNF-SD-SNF-RPT-011. The model developed in HNF-SD-SNF-RPT-011 is based on the process flow sheets developed for the CSB activities. Therefore this report indicates compliance with this report.	Closed
121	3.6.2	Training.	There will be an operational training program in accordance with DOE Order 5480.20A, Personnel Selection, Qualification, Training,						X	Not a design requirement	N/A

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			and Staffing Requirements at DOE Reactor and Non-Reactor Facilities (DOE 1994). Retraining and recertification shall be part of the operator-training plan.								
122	3.7	Pre-operational and startup testing.	Pre-operation and startup testing of the SNF CSB shall be planned and conducted to assure proper performance of components and subsystems individually, and as part of overall facility performance according to DOE Order 425.1a, Startup and Restart of Nuclear Facilities (DOE 1998).						X	Not a design requirement	N/A
123	3.8.1	Decontaminatio n and decommissionin g.	The design of the SNF CSB shall include provisions to facilitate decontamination of structures and equipment, minimize the quantity of radioactive wastes and contaminated equipment, and facilitate the removal of radioactive wastes and contaminated materials at the time the SNF CSB is decommissioned.		X					A compliance review was completed as part of the IDR of the Superstructure package to ensure incorporation of design features from the performance specification. A detailed checklist is provided as part of the Superstructure package that indicates compliance for each of these items. Additionally specific aspects of the design relating to the eventual decontamination and decommissioning of this facility are addressed in the CSB FSAR (SNF-3553).	Closed
124	3.8.2	Criteria for decommissionin g.	Design guidance that facilitates eventual decommissioning shall be obtained from ANSI N300-1975, Design Criteria for Decommissioning of Nuclear Fuel Reprocessing Plants (ANSI 1975) and DOE Order 5820.2A, Radioactive Waste Management (DOE 1988). The principles listed below shall be employed to the extent practicable.		X					A compliance review was completed as part of the IDR of the Superstructure package to ensure incorporation of design features from the performance specification. A detailed baseline design verification is provided as part of the Superstructure package that indicates compliance for each of these items. Additionally specific aspects of the design relating to the eventual decontamination and	Closed

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			a. Filters shall be placed as near as practical to the source of contamination to minimize contamination of ductwork. b. Areas subject to contamination shall be designed to facilitate decontamination. Liners and coatings shall be selected to withstand decontaminating agents and radiation degradation throughout the life of the plant. c. Storage vault penetrations shall be designed to minimize technical and construction problems in the structural closing and sealing of these penetrations during decommissioning. d. Penetrations shall be waterproofed for protection during decontamination. e. Fixtures and outlets shall be sealed. f. Floors shall be monolithic, nonporous, and sloped to provide drainage. g. Drains and similar piping shall have physical provisions for cleaning. h. Piping systems shall be sloped and free of traps except as required for process isolation. i. Adequate overhead clearance shall be provided for remote transfer of equipment overinstalled piping.							decommissioning of this facility are addressed in the CSB FSAR (SNF-3553).	

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			j. Aisles shall be wide enough to facilitate movement of equipment.								
125	4.1	Quality assurance (General).	All contractors involved in the development, design, construction, and testing of the SNF CSB shall formulate and execute quality assurance program to provide the following assurances: a. performance requirements and design criteria are established and clearly understood, b. studies, analyses, and design decisions are fully documented, c. design meets performance requirements and design criteria, is complete and adequate, and is properly documented in the contractor specifications, drawings, and plans, d. construction is performed in accordance with the design, e. testing verifies compliance with performance requirements and design criteria, the adequacy of the design, the quality of construction and manufactured components, and the facility operability, maintainability, and reliability, f. traceability to the requirements of this specification is maintained throughout the development, design, construction, and testing of the SNF CSB.					X		The original reference was to the QAPP (SD-379-QAPP-001) which has since been cancelled. However this requirement is satisfied through the implementation of the SNF Configuration Management Plan (SNF-CM-001), as well as higher level documents SNF Project QA Program Plan (SNF-4948) and PHMC Engineering Requirements (HNF-PRO-1819).	Closed
126	4.1.1	Responsibility for quality assurance.	The SNF CSB contractors shall be responsible to plan, perform, and document quality conformance inspections, including those under the direct responsibility of subcontractors. The procuring activity reserves the right to access and to inspect work					X		The original reference was to the QAPP (SD-379-QAPP-001) which has since been cancelled. However this requirement is satisfied through the implementation of the SNF Configuration Management Plan (SNF-CM-001), as well as higher level documents	Closed

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			performed by the contractor and its subcontractors, as well as to separately perform additional inspections.							SNF Project QA Program Plan (SNF-4948) and PHMC Engineering Requirements (HNF-PRO-1819).	
127	4.1.2	Quality assurance requirements.	All quality assurance activities shall be in accordance with HNF-MP-599 Hanford Quality Assurance Description (1999) [10 CFR 830.120, Quality Assurance Requirements (CFR 1994)]and 10 CFR 72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High Level Radioactive Waste (CFR 1994), Subpart G, as applicable to satisfy U.S. NRC equivalency. Applicable Quality Assurance program requirements may be imposed through the use of Nationally recognized standards such as ASME NQA-1-1994, Quality Assurance Program Requirements for Nuclear Facility Applications (ASME 1994). A graded approach will be used for items important to safety in accordance with NUREG/CR-6407.					X		Verified by informal review of QAPP (WHC-SD- 379-QAPP-001).	Closed
128	4.1.3	Quality assurance of critical items.	Upgraded quality assurance requirements shall be applied to items identified as having high technical risk and to critical items. Critical items and the actions to prevent or mitigate their failure shall be identified by a comprehensive, systematic, documented evaluation of the design. Critical items include: a. SC and SS items as defined in Section 3.2.2.1.2.3.1 and 3.2.2.1.2.3.2 of this specification, b. items whose failure could cause failure of a SC or SS item,					X		The original reference was to the QAPP (SD-379-QAPP-001) which has since been cancelled. However this requirement is satisfied through the implementation of the SNF Configuration Management Plan (SNF-CM-001), as well as higher level documents SNF Project QA Program Plan (SNF-4948) and PHMC Engineering Requirements (HNF-PRO-1819).	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			c. items whose failure could result in extended downtime, significant program delay, or high recovery cost, d. high development, high-risk equipment.								
129	5	NOTES	General Information						X	Not Applicable	N/A
130	**Appendix A**										
131	1.1	Multi-Canister Overpack Welding Facilities/Equipment	The Multi-Canister Overpack (MCO) containing Reactor fuel from K Basins will be weld sealed following processing in the Cold Vacuum Drying Facility. This appendix describes the facilities, equipment, and process envisioned to conduct the welding of a canister cover cap assembly (cover cap, test plug, and cover plate) over the mechanical compression seal of MCOs.The MCOs will be welded at the Canister Storage Building (CSB) in the CSB annex. Upon arrival at the CSB, most MCOs will be transported to the welding stations by the Multi-Canister Overpack Handling Machine (MHM) where they will undergo an optional leak test of mechanical seals, and when verified as acceptable to proceed, the canister cover cap assembly will be welded to the MCO collar. Equipment shall be provided to cool the MCO welded surface before manual examination and testing of the closure welds. The successfully welded and examined MCO will then be transported by the MHM into a CSB standard storage tube for interim storage. Approximately six preselected, mechanically sealed MCOs will be stored with the canister cover cap off for short term monitoring.						X	Not Applicable	N/A

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
132	1.1.1	CSB Work Stations	The required sampling/weld stations are planned for location at the old Hot Conditioning System (HCS) process pits and will interface with the MHM. These stations receive the MCO and position the MCO for manned access around the MCO, manned preparation for welding, manned setup of the welding machine on the canister cover cap, manned examination of the MCO top surface and the weld passes, manned installation of the test plug, manned welding of the cover plate, and manned testing of the MCOs and welds-all after the MHM has departed. The welding stations will provide radiation shielding immediately around the MCO for personnel exposure control. Steel and concrete shielding are incorporated into the facility design to minimize exposure directly from the pit. Two workstations are equipped with all the equipment and utilities required within the process pits for MCO welding, examination, monitored MCO sampling operations and monitored MCO pressure sensor replacement, and monitored MCO reinerting with helium. The reinerting returns the MCO gas pressure to the pressure before sampling or before pressure sensor replacement. Two sets of the portable welding and weld testing components (provided by others - not CSB), one set of MCO gas sampling components, and the equipment for handling and controlling the processes that are to be located above the deck		X			X		Verified by FDR of Sample Weld Station and informal review of Witness Model (HNF-SD-SNF-RPT-011, Rev 1a).	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			will be provided at startup. The stations are to be designed in concert with the work station enclosure to adequately control off gas, any incidental loose contamination from the MCO, and to ensure appropriate cooling of a 776 watt MCO as necessary, while performing MCO gas sampling, gas pressure sensor replacement, helium reinerting, welding, and inspections. These stations include labyrinth shielding to reduce radiation streaming. The system will be equipped with a lower impact absorber to break the inadvertentdrop of a MCO.							
133	1.1.2	CSB Work Station Enclosures	These enclosures will be portable sampling and welding hoods which will be moved in after the MHM has deposited the MCO and departed. Provisions for hookup to ventilation equipment and to allow the ingress and egress of equipment to the MCOs is necessary. Adequate lighting and room for equipment installation are necessary inside the enclosure. The enclosure will be big enough to allow for the work described in this appendix to be properly accomplished. The enclosure ventilation system will be integrated with the design of the workstation to assure that any possible contamination is adequately controlled. Provisions for MCO gas pressure and skin temperature measurement, MCO gas sampling, handling the canister cover cap, welding machine head, leakage rate testing equipment, cooling of MCO top enclosure, and other tools must be considered in the work station design.	X			X			Verified by FDR Weld Station testing. Validated in SNF-7028 Appendix "A".	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
134	1.1.3	MCO Internal Gas Sampling/Verification Equipment	This equipment will be used to connect to the preselected MCOs and any other safety basis challenged MCOs used for gas pressure and gas composition testing at the CSB sampling/weld stations. The equipment shall be able to safely vent and reinert the MCO interior gas with fresh helium to the pressure before sampling or before pressure sensor replacement while inside the work station enclosure. This MCO Sampling/Verification equipment and sample results will be used to confirm nominal process operations are consistent with analytical predictions (models, testing, sampling). Key elements of the MCO monitoring are described in HNF-3312, Rev. 1, MCO Monitoring Activity Description (1998) and SNF-5536, Rev. 0, MCO Monitoring Plan (2000).	X			X			Verified by FDR Monitoring Equipment (EDT-629021) Qualification Test. Validated in SNF-7028 Appendix "A".	Closed
135	1.1.4	Canister Cover Cap Handling Fixture	A fixture will be provided to allow for pick up of the canister cover cap and placement of it on the prepared MCO at any of the two work stations.		X		X				Closed
136	1.1.5	Canister Cover Cap Welding Machine	In support of the previous baseline that assumed post-HCS welding of the canister cover cap, a gas tungsten arc automatic welder has been specified, procured, and some testing has been conducted. Follow on work is planned with the cover cap weld process development and qualification. The gas tungsten arc welder produces very high quality welds, with no smoke, spatter, or slag. Post weld cleaning is unnecessary. Closed-circuit Television monitors weld operation. Current planning		X		X				Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			considers that a subcontracted supplier will provide the welding equipment and perform the production canister cover cap welds.								
137	1.1.6	Canister Cover Plate Welding	The canister cover plate is welded to the canister cover cap using a manually operated gas tungsten arc welder. No smoke, spatter or slag is produced and post weld cleaning shall be limited to light brushing. Current planning considers that a subcontracted supplier will provide the welding equipment and perform the production cover plate welds.		X		X				Closed
138	1.1.7	Dye Penetrant Testing (PT) Equipment	Dye penetrant testing (PT) is planned for the several passes of the canister cover cap to collar weld joint and the cover plate to canister cover cap weld joint. The application of reagents, development, and reading of indications for the test will be done by manual, hands on, means with personnel beside the MCO. MCO temperatures will be regulated to < 50?C for the PT activity.		X		X				Closed
139	1.1.8	Leakage Rate Testing Equipment	PT and Leak Testing (LT) will be adequate for long term storage of the MCOs. After the weld is complete, the leakage rate of the weld joint will be determined. Leakage rate testing of the weld joint involves filling the cavity under the welded canister cover cap with helium, then trying to pull the helium through the weld joint into the outer test ring. This approach involves a penetration in the cover cap to introduce the helium to the cavity. The access penetration in the cover cap will be later sealed mechanically and seal welded.		X		X				Closed
140	1.1.9	Ultrasonic	The canister cover cap to collar welded joint is						X	Not a design requirement	N/A

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		Testing Equipment	designed for an ultrasonic (UT) inspection. However the UT inspection of the joint is not a requirement and is not planned.								
141	1.1.10	Equipment Utilities	The following equipment utilities are required to be available to service each of the two workstations for the monitored MCO sampling, monitored MCO pressure sensor replacement, welding, leakage rate testing. penetrant testing, possible ultrasonic testing activities, and other examination and/or testing. Helium gas supply (canister cover cap and cover plate back gas, leak testing, monitored MCO gas venting, and monitored MCO reinerting) Welding gas supply (Argon) Electric Power- (2ea.) 120 VAC, 1 phase, 20 amp circuit (1ea.) 480 VAC. 3 phase, 50 amp. Circuit Compressed air - 100 psig. Supply Cooling system to maintain MCO top surface temperatures < 500°C during gas sampling helium reinerting, post-weld testing, inspection and cleaning activities, and for worker safety.	X						Two work stations: CNN 1202 discussion 2.1 addresses that two sample weld stations will be provided and each will be capable of welding and sampling. Helium Gas Supply: The cask servicing system described in SNF-6154 Rev. 0 Section 2, uses a helium supply system to re-inert the MCO. Welding Gas Supply (Argon): Drawing H-2-119450 shows the Argon gas station orientation. Two 120 Vac circuits: There is only one 120 Vac circuit per weld station. One 480 Vac circuit: Drawing H-2-122740 sh. 1 & 2 shows at least one 480 Vac, three phase, 50 Amp circuit per Sample/Weld Station. Compressed Air: Specification SNF-6154 Rev. 0 Section 2.2.1 states that the distribution pressure of the Instrument/Plant Air System will range from 85-125 PSIG.	Closed
142	1.2	Applicable Documents	General Information						X	N/A	N/A
143	1.3	Technical Requirements	General Information						X	N/A	N/A
144	1.3.1	Definition	General Information						X	N/A	N/A

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
145	1.3.2	Interface Definition	The monitored MCO gas sampling and weld sealing operation is an internal function within the CSB and interfaces are included as part of the CSB operation.		X					IC-233	Closed
146	1.3.3	Operational Philosophy	The safety of the public, the safety of the worker and protection of the environment shall be the primary considerations in the redesign, construction, startup and operation of the CSB Annex. The redesign shall include As Low As Reasonably Achievable (ALARA) provisions to protect the public, worker, and environment from hazards associated with startup and operation of the monitored MCO gas sampling, monitored MCO gas pressure sensor replacement, helium reinerting, and canister cover cap assembly welding operations in the CSB Annex. Startup and operations shall maintain the CSB Annex within the CSB safety authorization and shall be conducted in full compliance with applicable Federal, State and Local laws and regulations. The MCO transfer, sampling, gas pressure sensor replacement, helium reinerting, and weld sealing operations shall be conducted efficiently. No lost time accidents shall be a primary goal. Exposures to radiation and toxic materials shall be held as low as reasonably achievable consistent with good industry practice and U.S. Department of Energy regulations and Orders.					X		ALARA Analysis -09 estimates the radiation exposure during operations at the CSB, specifically during receipt, cap weldment, and MCO staging (inclusive of validation monitoring). Further operational procedures are in place to ensure that work being performed follows a sequence of steps that are in compliance with the ALARA analysis that has been completed. Annex A of HNF-3553 (CSB FSAR) includes the accident analysis for the facility and the consequences to potential receptors both on-site and off-site.	Closed
147	1.3.4.1	House MCO Gas Sampling and Weld	The CSB Annex shall house the MCO gas sampling, gas pressure sensor replacement, helium reinerting, and welding operations	X						Verified By FDR Sample Weld Station	Closed

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		Sealing Operations	including the equipment and personnel (provided by others) required to perform these operations at 2 stations. Adequate space shall be provided for the sampling, welding and testing equipment, personnel and adequate clearance and access to equipment to enable the CSB Annex personnel to perform their duties in a safe and effective way.								
148	1.3.4.2	Accommodate MCO Gas Sampling and Welding Equipment	The CSB Annex shall provide accommodations for MCO gas sampling, gas pressure sensor replacement, and welding operations at 2 stations, local process control systems, process off gas system, process ventilation system and continuous air effluent monitoring equipment. Two sets of the welding, testing components (provided by others), MCO cooling, and one set of MCO gas sampling/sensor replacements components will be provided at start up. The equipment used for monitored MCO gas sampling will be used for venting, purging, and reinerting of the MCO during pressure sensor replacement.	X						Verified By FDR Sample Weld Station	Closed
149	1.3.4.3	Enable MCO Transfer	The CSB Annex shall enable the transfer of MCOs from the CSB service station and vault areas to any of the 2 sampling/weld stations in the CSB Annex, from one station to another, and from any of the 2 stations back to the CSB vault. The CSB Annex shall also enable the handling of supplemental shielding panels. This plan shall support the Spent Nuclear Fuel (SNF) removal campaign schedule for the K Basins.	X			X			Verified by FDR of the MHM and PAT-015-3. Validated in SNF-7028 Appendix "A".	Closed
150	1.3.4.4	Provide Support	The CSB Annex shall provide support facilities		X					Verified by independent design reviews of	Closed

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		Facilities	to enable functions to receive shipments of sampling, gas pressure sensor replacement, and welding equipment and supplies, and to ship solid wastes, independently of CSB receiving and shipping operations. In addition the CSB Annex shall provide adequate space to allow: a. the staging of solid waste, and b. storage of supplies							Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	
151	1.3.5.1	Design Life	The CSB Annex structure shall have a projected design life of 75 years. Systems or components needed to house and enable gas sampling, cooling of MCO top, gas pressure sensor replacement, helium reinerting, welding, and post welding of MCOs shall have minimum design life of 10 years. Criteria for the selection of systems and components shall include safety, operability, reliability, maintainability and life cycle cost.	X						Verified by FDR Sample Weld Station	Closed
152	1.3.5.2	Design Flexibility	The workstations shall be designed to facilitate integration with the CSB design and installation of the gas sampling, MCO cooling, gas pressure sensor replacement, helium reinerting, welding, and testing equipment as well as to enable the safe and efficient conduct of sample/weld/test operations. The CSB Annex redesign shall maintain the area south of the CSB Annex clear and free of encumbrances to allow future expansion and interface of the CSB with other users.	X						Verified by FDR Sample Weld Station	Closed
153	1.3.5.3	CSB Annex Reconfiguration	The redesign of the CSB Annex shall be based on the characteristics defined in this appendix and the criteria established in other sections of	X						Verified by FDR Sample Weld Station and informal review of Witness Model (HNF-SD-SNF-RPT-011, Rev. 2)	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			this document. Redesign of the CSB Annex for MCO gas sampling, MCO cooling, gas pressure sensor replacement, helium reinerting, and welding shall be consistent with design features and constraints of the CSB. The redesign and equipment layout of the CSB Annex shall provide adequate space for a maximum shift crew size of 4, adequate clearance between equipment, and adequate access to equipment to enable the crew to perform their duties in a safe and effective way. The redesign of the CSB Annex and design of new equipment shall be in accordance with applicable documents of Section 2.0.								
154	1.3.5.3.1	CSB Annex Access Road	Access to the CSB Annex shall be provided by extending the new CSB paved road to the CSB Annex in the southwest corner of the CSB. This road shall be designed as a 2-lane service road with an HS-20 load capacity to extend road access to the CSB Annex receiving and shipping area. The balance of the exterior area shall have gravel surface stabilization.		X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements. Further, there are several drawings that outline the planning and development of the access road, these are H-2-117071, -117072, -117073, and -117074. These drawings have been reviewed against the as-built road conditions and are accepted.	Closed
155	1.3.5.3.2	CSB Annex	The redesign of the CSB Annex and	X	X					Verified by FDR Sample Weld Station and	Closed

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		Substructure	design/installation/operation of new equipment for MCO sampling, MCO cooling, gas pressure sensor replacement, helium reinerting, and welding shall comply to the design loads and design criteria of the previous Hot Conditioning System Annex and shall maintain the seismic integrity of the CSB. In establishing CBS Annex loads and design criteria, consideration shall be given to the loads and design features required to accommodate the above operation at 2 stations and extension of the MHM rails the full width (north-south) of the CSB Annex.							Independent review of Weld Station Pit Seismic Analysis	
156	1.3.5.3.3	CSB Annex Operations Deck	The redesign of the CSB Annex and design/installation/operation of new equipment for MCO gas sampling, MCO cooling, pressure sensor replacement, helium reinerting, and welding shall comply to the design loads and design criteria of the previous Hot Conditioning System Annex and shall maintain the seismic integrity of the CSB. In establishing CBS Annex deck loads and design criteria, consideration shall be given to the loads and design features required to accommodate the above operations at 2 stations and extension of the MHM rails the full width (north-south) of the CSB Annex.	X	X					Verified by FDR Sample Weld Station and Seismic Analysis with IDR	Closed
157	1.3.5.3.4	CSB Annex Structure	The redesign of the CSB Annex and design/installation/operation of new equipment for MCO gas sampling, cooling of MCO top, gas pressure sensor replacement, helium reinerting, and welding shall comply to the design loads and design criteria of the previous	X	X					Verified by FDR Sample Weld Station and IDR of Seismic Analysis	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			Hot Conditioning System Annex and shall maintain the seismic integrity of the CSB. In establishing CSB Annex superstructure loads and design criteria, consideration shall be given to the loads and design features required to accommodate the above operations at 2 stations and extension of the MHM rails the full width (north-south) of the CSB Annex.								
158	1.3.5.3.5	CSB Annex Grounding Grid	The CSB Annex grounding grid has been designed to the criteria established for the CSB grounding grid and has been integrated with the CSB grounding grid. The 2-sampling/weld stations shall be tied to the available grounding grid.	X						Verified by FDR Sample Weld Station. Design drawings H-2-122736 sh. 1,2,3, & 4 shows the grounding plan/grid that is integrated with the CSB Annex service area ant the CSB facility.	Closed
159	1.3.5.3.6	CSB Annex Operation Deck Area HVAC	The CSB Annex operations deck has been designed to receive ventilation from the CSB operations deck area HVAC system. The necessary cooling, ventilation and High-Efficiency Particulate Air (HEPA) filtration capabilities for MCO gas sampling, cooling of MCO top, gas pressure sensor replacement, helium reinerting, and welding will be provided by the MCO sampling and welding equipment.					X		Verified by FDR Sample Weld Station	Closed
160	1.3.5.3.7	CSB Annex MHM Crane Rails	The MHM crane rails shall be extended to the CSB Annex so that the MHM can access each of the seven pits. The MHM shall be capable of transferring an MCO from the CSB service pit or vault to any of the 2 sampling/weld stations, from one station into another and from any of the 2 sampling/weld stations back to the CSB vault. The redesign of the CSB Annex shall provide adequate space and clearance for safe	X			X			Verified by FDR MHM and qualification tested in PAT-015-3. Validated in SNF-7028 Appendix "A".	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			operation of the MHM.								
161	1.3.5.3.8.1	CSB Annex I&C	Conduit and wire from the CSB control room shall be routed to a junction box located on the south wall of the CSB. The I&C equipment from the 2 sampling/weld stations of the CSB Annex shall be tied into the junction box and routed to the CSB I&C system. A CSB distributed control system shall provide monitoring, alarming, data logging and personnel interface of equipment.	X						Design drawing H-2-121240 sh. 1, 2, &, 3 show the instrument loop wiring from the MCO Sample/Weld Station to the DCS in the control room. PAT-015-001, -002, & -003 verifies that the DCS provides functions for the MHM which includes monitoring, alarming, data logging, and personnel interface with the equipment.	Closed
162	1.3.5.3.8.2	CSB Annex Communication	The CSB Annex shall be tied into the CSB communication system. Equipment shall be provided for integrated communication to the CSB Annex and between the control room and locations near the 2-sampling/weld stations. The CSB Annex communication system shall be designed to the needs of the CSB Annex maximum crew shift and design criteria established for the CSB and be consistent with the CSB design.	X						Refer to line item #66. Design drawing H-2-122747 sh. 1, shows the communication plan of the various areas of the CSB facility, including the CSB Annex service area.	Closed
163	1.3.5.3.8.3	CSB Annex Safeguards and Security	The CSB Annex shall meet the design criteria established for the CSB and will be integrated into the CSB safeguards and security system.	X						Verified by FDR of Security Concept and Design Criteria, "100% Design review for the Canister Storage Building and Hot Conditioning System Annex." Letter, E. S. McGinley, FDH, to F. G. Hudson, DESH, FDH-9655540 R1, dated May 19, 1997.	Closed
164	1.3.5.3.8.4	CSB Annex Lighting	The CSB Annex lighting system shall be designed to the illumination levels and criteria established for the CSB and shall be consistent with the CSB design. Supplemental lightening of the sample/weld station equipment will be provided as needed.	X						Refer to line item #67. Design drawing H-2-122742 sh. 1, 2, 3, & 4 show all the CSB facility lighting, witch includes the CSB Annex service area.	Closed
165	1.3.5.3.8.5	CSB Annex	The CSB Annex shall provide any instrument	X						Verified by FDR Sample Weld Station,	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		Instrument Air	air if necessary.							specifically see drawing H-2-123392.	
166	1.3.5.3.8.6	CSB Annex Electrical Power	The CSB Annex shall provide accommodations to facilitate integration of the CSB Annex electrical power (normal loads) with the CSB electrical power systems. A single point of connection shall be provided at the CSB main switchgear. Standby or uninterruptible power shall be provided as needed for monitoring of equipment.	X						The CSB Annex service area provides power via four MCCs to all the CSB facility. See design drawing H-2-122733, sh. 3.	Closed
167	1.3.5.3.8.7	CSB Annex Water and Sewage	No water or sewage systems are required for the CSB Annex.						X	N/A	N/A
168	1.3.5.3.8.8	CSB Annex Helium	The CSB Annex shall provide piping and tie into the CSB helium supply line to provide a source of helium to each of the 2-sampling/weld stations.	X						Refer to line item # 141. The cask servicing system described in SNF-6154 Rev. 0 Section two, uses a helium supply system to re-inert the MCO. CNN 1202 discussion 2.1 states that the two Sample/Weld Stations will be provided that will be capable of welding and sampling.	Closed
169	1.3.5.3.8.9	CSB Annex Argon	The CSB Annex shall provide piping and tie into an argon bottle supply to provide a source of argon to each of the 2-sampling/weld stations.	X						CNN 1202 of the FDR for the MHM implies that argon gas will be supplied, by stating that two weld stations with full capabilities will be provided. Also, design drawing H-2-119450 sh. 2 shows the argon gas manifold for the CSB facility.	Closed
170	1.3.5.3.10	Sampling/Weld Station Accommodations	The design of accommodations for the 2-sampling/weld stations shall be based on layouts, dimensions, utility services and loads. The design and layout of the accommodations for the 2-sampling/weld stations shall provide adequate space, clearance, and access to equipment to enable the crew to perform their duties in a safe and effective way. The accommodations shall permit concurrent	X	X					Verified by FDR of the Sample Weld Station package (specifically Conference Note 1202) and the Human Factors Evaluations (HFEs) completed in SNF-3907 and SNF-4831, both of which have been reviewed and approved. The HFEs only reviewed the design of the sample/weld stations and not the actual construction but found no deficiencies. Also the HFEs were the basis for the human factors	Closed

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			operation at the 2 stations using any combination of equipment systems for welding/weld testing, MCO gas sampling, cooling of MCO top, pressure sensor replacement, and helium reinerting, depending on operational requirements.							sections in the CSB FSAR (HNF-3553), which has been approved and implemented.	
171	1.3.5.3.11	CSB Annex Support Facilities	The CSB Annex shall provide support facilities within the CSB to support sampling/weld operations at 2 stations. Support facilities include, but are not limited to shipping and receiving area, staging area, solid waste staging area, liquid waste staging area, and supplies storage area.	X	X					Verified by independent design reviews of Superstructure Package: The independent design reviews were documented by conference number notes (CNNs) 1097, 1106, 1108, 1109, and 1110. The Superstructure Package consists of the drawings and specifications attached to CNN 1108. Project engineering reviewed the Superstructure Package to assure that it complied with the project requirements.	Closed
172	1.4	Quality Assurance	The quality assurance criteria established in Section 4.0 are applicable to the CSB Annex.							The original reference was to the QAPP (SD-379-QAPP-001) which has since been cancelled. However this requirement is satisfied through the implementation of the SNF Configuration Management Plan (SNF-CM-001), as well as higher level documents SNF Project QA Program Plan (SNF-4948) and PHMC Engineering Requirements (HNF-PRO-1819).	Closed
173	2.1	MCO Welding	Process information						X	N/A	N/A

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1	1	Scope	General Information						X		N/A
2	2	Applicable documents	General Information						X		N/A
3	3	Design Criteria	General Information						X		N/A
4	3.1	Environmental Conditions	3.1.1 The Spent Nuclear Fuels Canister Storage Building will house the MHM and all support systems. Air temperature within man-accessible work areas will be maintained for normal operating conditions for personnel access, as required in DOE Order 6430.1A. 3.1.2 The contact operated MHM will be exposed to climatic, design, and operating environment as follows.							DOE 6430.1A Division 1550, "Heating, Ventilating, and air-conditioning Systems", sub section 1.2.2, "Inside Design Temperature and Relative Humidifies" are where the requirements for Inside air temperatures are located. The HVAC system for the service area controlling the air temperature for man accessible areas was tested by SNF-W379-PAT-007, "Heating, Ventilating, and Air Conditioning Support Area".	Closed
			3.1.2.1 Climatic and Geographic Site Conditions a. Site Elevation: 708 feet above sea level. b. Barometric Pressure: 14.3 psia. c. Minimum Temperature: -27 °F. d. Maximum Temperature: 115 °F. e. Relative Humidity: 6 to 100%.	X						For a. through e., these climatic and geographic site conditions are in the performance specification HNF-S-0468 section 3.1.2.1, which was given to the MHM contractor to take into consideration for the designing, constructing, factory testing, and site testing of the CSB MHM. SNF-W379-PAT-006 verified operations of the MHM under these environmental conditions.	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			3.1.2.2 Operating Environment a. Normal Operating Temperature Range: 60 to 85 °F. b. Minimum External Design Temperature: 5 °F. c. Maximum External Temperature: 115 °F. d. Maximum Internal Cask Design Temperature: 220 °F. e. Design Relative Humidity: 5 to 95%	X						For a. through e., these climatic and geographic site conditions are in the performance specification HNF-S-0468 section 3.1.2.1, which was given to the MHM contractor to take into consideration for the designing, constructing, factory testing, and site testing of the CSB MHM. SNF-W379-PAT-006 verified operations of the MHM under these environmental conditions.	Closed
5	3.2	Detailed Design Criteria									
6	3.2.1.1		The crane system shall be designed, fabricated, manufactured, inspected and factory tested primarily in accordance with ASME NOG-1 Type I, except as noted in section 3.2.2.1(d). The site MCO hoist load test shall also be the governing load test for crane and trolley structures. In addition however, the requirements of applicable sections of Specification CMAA 70 shall also apply in case these are not already covered in ASME NOG-1 or are applicable only to the Owner/User of the crane. In case of conflict between this Specification and ASME NOG-1, including specifications referenced herein, the requirements of this Specification shall take precedence. ASME NOG-1 includes stipulations for the Buyer to specify additional ordering information, clarifications or exclusions. The	X				X		Interview with MHM Design Authority: The design authority of the MHM through the phases of the fabrication, manufacturing, inspection, and factory testing, verified that the MHM for the CSB satisfied these ASME NOG-1 Types-1 requirements. Questions that arose during construction on clarification of the requirements of the performance specification HNF-S-0468 including ASME NOG-1 requirements was clarified by document 00-SNF/CES-005, which this design authority developed.	Closed

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			paragraphs that follow are in reference thereto and must be read in conjunction with the matching sections in ASME NOG-1.								
7	3.2.1.2	Section NOG-1000, Introduction:	The shipping cask has less shielding ability than the MHM cask; therefore, the TID calculated for the Receiving Crane should be applicable for the MHM crane as well. Based on an analysis of the side exposure of the Receiving Crane a maximum rate of approximately 11 mR/h is obtained or about 4 X 103 Rad is the 40 year lifetime TID. This should be conservative since it is unlikely that the Receiving and MHM Cranes will experience a 40 year continuous work schedule.						X	N/A	N/A
8	3.2.1.3	Section NOG-3000, Coatings and Finishes:	The MHM Crane shall be coated to Category C, "Standard Industrial Practice," in accordance with Paragraphs NOG-3230 and NOG-3240. The final paint color for the structural crane components and bridge drive enclosures shall be Safety Yellow #13655 in accordance with FED-STD595. The colors of all other crane components shall be the Seller's standard colors.	X				X		Verified by Informal Review of NOG Compliance Matrix (SNF Internal Correspondence 00-SNF/CES-0005) and FDR of the MHM, see also NCR 97-PQA-021 R.1. Paint on girders (T.Z. Anderson).	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
9	3.2.1.4	Section NOG-4000, Structural Components	a. Paragraph NOG-4132 Live Loads TROLLEY (see note below) Rated Load, Plr (See note) Cask/turret, MCO, trolley plus miscellaneous. Critical Load, Plc (See note) The MHM does not have a critical load per the definitions of NOG-1. Construction Load, Pcn As applicable by Erector/Seller Credible Critical Load, Pco Not a requirement Credible Critical Load, Pcs Not a requirement NOTE: There is no main hoist. The bridge and trolley are continuously loaded by the dead weight of the cask/turret system and accessories. The cask handles the additional load, which is the 10.5-ton MCO, handled by its own grapple drive system. The MHM arrangement of dead weights does not match the definitions for Plr and Plc in NOG-4132.	X			X			a) Verified by FDR of the MHM and Qualification tested by W379-PAT-015-2. Also, validated in SNF-7028 Appendix "A" Requirement number 62.	Closed
			b. Paragraph NOG-4134, Wind Load: See Section 3.4.						X	b) See Section 3.4. Not applicable.	N/A

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			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		c. Paragraph NOG-4152, Seismic Input Data: The in-structure response spectra for a Design Basis Earthquake (DBE), which is equivalent to a Safe Shutdown Earthquake (SSE) in NOG-1, as shown in Appendix B, Figures 1 and 2, and shall be used in the analysis for the crane.	X	X					The instructor response spectra provided in HNF-S-0468 figure B-1 & B-2 has been used in the document # ESL/R(96)083 Rev. 3, August 1998, "Hanford MHM Seismic Analysis of the Hanford MCO Handling Machine".	Closed
		d. Paragraph NOG-4153.5, Decoupling Criteria: The MHM Crane and Cask system is different from the usual gantry system in that the crane can be restrained at the MHM Cask as well. A seismic analysis shall be performed using the seismic response spectra in Appendix B. The horizontal displacement of the nose of the cask relative to the operating deck shall be limited to prevent damage or shear of a MCO when partially inserted in a storage tube during a seismic event. The vertical relative displacement of the nose with respect to the operating deck shall be accommodated by design to prevent the cask from hammering onto the operating deck during a DBE.	X	X					The in-structure response spectra provided in HNF-S-0468 figure B-1 & B-2 has been used in the document # ESL/R(96)083 Rev. 3, August 1998, "Hanford MHM Seismic Analysis of the Hanford MCO Handling Machine". The seismic analysis was performed with the assumption that all active seismic restraints are engaged and the passive restraints are in contact with the rails. The combination of the vertical and horizontal seismic accelerations have been analysis to assure that the MCO is not sheared when partially inserted into a storage tube and that the MCO will not hit down on to the operating deck during a postulated seismic design base event (DBE).	Closed
		e. Paragraph NOG-4153.8, Damping Values: A damping value of 5% of critical damping shall be used for the initial crane analysis. The seismic analysis at 7% of critical damping shall be the governing criteria in accordance with NOG-4153.8.	X	X					The seismic analysis ESL/(96)083 Rev. 3 August 1998, uses input response spectra for 7% damping. The input response spectra for 7% damping was taken from reference (1a) of ESL/R(96)083 Rev. 3.	Closed

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			f. Paragraph NOG-4457, Gantry Stability: The MHM Crane system shall be stable against overturning during a seismic occurrence in accordance with the requirements as stated.						X	N/A There is no uplift on the bridge truck restraints from seismic analysis ESL/R(96)083 Rev. 3.	N/A
			g. Paragraph NOG-4470, Foot walks, Handrails, Platforms, etc: The Seller shall provide operations and maintenance platforms for in-situ servicing of trolley based drives, including drives associated with the cask/turret system. Access to the trolley platform from the operating floor shall be by a ladder preferably attached to the south-west gantry leg. Alternate ladder location will be submitted to Buyer for approval.	X						The 100% design report (or FDR) from MHM contractor section 1-2, executive summary, states that the FDR complies with the contract specification reference HNF-S-0468, revision 4 (dated Dec. 1997). The MHM DA worked closely with the MHM contractor during design, fabrication, factory testing, construction, and site testing to assure that the requirements of HNF-S-0468 were met.	Closed
10	3.2.1.5	Section NOG-5000, Mechanical	a. Paragraph NOG-5111(a), Load Spectrum: The load spectrum shall be in accordance with Specification CMAA 70, Class D.	X						Calculation 493/1 from ALSTHOM uses load spectrum that is in accordance with specification CMAA -70 Class D.	Closed
			b. (deleted)						X	N/A	N/A
			c. Paragraph NOG-5332.1, Trolley Speeds: The rated load trolley speed shall be 40 FPM with a tolerance of ±10%. A variable speed control shall be provided with a creep speed capability of 1.0 FPM for 1 hour.	X			X			Verified in FDR of MHM and W379-PAT-015-3. Also, validated in SNF-7028 Appendix "A" Requirement number 63.	Closed
			d. Paragraph NOG-5333.1, Bridge Speeds: The rated load bridge speed shall be 40 FPM with a tolerance of ±10%. A variable speed control shall be provided with a creep speed capability of 1.0 FPM for 1hour.	X			X			Verified in FDR of MHM and W379-PAT-015-3	Closed
			e. (deleted)						X	N/A	N/A
			f. (deleted)						X	N/A	N/A
			g. (deleted)						X	N/A	N/A

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		h. (deleted)						X	N/A	N/A
		l. Paragraph NOG-5430(a), Trolley Drives: Single failure-proof features for the trolley drive will not be required.						X	N/A	N/A
		j. Paragraph NOG-5440(a), Bridge Drive: Single failure-proof features for the bridge drive will not be required.						X	N/A	N/A
		k. Paragraph NOG-5452, Wheels: The bridge wheels shall be designed to run on 175# UNTREATED crane rails which will be furnished and installed by others in accordance with Paragraph NOG-4160.	X				X		Verified in FDR of MHM, and Informal Review of NOG-1 Compliance Matrix (SNF Internal Correspondence 00-SNF/CES-005)	Closed
		l. Paragraph NOG-5455.1(b)(3), Bearings: Anti-friction bearings shall have an AFBMA L-10 life of minimum 20,000 hours.	X				X		Verified in FDR of MHM, and Informal Review of NOG-1 Compliance Matrix (SNF Internal Correspondence 00-SNF/CES-005)	Closed
		m. Paragraph NOG-5458.1(a), Bridge Stops: The bridge stops that will be contacted by the bumpers will be furnished and installed as shown on Drawing H-2-120913. The track-type limit switches, see ParagraphNOG-5459.1(e), shall be positioned and bridge bumpers sized so as to limit impact loading on the stops to a maximum of 6000 lbs.	X						Drawing set H-2-120916 sh 1 through 7, "Receiving Crane/MHM Anti-Collision System", have been as-built, DCNs incorporated, and signed off June, 2000. This system has been qualification tested by W379-PAT-015-3.	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
11	3.2.1.6	Section NOG-6000, Electrical Components	a. General: All electrical requirements shall be in accordance with Section NOG-6000, with exceptions and clarifications described below.	X	X					Compliance review of MHM ASME NOG-1 was completed May 2000 on project W-379. The resulting compliance matrix appears in document 00-SNF/CES-005. During the construction phase there were questions about how to meet subsections of NOG-6000, "Electrical Components". Those questions resulted in the applicable NOG electrical requirements to the project, to be clearly stated with an explanation as to how the requirements were met. Listed here are the NOG Electrical Sections in the compliance matrix: NOG-6300/Performance Specifications, NOG-6320/Hoists, NOG-6330/Bridge, NOG-6341/Trolley, NOG-5331/Hoist Speeds, NOG-6416/Adjustable Voltage AC, NOG-6416.1/Hoist, NOG-6414/Constant Potential AC, NOG-6447/Bridge and Trolley Overtravel Limits, NOG-6450/Crane Controls, NOG-6452/Contact ratings, NOG-6453/Voltage Ratings, NOG-6454/Radio Controls, NOG-6462/Light Fixtures, NOG-6465/Convenience Outlets, and NOG-6482.1/Runaway Systems.	Closed

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		b. Paragraph NOG-6310 Performance, General: In addition to the requirements of Paragraph NOG-6320, NOG-6330, and NOG-6340, the hoist, bridge and trolley drives will require stepless variable speed control for the speed ranges. Control of creep speeds shall be possible for a duration of at least 1 hour. Specification section 16610 is also required	X			X			Verified by FDR of MHM and qualification tested by W379-PAT-015-3. Also, validated in SNF-7028 Appendix "A" Requirement number 65.	Closed
		c. Paragraph NOG-6416, Adjustable voltage ac: The preferred speed control system for hoist and travel is the Flux Vector Control or equal.	X			X			Verified by FDR of MHM and qualification tested by W379-PAT-015-3	Closed
		d. Paragraph NOG-6447, Overtravel Limit Switches: In addition to bridge and trolley overtravel limit switches the MHM Crane shall be hard contact wired for collision prevention.	X						This requirement arose during construction. The explanation for meeting these overtravel limit switch requirements from the DA were given in the ASME NOG-1 compliance matrix 00-SNF/CES-005, page 21 of 62. Throughout the construction process the DA worked closely with the design installation contractor to assure that they met these ASME NOG-1 requirements. Review-comment-records (RCRs) from the DA are attached to the FDR of the MHM.	Closed

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		e. Paragraph NOG-6450, Crane Controls: The MHM (Crane and Cask/Turret system) shall be provided with an all-encompassing control console.	X						This requirement arose during construction. The explanation for meeting these light fixtures requirements from the DA were given in the ASME NOG-1 compliance matrix 00-SNF/CES-005, page 22 of 62. Throughout the construction process the DA worked closely with the design installation contractor to assure that they met these ASME NOG-1 requirements. Review-comment-records (RCRs) from the DA are attached to the FDR of the MHM.	Closed
		f. Paragraph NOG-6462, Light Fixtures: The MHM Crane trolley operator area shall be provided with emergency light fixtures for operator evacuation. Normal visual access for operators for cask/turret operations shall be provided by the CSB facility lighting.		X					This requirement arose during construction. The explanation for meeting these light fixtures requirements from the DA were given in the ASME NOG-1 compliance matrix 00-SNF/CES-005, page 22 of 62. Throughout the construction process the DA worked closely with the design installation contractor to assure that they met these ASME NOG-1 requirements. Review-comment-records (RCRs) from the DA are attached to the FDR of the MHM.	Closed
		g. Paragraph NOG-6465, Convenience Outlets: Convenience outlets to support maintenance and repair work on the MHM are required.		X					This requirement arose during construction. The explanation for meeting these convenience outlets requirements from the DA were given in the ASME NOG-1 compliance matrix 00-SNF/CES-005, page 24 of 62. Throughout the construction process the DA worked closely with the design installation contractor to assure that they met these ASME NOG-1 requirements. Review-comment-records (RCRs) from the DA are attached to the FDR of the MHM.	Closed

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		h. Paragraph NOG-6482.1, Runway Conductor System: The Seller shall supply a cable festooning system, including the festoon track beam and tow arm to the crane, in accordance with ASMENOG-1 and Seller furnished wiring diagrams. The festoon system shall support 480 V power, control conductors and pneumatic hoses. Structural support brackets for attachment of the Seller supplied track beam will be furnished and installed by others as shown on DrawingH-2-120903. The support brackets have been designed for a maximum load of 2500lbs exerted by an I-beam, size S 6x12.5 or lighter, to be used for the festooning trolleys. Attachment details for the I-beam shall be as shown on Drawing H-2-120903. One electrical junction box will be provided by others as shown in Drawing H-2-120903.		X					This requirement arose during construction. The explanation for meeting these runway systems requirements from the DA were given in the ASME NOG-1 compliance matrix 00-SNF/CES-005, page 24 of 62. Throughout the construction process the DA worked closely with the design installation contractor to assure that they met these ASME NOG-1 requirements. Review-comment-records (RCRs) from the DA are attached to the FDR of the MHM.	Closed

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		The electrical wiring, components, materials, installation, and connections shall be in accordance with Specification Section W-379-C-CSB-16610, Electrical Requirements for Packaged Equipment, which includes requirements in materials and equipment, fabrication and manufacturing, and inspection testing. In addition, listed below are the submittals required per W-379-C-CSB-16610.		X					Specification HNF-S-0468 Revision 5, CSB MHM, Section 8, Submittals: Contains all the following submittal requirements that are within supplemental Specification W-379-C-CSB-16610, Electrical Requirements for Packaged Equipment. These required submittals meets the requirements of this specification and are in the MHM Vendor Information (VI) File 50100, except for Megger and Continuity test records of wiring, for the MHM packaged equipment. A UL equivalent certification was provided. Accept Green Card from FH/AVS for the CSB MHM Specification HNF-S-0468, from Foster Wheeler was signed October 2, 2000. Inspection and UL acceptance for all electrical devices and systems was also done.	Closed
		Submittal of outline drawing showing the location of all major electrical equipment, including junction boxes, motors and conduit, with all applicable device ratings. Location and size of Buyer's conduit connections shall be shown.		X					Refer to HNF-S-0468 Section 8.7.4.1.	Closed
		Submittal of Elementary Diagrams for all circuits.		X					Refer to HNF-S-0468 Section 8.7.4.3.	Closed
		Submittal of connection diagrams for all electrical equipment. Diagrams shall include equipment ID numbers, terminal block location and identification and wire numbers.		X					Refer to HNF-S-0468 Section 8.7.4.5.	Closed

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			Submit of Bill-Of-Materials to include the name of the manufacturer and catalog number of all electrical devices.		X					Refer to HNF-S-0468 Section 8.7.4.6.	Closed
			Submittal of receiving, storage and handling instructions to include inspection and checkout tests.		X					Refer to HNF-S-0468 Section 8.7.5.11.	Closed
			Submittal of operation and maintenance manual in accordance with specification W379-C-CSB-01730, Operation and Maintenance Data.		X					Refer to HNF-S-0468 Section 8.7.5.1.	Closed
			Submittal of manufacturer's installation manual.		X					Refer to HNF-S-0468 Section 8.7.5.25.	Closed
			Submittal of certified Test reports for Factory Acceptance Tests per W-379-C-CSB-16610 section 2.3, which includes Continuity Tests, and Insulation Resistance Test.		X					The meggering and continuity test records for the MHM packaged electrical components were not located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, The prerequisite section of each of the PATs W-379-PAT-015-01, -02, -03 has a signature signoff for all the prerequisites being met before performance of the PAT. Also, each of the PATs passed and the associated MHM Test Result Packages accepted. Which indicates that there are no broken or shorted wires or cables. Therefore, at this point in time there is little risk in not having these particular submittals. Shop and field wiring, devices, and systems had UL inspection and acceptance.	Closed
			Submittal of recommended spare parts list.		X					Refer to HNF-S-0468 Section 8.6.	Closed
12	3.2.1.7.a	Supplemental Requirements not	a. Design Life: Non-replaceable parts shall be designed or selected for a design life of 40						X	N/A	N/A

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		Covered in ASME NOG-1.	years.								
13	3.2.1.7.b	Supplemental Requirements not Covered in ASME NOG-1.	b. Crane Coverage Area and Lift: The crane shall meet requirements for cask coverage area, and lifts as shown on DrawingsH-2-120900 and H-2-120903.	X			X			Verified by FDR on MHM and qualification tested by W379-PAT-015-3. Also, validated in SNF-7028 Appendix "A" Requirement number 67.	Closed
14	3.2.1.7.c	Supplemental Requirements not Covered in ASME NOG-1.	c. Anti-Collision Limit Switches: As shown on DrawingH-2-120900, the coverage areas of the MHM and the Receiving Crane overlap. Inadvertent collision involving the 2 cranes must be prevented. This shall be accomplished using limit switches to match an adjustable 12-inch wide buffer zone just outside of the overlap-zone and alongside the trolley tracks that support the festooned conductor cables. Devices attached the facility to strike the MHM limit switches will be provided by Others. Interlocks and limit switches for the anti-collision system shall be designed single-failure proof. The single-failure proof design shall include appropriate redundancy and consider diversity (depending on reliability) to minimize the possibility of common mode failures of redundant items. Single-failure proof, redundancy, and diversity shall be as described in Item A , Appendix C. Multiple failures resulting from a single occurrence are considered to be a single failure. A description of the features provided to satisfy the requirements of single-failure proof design	X			X			Verified by FDR on MHM (H-2-120916) and qualification tested by W379-PAT-015-3. Also, validated in SNF-7028 Appendix "A" Requirement number 68.	Closed

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			shall be submitted to the Buyer for review. Passive structural components must be assumed to fail unless designed to withstand the DBE.								
15	3.2.1.7.d	Supplemental Requirements not Covered in ASME NOG-1.	d. Collision Avoidance System: The MHM shall be provided with a detection system (e.g., electric eyes, radar sensors, contact sensing bumpers, etc.) which are electrically interlocked with the bridge and trolley drives to avoid inadvertent collision with objects left standing on the operating floor. This collision avoidance system shall be designed such that neither the crane nor the cask will collide with any objects taller than 2 inches. This 2 inch height is based on the elevation of the bottom of the Turntable Assembly above the floor with the Retractable Shield Skirt raised. This collision avoidance system is in addition to the anti-collision system described in Para 3.2.1.7.c.	X			X			Verified by FDR on MHM and qualification tested by W379-PAT-015-1. Also, validated in SNF-7028 Appendix "A" Requirement number 69.	Closed
16	3.2.1.7.e	Supplemental Requirements not Covered in ASME NOG-1.	e. Rail-Frogs: As shown on Drawing H-2-120904, the runway rail system must include rail-frogs. The Seller shall adhere to the dimensions for wheel and seismic restraints as shown on Drawing H-2-120904 and the tolerances specified in Paragraph NOG-5452.1. The dimensions for wheels and seismic restraints shown on DrawingH-2-120904 are based on allowable lateral crane displacements of 3/8 inch per side or 3/4inch total. Rail frogs are shown on drawing H-2-120901.	X						Design drawing H-2-120904 Rev. 0, which shows the rail frog design, was proved for construction July, 1996. October, 1999 revision 1 of this drawing was signed off that incorporated DCN-046, DCN-084 Rev. 2, DCN-120 Rev 3, and RFI-1276.	Closed
17	3.2.1.7.f	Supplemental	f. Electric motors shall be in accordance with	X						This requirement for electric motors is	Closed

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		Requirements not Covered in ASME NOG-1.	Specification Section16150, Motors-Induction. The electrical wiring, components, materials, installation, and connections shall be in accordance with construction specification 16610, Electrical Requirements for Packaged Equipment.							redundant and covered in miscellaneous motor specification section 3.2.3.39. This requirement for packaged equipment is redundant and covered in crane specification section 3.2.1.6.	
18	3.2.1.8	Crane Height:	The crane box beam height shall be such that there is 9'-0" of nominal clearance between the operating deck and the bottom of the crane beams.	X			X			Verified by FDR on MHM and measured during Installation Component Test Package.	Closed
19	3.2.2.1.a, .b, & .c	MHM Cast/Turret System	The MHM cask/turret system shall be permanently mounted on the trolley. The MHM Cask/Turret system shall include but is not limited to the following:	X						Validated in SNF-7028 Appendix "A" Requirement number 71.	Closed
			a. The method of attachment of the cask to the cask trolley shall be the responsibility of the supplier. The hoisting system operational rating shall be governed by 80% of the site test weight that can be enclosed in the cask. b. (deleted) c. (deleted)	X			X			Verified by FDR on MHM and qualification tested by W379-PAT-015-2. Also, validated in SNF-7028 Appendix A requirement #71. Hoist shop tested to 123% of 12-ton rating and site retested to 107% per ASME B30.2.	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
20	3.2.2.1.d.1, .2, .3, .4, .5, .6, .7, & .8	MCO Hoist System	d. The MHM cask/turret shall be equipped with a 15 ton design capacity CMAA-70 Class D hoisting system of which the "below-the-hook" design capacity of the grapple is 12 tons. Specific operational rating will be according to ASME/ANSI B30.2a section 2-2.2.2(d) and the Manufacturer's recommendations, but not more than the design capacity of 12 tons. Unless approved otherwise by the Manufacturer, the hoist rating will be 80% of the site test weight. The purpose of this hoist is to raise and lower the MCO, a faulty Shield Plug and the impact absorber. This hoist system shall have the following performance features:	X			X			Verified by FDR on MHM and qualification tested on W379-PAT-015-2. Also, validated in SNF-7028 Appendix A requirement #72.	Closed
			1) The hoist shall have a hoisting range from a full up position to a down position such that the grapple can access the bottom of the storage tube (elevation 667'--5-1/2").	X			X			Verified by FDR on MHM and qualification tested on W379-PAT-015-3.	Closed
			2) The MCO hoist shall have lifting and lowering speeds from 0to5.5 ±0.5 ft/min and a combined MCO load and force of acceleration not to exceed the maximum weight of the MCO plus 1000 lbs. The weights of all MCOs will not be the same.	X			X			Verified by FDR on MHM and qualification tested on W379-PAT-015-3.	Closed
			3) (deleted)								
			4) If regreasable bearings are used on the hoist the bearings shall have the capability to be greased through flexible tubes from fittings outside the hoist enclosure. Waste grease shall not be allowed to accumulate in side hoist enclosure.						X	The MHM hoist system does not have regreasable bearing inside the hoist enclosure.	N/A
			5) (deleted)								

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			6) The hoist shall have high and high-high and low limit switches.	X						Verified by FDR on MHM and qualification tested on W379-PAT-015-3	Closed
			7) Motor electrical power rating shall be 480V/3-phase/60 Hz.	X						The FDR of the MHM indicates that all motors are 480-Vac 3-phase 60 Hz.	Closed
			8) The MHM cask and MCO hoist shall be capable of handling the standard impact absorbers as shown on Drawing H-2-120142. The MHM cask shall be designed for a minimum of 40 years life. This life span shall be with normal maintenance as specified in the Seller's Operation and Maintenance Manual.						X	N/A	N/A
21	3.2.2.1.d.9	MCO Hoisting System	9) The MCO hoisting system shall meet the following additional requirements: a. Since the MCO grapple operates inside the cask it will be necessary that the hoist's revving system be located inside as well. The design layout shall have an arrangement whereby the drive train system components remain outside of the cask for enhanced maintenance access. The hoist enclosure shall have access and inspection ports. Lighting for the hoist enclosure shall be provided for inspection and maintenance of internal components and wire rope.	X						Vendor drawings 362A0578 and 362A0826 show the design layout, access points and inspection ports.	Closed
			b. The hoisting system shall incorporate redundant load holding brakes with sufficient capacity to hold the rated load independently of each other and of the load control brake.	X			X			Verified by FDR on MHM and W379-PAT-015-2	Closed

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			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		c. The hoisting system shall incorporate a mechanical or power control braking means (i.e. regenerative, dynamic, counter torque, etc.) for controlled lowering of the load with a capacity to stop and hold the rated load independently of the load holding brakes.	X			X			Verified by FDR on MHM and W379-PAT-015-2. Also, validated by SNF-7028 Appendix A requirement #76.	Closed
		d. For emergency measures involving a failed hoisting system the design shall include the following:								
		(1) Manual emergency release system for the brakes in support of emergency hand wind operations.	X						Verified by FDR on MHM and W379-PAT-015-2, step 9.3.2.17.	Closed
		(2) A hand wind drive for raising and lowering of the rated load by an operator in case of an emergency. Control of the MCO shall be maintained at all times during an emergency and not be dependent on exceptional strength or dexterity of the operator.	X			X			Verified by FDR on MHM and W379-PAT-015-1	Closed
		(3) A grapple elevation position indicating system that is visually accessible from the same location where the emergency hand wind is operated.	X						Verified by FDR on MHM and W379-PAT-015-1	Closed
		e. The hoisting system shall be designed to CMAA-70 and so that no credible single failure will result in the loss of capability to stop and hold the MCO. A failure modes and effects analysis for the hoisting system (MCO hoist, grapple, and wire rope) shall be performed using MIL-STD-1629A as a guideline.	X						Verified by FDR on MHM and W379-PAT-015-2	Closed
		f. The hoisting system design and manufacturing shall meet the requirements of ASME/ANSI NQA-1.		X					QA source inspection complete of purchase of MHM on purchase order # 452656/244.	Closed

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			g. The grapple and its connections shall be designed as critical devices in accordance with ANSI N14.6.	X						The FDR of the MHM, Turret Design Calculation Manual contains ALSTHOM calculation # 490/1 (ESL/R(96)099).	Closed
22	3.2.2.1.e	Weighing Device	e. A weighing device shall be provided for determining the weight suspended from the lower block (grapple support, grapple and load/no load). Operation of the hoist drives shall be in accordance with section 3.2.2.1.d.2 and accomplish the following:	X						Verified by FDR of MHM and qualification tested in W379-PAT-015-2.	Closed
			1) When the hoist is lowering the weighing device shall stop the hoist when the indicated weight is less than the weight of an impact absorber, a tube plug, or the lowest projected partial weight MCO, depending on the mode of operation. This feature is to prevent play out of additional cable if the load/grapple should hang up or reaches its resting position. If the weighing device stops the hoist from this underload a lock out shall be engaged which will prevent further use of the crane, except for raising the load, until a key operated reset is activated on the panel.	X			X			Verified by FDR of MHM and qualification tested in W379-PAT-015-1. Also, validated by SNF-7028 Appendix A requirement #78.	Closed
			2) When the hoist is lifting a load (MCO grapple engaged) this weighing device shall stop the hoist when the indicated load is 1000 lbs. over its heaviest normal load or greater. If the weighing device stops the hoist, a lock out shall be engaged which will prevent further use of the crane until a key operated reset is activated on the control panel.	X			X			Verified by FDR of MHM and qualification tested in W379-PAT-015-1. Also, validated by SNF-7028 Appendix A requirement #79.	Closed

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			3) If the weighing device stops the hoist, a lock out shall be engaged which will prevent further use of the crane, except for lowering the load, until a key operated reset is activated on the control panel.	X			X			Verified by FDR of MHM and qualification tested in W379-PAT-015-2. Also, validated by SNF-7028 Appendix A requirement #80.	Closed
			4) The weighing device system shall have an accuracy of ± 5% of maximum rated load.	X			X			Verified by FDR of MHM and qualification tested in W379-PAT-015-2. Also, validated by SNF-7028 Appendix A requirement #81.	Closed
			5) The weighing device shall have a normal load limit of 50,000lbs and a static overload capacity of 150% of the normal load. The weighing device and associated weighing system shall have be periodically verified against a calibrated load verification system. Loads shall be replaceable.	X			X			Verified by the FDR of the MHM. Load tested in PAT-015-2; ECN 663439 has been initiated to change the normal load limit to 30,000 pounds.	Closed
23	3.2.2.1.f, g	MHM Cask/Turret Inside Space	f. The MHM cask/turret inside space shall accommodate an MCO overpack. The handling of an overpack would occur for the off-normal condition where it became necessary to overpack a leaking MCO. A special grapple for the overpack MCO shall be provided by others, if required. The bounding parameters for the over packed MCO were as listed below. MCO Overpack handling is not currently required. 1) Height: 170 inches 2) Weight: Maximum of 12 tons 3) Diameter: The cask ID shall be a minimum of 27 inches. g. (deleted)	X						Vendor drawing 362A0551 incorporates these enveloping dimensions.	Closed
24	3.2.2.2	Grapple	A grapple shall be used to attach the MCO to the MHM cask hoisting system. A cable reel	X						Vendor drawing 362A0578 is of the cask hoisting system and 362A0866 of the	Closed

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			shall supply compressed air for operating the grapple (engaged/disengaged) and signals from the indicator switches on the grapple.							compressed air system, which incorporates these requirements.	
25	3.2.2.3	HEPA	The MHM cask shall be equipped with a Cask Extract system consisting of a single fan and HEPA filter unit. a. The Cask Extract system shall be capable of developing continuous air flow in the normal mode within the cask with the turret system engaged with the storage tube or service pit. The control system shall have an alarm if high differential filter pressure is detected.	X			X			Verified by FDR of MHM and qualification tested in W379-PAT-015-3. Also, validated by SNF-7028 Appendix A requirement #82. Vendor drawing 376A0863.	Closed
			b. (deleted)						X	N/A	N/A
			c. The HEPA filter shall be of nuclear grade Flanders® stainless steel R2 size B units with neoprene gaskets located outside the flange perimeter at both ends or equal. The filters shall be designed to ASME N509. They shall be constructed and tested in accordance with IES-RP-CC-001.3, ASME N510, and UL 586 listed.	X						Vendor drawing 362A0863 shows HEPA filter. Compliance review SNF-7109 and SNF-7475 were completed.	Closed
			d. The fan shall be directly connected to a 480v/3ph/60Hz motor capable of producing a continuous air flow in the Cask/Turret . Certified fan performance curves shall be provided. Both inlet and discharge ports shall be equipped with 1-1/4-inch NPSC flanges. Fans shall be Rotron® DR 353 blowers with 4-pole motors or equal.	X			X			Verified by FDR of MHM and tested in CTP to be performed	Closed
			e. (deleted)						X	N/A	N/A
			f. (deleted)						X	N/A	N/A

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			g. (deleted)						X	N/A	N/A
			h. (deleted)						X	N/A	N/A
			i. Exhaust path shall have two sample ports for 1/2" NPT connections downstream of the HEPA filter for interface with exhaust monitoring.		X					Vendor drawing 362A0863 of the HEPA filter incorporates these sample ports.	Closed
26	3.2.2.4.g	Extract System	g. The Cask Extract system air flow through the Cask and the heat sink of the Cask mass shall be sufficient to maintain the MCO surface at less than 270oF during the 48-hour loss of normal power incident. During loss of power, the operating area room temperature can reach 120oF. The maximum heat source is 835 watt and the initial surface temperature could reach as high as 251oF when it is brought into the MHM.		X					Vendor thermal analysis performed with and without extract system operating.	Closed
27	3.2.2.8	Operator Control System	a. The MHM shall include an operator control system that may consist of an integrated system of local control panels and an operator console. The control console layout shall be located logically to match required operator actions.	X				X		Drawings H-2-828717 sh. 1 through sh. 10 show operator panel layouts. They were verified by FDR of MHM and Human Factor Reports SNF-4831 and SNF-3907.	Closed
			b. The system shall incorporate power and control wiring separated from low voltage signal wiring.	X				X		Refer to EDERER drawing D36967.	Closed
			c. Front wired panels for ease of maintenance.	X				X		Operator control system panels on drawings H-2-828717 sh. 1 through 10 are front wired panels.	Closed
			d. Wiring labeled in accordance with the electrical schematics, and running in raceways.	X				X		Verified either by construction acceptance testing (CAT) or vendor megger tests of power conductors and continuity check of signal conductors.	Closed

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			e. Power, control, and signal wiring are to be wrapped in groups or in rigid conduits outside the panels.	X				X		Verified by the UL evaluation SNF-6800.	Closed
			f. The panels shall have clear indicators for off-normal operating conditions together with keyed interlock by-pass switches to permit recovery for corrective maintenance.	X				X		Drawings H-2-828717 sh. 1 through sh. 10 incorporates indicators for off-normal events and keyed interlock switches.	Closed
			g. 1. The electrical wiring, components, materials, installation, and connections shall be in accordance with Specification Section 16610, Electrical Requirements for Packaged Equipment.	X				X		This requirement for packaged equipment is redundant and covered by Electrical specification section 3.2.2.12.	Closed
			g. 2. Instruments shall be installed, tested, calibrated and checked out in accordance with the requirements of Specification Section 17704B and 17705B.	X				X		Validated by SNF-7028 Appendix A requirement #84.	Closed
			g. 3. Enclosed panels of the control system shall be in accordance with Specification Section 17861B, Control System Panels, unless technical exceptions are approved otherwise.	X				X		NCR-99-DESH-0021 was written, since it was felt elements of the control room panels did not meet requirements of specification section 17861B, "Control System Panels". However the DA dispositioned that the design was acceptable as is and the NCR closed out.	Closed
			h. The MHM electric power system shall include an emergency power disconnect that shall run separate and removed from any control panel.	X				X		Drawing H-2-828710 sh. 5 has both an emergency stop for stopping the process, and a main power disconnect switch.	Closed
28	3.2.2.10	Interlocks	Those MHM Cask system interlocks which have the function to prevent damage to the MCO shall be redundant, and single failure proof. The MCO shall be considered vulnerable to damage under the following conditions: (1) The height of the MCO body is suspended	X						These interlock requirements are in the FDR Section 3.4 of the MHM.	Closed

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			from the grapple at elevations coincident with the physical interfaces at the bottom of the retractable shield skirt and/or the bottom of the rotatable upper turret. At these elevations, the MCO would be susceptible to damage if the bridge/trolley travel and/or the turret rotate motions were permitted. (2) The MCO inside the unprotected MCO Weld Station which is susceptible to collision by the MHM. (3) (deleted) (4) Collision with the Receiving Crane which would jeopardize the operating deck. (5) Collision with the CSB Service Tent when positioned over the MCO Service Pit.								
29	3.2.2.11	Painting	Painting of the cask body and the exterior of all components shall be in accordance with Specification Section09900 Table - III letter E FED-STD-595B Safety Yellow - 13591. All other components on the cask shall be painted in accordance with painting requirements of this Specification.	X						Letter DESH-9860554 has closed NCR attached that documents the deficiencies and resolutions. However, there still exists open item on touch up painting but is being worked under work package 1S-00-00143 in the job control system (JCS).	Closed

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30	3.2.2.12	Electrical	The electrical wiring, components, materials, installation, and connections shall be in accordance with Specification Section W-379-C-CSB-16610, Electrical Requirements for Packaged Equipment, which includes requirements in materials and equipment, fabrication and manufacturing, and inspection testing. In addition, listed below are the submittals required per W-379-C-CSB-16610.		X					Specification HNF-S-0468 Revision 5, CSB MHM, Section 8, Submittals: Contains all the following submittal requirements that are within supplemental Specification W-379-C-CSB-16610, Electrical Requirements for Packaged Equipment. These required submittals meets the requirements of this specification and are in the MHM Vendor Information (VI) File 50100, except for Megger and Continuity test records of wiring, for the MHM packaged equipment. A UL equivalent certification was provided. Accept Green Card from FH/AVS for the CSB MHM Specification HNF-S-0468, from Foster Wheeler was signed October 2, 2000. Inspection and UL acceptance for all electrical devices and systems was also done.	Closed
			Submittal of outline drawing showing the location of all major electrical equipment, including junction boxes, motors and conduit, with all applicable device ratings. Location and size of Buyer's conduit connections shall be shown.		X					Refer to HNF-S-0468 Section 8.7.4.1.	Closed
			Submittal of Elementary Diagrams for all circuits.		X					Refer to HNF-S-0468 Section 8.7.4.3.	Closed
			Submittal of connection diagrams for all electrical equipment. Diagrams shall include equipment ID numbers, terminal block location and identification and wire numbers.		X					Refer to HNF-S-0468 Section 8.7.4.5.	Closed

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			Submit of Bill-Of-Materials to include the name of the manufacturer and catalog number of all electrical devices.		X					Refer to HNF-S-0468 Section 8.7.4.6.	Closed
			Submittal of receiving, storage and handling instructions to include inspection and checkout tests.		X					Refer to HNF-S-0468 Section 8.7.5.11.	Closed
			Submittal of operation and maintenance manual in accordance with specification W379-C-CSB-01730, Operation and Maintenance Data.		X					Refer to HNF-S-0468 Section 8.7.5.1.	Closed
			Submittal of manufacturer's installation manual.		X					Refer to HNF-S-0468 Section 8.7.5.25.	Closed
			Submittal of certified Test reports for Factory Acceptance Tests per W-379-C-CSB-16610 section 2.3, which includes Continuity Tests, and Insulation Resistance Test.		X					The meggering and continuity test records for the MHM packaged electrical components were not located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, The prerequisite section of each of the PATs W-379-PAT-015-01, -02, -03 has a signature signoff for all the prerequisites being met before performance of the PAT. Also, each of the PATs passed and the associated MHM Test Result Packages accepted. Which indicates that there are no broken or shorted wires or cables. Therefore, at this point in time there is little risk in not having these particular submittals. Shop and field wiring, devices, and systems had UL inspection and acceptance.	Closed
			Submittal of recommended spare parts list.		X					Refer to HNF-S-0468 Section 8.6.	Closed
31	3.2.2.15	Operators Platform CAM	The operators platform shall have space and an electric power receptacle for mounting a	X						The 100% design report (or FDR) from MHM contractor section 1-2, executive summary,	Closed

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			continuous air monitor (CAM), supplied by others.							states that the FDR complies with the contract specification reference HNF-S-0468, revision 4 (dated Dec. 1997). The MHM DA worked closely with the MHM contractor during design, fabrication, factory testing, construction, and site testing to assure that the requirements of HNF-S-0468 were met.	
32	3.2.2.16	CAM Outlet	A 110 volt 60 Hz, 1 phase AC duplex outlet shall be available for power to the CAM. Mounting provisions will be according to Buyer interface requirements. This outlet shall be protected by a 15A single-pole circuit breaker.	X				X		The 100% design report (or FDR) from MHM contractor section 1-2, executive summary, states that the FDR complies with the contract specification reference HNF-S-0468, revision 4 (dated Dec. 1997). The MHM DA worked closely with the MHM contractor during design, fabrication, factory testing, construction, and site testing to assure that the requirements of HNF-S-0468 were met.	Closed
33	3.2.2.17	Induction Motors	Induction motors shall meet the requirements of Specification Section16150. Induction motors for MCO grapple, if used, shall meet requirements of Specification Section 16151.						X	N/A	N/A
34	3.2.2.18	Pressure Switches	Pressure switches shall meet the requirements of Specification Section17667.	X						From the MEL, the vendor data catalogue sheets for pressure switches PSLTSC1AX, PSLTSC1AY, PSLTSC2AX, and PSLTSC2AY were reviewed against specification W-379-P-CSB-17667, and satisfied these requirements. From the success of this review it is concluded that the rest of the pressure switches on the MEL meet these same requirements.	Closed
35	3.2.2.19	Instrument piping	Instrument piping materials shall meet the requirements of Specification Section 17703B and pressure tested in accordance with Specification Section 17708B.						X	N/A	N/A

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
36	3.2.2.20	Instruments	Instruments shall be installed, tested, calibrated and checked out in accordance with the requirements of Specification Section 17704B and 17705B.	X			X			Verified by FDR of MHM and qualification tested by W379-PAT-015-1. Also, validated by SNF-7028 Appendix A requirement #84.	Closed
37	3.2.3.7	Radiation and Service Life	Radiation and Service Life a. The MHM and its auxiliary equipment shall be designed for a minimum 40-year life. Components with a life expectancy of less than 40 years shall be separately replaceable. The design shall utilize radiation tolerant components where their exposure makes such design appropriate. Seller shall submit the service life expectancy of each component for Buyer. The equipment, including items such as bearings, packings, seals and gaskets, shall be as maintenance free as achievable. The design shall make provisions to improve convenience of maintenance activities. Maintenance schedules and requirements shall be submitted for Buyer review.	X					X	Verified by FDR of MHM, Informal review of Alternate calculation by M&D Associates (See EDT 627041) After further review, we have determined that there are no bearing, packings, seals, and gaskets that will be exposed to high radiation. The components that are exposed are all made out of steel.	Closed
			b. Rotating equipment (motors, gear boxes, bearings, etc.) designed for radiation service shall be provided with lubricants, rated by the manufacturer for prolonged radiation tolerance to exceed the anticipated exposure in accordance with Paragraph 3.2.1.2.	X		X				Verified by FDR of MHM, Informal review of Alternate calculation by M&D Associates (See EDT 627041). Also, there are no rotating parts that will be exposed to radiation. Refer to vendor drawing 362A0551, and 362A0578.	Closed
			c. An event where an inadvertent rotation of the upper turret and/or motion of the bridge and trolley would attempt to shear the MCO is the most critical failure . Design must fully address prevention of this condition. Passive failures of structural components are assumed unless they	X		X				SNF-5930, "Structural Analysis of MCO for Accidental Movement of MHM during MCO Lifting Operations" was reviewed and found that section 8.2 addresses this issue of turret rotating and shearing the MCO. For other failures, since there can be so many, three	Closed

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			are designed to withstand the DBE.							configurations, or damage mechanisms were identified and studied in detail.	
			d. All other failures may be addressed with the following modification of the above criteria. This modification is that passive failures are not to be assumed, unless identified as credible by analysis.	X		X				SNF-5930, "Structural Analysis of MCO for Accidental Movement of MHM during MCO Lifting Operations" was reviewed and three configurations, or damage mechanisms were identified and studied in detail.	Closed
38	3.2.3.9	Decontamination	For decontamination, design and fabrication of cask components and assemblies shall minimize crevices, pockets, absorbent materials or similar voids where contaminants can be trapped. Intermittent welds are not permitted.	X						Verified by FDR of MHM. Note: Because of the way the system is built it would be hard to decontaminate but possible, but contamination is not expected.	Closed
39	3.2.3.10	Materials	Materials shall be as follows unless otherwise noted on drawings.								
			a. Carbon steel shielding shall be in accordance with ASTM specifications listed in ANSI N690, Section Q1.4.		X					Cask material is per British specification 3100, which is an acceptable substitution per FDR MHM Appendix 3, Material Correlation BS/ASTM.	Closed
			b. Technical data of the type of neutron shielding selected by the Seller shall be submitted to the Buyer for approval prior to application.		X					The technical data for the type of neutron shielding was submitted by vendor under the FDR of the MHM: ESL/R(96)085, Rev. 1, MHM Shielding Assessment.	Closed
			c. Tungsten Shielding, if used, shall be in accordance with ASTM B 777.						X	Not applicable. Tungsten shielding not used.	N/A
			d. Structural shapes and plate shall be carbon steel in accordance with Specification Section 05120, Structural Steel, or approved equal.		X					The 100% design report (or FDR) from MHM contractor section 1-2, executive summary, states that the FDR complies with the contract specification reference HNF-S-0468, revision 4 (dated Dec. 1997). The MHM DA worked closely with the MHM contractor during design, fabrication, factory testing, construction, and site testing to assure that the requirements of HNF-S-0468 were met.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			e. (deleted)								
			f. (deleted)								
			g. The neutron shield material shall not exceed a flame spread rating of 25 when tested in accordance with UL 723.		X					The results of this UL Flame Spread Test are in the FDR for the MHM, Appendix 5, which meets the flame spread rating of 25.	Closed
40	3.2.3.11	Shielding Skirt Actuator	Retractable Shielding Skirt Actuator.								
			a. The motor shall be 480 V, 3-phase, 60 Hz, TEFC, reversible.		X					FDR Section 3.4.3 table 1 shows shield actuator meeting these requirements.	Closed
			b. The gear reducer shall be a, one-piece construction cast iron housing, oil reservoir, positive retained input shaft, high strength, case-hardened steel integral input worm and shaft, Boston Gear F/FS 721-20 or equal.		X					The vendor submittals for the gear reducers have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, the gear reducers functionally works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	Closed

Line #	Spec Section HNF-S-0425	Function/Requirement	Verification/Validation						Reference Document/Comments	Status
			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		c. Flexible couplings shall be Duff-Norton Flex-Rigid gear couplings, or equal, which will allow incremental system adjustment or equal and shall be used at each point where two shaft segments must couple together or approved equal.		X					The vendor submittals for the MHM flexible couplings have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, the flexible couplings works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	Closed
		d. Shafts shall be solid steel, ASTM A36, keyed ends, full diameter of end connections entire length or approved equal.		X					The vendor submittals for the MHM shafts have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, the shafts works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			e. Gear boxes shall be miter gear boxes, oil lubricated, cast iron housings, alloy steel shafting, anti-friction shaft bearings, Duff-Norton SK2519 or equal.		X					The vendor submittals for the MHM gear boxes have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, the gear boxes works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	Closed
			f. The actuators shall be a machine screw type, self locking, worm drive, 6:1 reduction, ductile iron housing, Duff-Norton M-9005 or equal.		X					The vendor submittals for the MHM actuators have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, the actuators works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	Closed
41	3.2.3.12	Turret Actuator	Turret Rotation Actuator	X						The FDR of the MHM section 3.4.3 Table 1	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			a. The motor shall be 480 V, 3-phase, 60 Hz, totally enclosed, reversible, in accordance with Section 2.3. Motor over-torque during rotational travel shall interrupt power. b. (deleted) c. (deleted)							shows the motor for the turret actuator meeting these requirements.	
42	3.2.3.15	Alignment Camera	TV Alignment Camera System for MHM Positioning: A system for alignment of the MHM with the selected storage opening shall be provided. The system shall provide appropriate marks on the floor or shield plug which may be aligned with a device on the MHM. If more than one aligned point is required they shall both be readily visible at the same time by the device. The system shall make alignment achievable within 3/16-inch tolerance.	X			X			Verified by FDR of MHM and qualification tested in PAT-015-3. Also validated by SNF-7028 Appendix A requirement #85.	Closed
43	3.2.3.16	Manual Actuators	Retractable Shield Skirt and Turret Manual Actuator Drives: Systems shall be provided for manually driving the retractable shield skirt and the turret in the event of an electrical drive failure. Each system shall provide a hand operator, which is removable, for driving the actuator system. The drive systems shall also provide any additional gear reduction, if required, to limit manual applied force to a reasonable level. Drive components shall meet requirements for a safety factor of 3.	X						Verified by FDR of MHM. Vendor drawing 362A0556 shows hand actuator for turret, and drawing 362A0557 shows hand actuator for retractable shield.	Closed
44	3.2.3.19	Limit Switches	Limit switches shall be UL listed and CSA certified, 120 Vac, double pole, Eaton E50 or equal, in accordance with Specification Section 16110, Electrical Requirements for Packaged		X					Limit switches were part of the UL review, SNF-6800.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			Equipment.								
45	3.2.3.20	Control System Panels	Enclosed panels of the control system shall be in accordance with Specification Section 17861B, Control System Panels, unless technical exceptions are approved otherwise.		X					NCR-99-DESH-0021 was written, since it was felt elements of the control room panels did not meet requirements of specification section 17861B, "Control System Panels". However the DA dispositioned that the design was acceptable as is and the NCR closed out.	Closed
46	3.2.3.22	Pressure Gauges	Pressure gauges shall conform to ASME B40.1 Grade B with a weather resistant steel case, 2-1/2-inch dial, 0 to 160 psig range, 1/4-inch NPT bottom connection, Ashcroft 1005 or equal.		X					Pressure gauges PG1 and PG2, manufactured by NORGREN are the sample pressure gauges evaluated off the master equipment list (MEL). Their vendor data sheets were compared to these requirements and results were satisfactory. We can conclude that the other pressure gauges on the MEL meets these same requirements.	Closed
47	3.2.3.23	Pressure Transducers	Pressure Transducers shall be 300 series stainless steel, 0 to 60 psig, silicon diaphragm, Omega PX236 or equal.						X	SNF-5589 Revision 1, "Canister Storage Building Master Equipment List", was updated per ECN 654497 which incorporated engineering walk-downs from September 2000. The resulting revision 2, the section with MHM under system 15, was reviewed and found not to contain any pressure transducers. Further, review of drawing H-2-829053 revision 0, "MCO handling M/C MCO Grapple Pneumatic Panel", does not use pressure transducers but instead uses discrete air flow regulators, filters, pressure switches and etc, in the MHM Compressed Air System. Also, the vendor parts list 362P0866 for this drawing in the Bill-of-Material submitted in the 100% Final Report was reviewed and know air pressure transducers are listed. Therefore, this requirement is not applicable to the MHM.	N/A

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
48	3.2.3.25	Pressure Regulators	The air pressure regulators shall be a 1/4 inch size, 250psig, 175 °F rated regulator-filter combination. The unit shall be a metal body and bowl with Pyrex® sight glass. The regulator shall be diaphragm operated, dial gauge and adjustable outlet pressure range from 10 to 60 psig, set at 35psig. The filter shall be reusable and remove particles to 5microns with a manual drain. The unit shall be Parker Hannifin 06E or equal.						X	SNF-5589 Revision 1, "Canister Storage Building Master Equipment List", was updated per ECN 654497 which incorporated engineering walk-downs from September 2000. The resulting revision 2, the section with MHM under system 15, was reviewed and found not to contain any pressure regulators. Further, review of drawing H-2-829053 revision 0, "MCO handling M/C MCO Grapple Pneumatic Panel", does not use pressure regulators but instead uses discrete air flow regulators, filters, pressure switches and etc, in the MHM Compressed Air System. Also, the vendor parts list 362P0866 for this drawing in the Bill-of-Material submitted in the 100% Final Report was reviewed and know air pressure regulators are listed. Therefore, this requirement is not applicable to the MHM.	N/A
49	3.2.3.26	Pressure Monitors	Air Pressure Monitor: The pressure in the air supply line downstream of the regulators shall be monitored. Conditions of either high pressure or low pressure shall sound and audible alarm and light a panel trouble light, indicating which condition has occurred.				X			High pressure alarm & audible signals were determined not to be necessary. ECN 663439 has been initiated to revise the requirement in the performance spec. Low pressure monitoring and alarm function verified in W379-PAT-015-1.	Closed
50	3.2.3.27	Air Control Valves	Air control valves shall be 316 stainless steel, 3-way solenoid valves, 4-valve manifolds, 120 V ac, 60 Hz, 30 to 175°F operating temperature. They shall be Honeywell 3131BSA6QN00BBTIJIP3 or equal.		X					SNF-5589 Revision 1, "Canister Storage Building Master Equipment List", was updated per ECN 654497 which incorporated engineering walk-downs from September 2000. The resulting revision 2, the section with MHM under system 15, was reviewed and found to contain two air control valves SVMGJO (SV1) and CCAS (SV2). Both these valves appear on H-2-829053 as SV1 and SV2, Revision 0, sheet	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
										1, as part of the MHM compressed air system. The vendor parts list 362P0866 for this drawing in the Bill-of-Material submitted in the 100% Final Report was reviewed and shows reference 7 (SV2) Norgren Martonair as the manufacture with model number K41DG00-KS1KXC60/120. For the intended operation of these two solenoid valves per design, the specifications for these valves are at least equal to the specifications listed for the equal Honeywell solenoid valve.	
51	3.2.3.28	Check Valves	Check valves shall be 316 series stainless steel with viton seals and a minimum Cv=1.6, 1 psig cracking pressure, Parker Hannifin O-ring poppet check valve or equal.		X					SNF-5589 Revision 1, "Canister Storage Building Master Equipment List", was updated per ECN 654497 which incorporated engineering walk-downs from September 2000. The resulting revision 2, the section with MHM under system 15, was reviewed and found to contain one check valve NRV4. This valve appears on drawing H-2-829053 Revision 0 sheet 1 as part of the MHM compressed air system. The vendor parts list 362P0866 for this drawing in the Bill-of-Material submitted in the 100% Final Report was reviewed and shows reference 17, NUPRO, as the manufacture with model number SS-4C-1. The vendor cutsheet was obtained from this manufacture and reviewed. For the intended operation of this check valve per design, the specifications for this check valve are at least equal to the specifications listed for the equal Parker Hannifin, O-ring poppet check valve.	Closed
52	3.2.3.29	Hose Couplings	Hose couplings shall be 1/2-inch size quick disconnects, double shutoff type, NPT threaded		X					Hose coupling QCV1 appears on drawing H-2-829053 Revision 0 sheet 1 as part of the MHM	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			ends, 300 series stainless steel, Parker Hannifin 60series or equal.							compressed air system. For the intended operation of this hose coupling per design, the specifications for this hose coupling are at least equal to the specifications listed for the equal Parker Hannifin 60-series.	
53	3.2.3.30	Air Hose	Flexible air hose shall be abrasion and oil resistant nylon, 1/4 inch size, 250 psig working pressure, with 300 series stainless steel end connections, Parker Hannifin NN-4-035 or equal.						X	No flex hose on MHM	N/A
54	3.2.3.31	Tubing	Rigid tubing and tube fittings for instrument air service shall be in accordance with Specification Section 17703B, Instrument Piping Materials, Class ZJ or equal.		X					The vendor submittals for the rigid tube and tube fittings have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, the MHM compressed air system functionally works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	Closed
55	3.2.3.32	Supports	Supports for components for the compressed air system shall be carbon steel materials in accordance with the Specification Section 17703B, Instrument Piping Materials, Class ZZ.		X					The vendor submittals for the compressed air system supports have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However,	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
										the MHM compressed air system functionally works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	
56	3.2.3.33	Shut Off Valves	Shut off valves shall be 316 or CF-8M stainless steel, meet MSS SP-82, reinforced Teflon seats and seals, Parker Hannifin V500SS series ball valves or equal.		X					The vendor submittals for the shut off valves have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, the MHM compressed air system functionally works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	Closed
57	3.2.3.34	Guards	Equipment guards and housings shall be fabricated from 16 gauge (minimum) perforated or solid carbon steel sheet, ASTM A 570 or equal. Guards shall be removable.		X					The vendor submittals for the equipment guards have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
										MHM, and the submittals. However, the MHM compressed air system functionally works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	
58	3.2.3.35	Fasteners	Structural fasteners including bolts, nuts and washers shall be in accordance with the Specification Section 05120, Structural Steel. Bolts subjected to shear loading or providing structural support shall be high strength.		X			X		The vendor submittals for structural fasteners have not been located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, the MHM compressed air system functionally works as designed, as documented by three performance acceptance tests W379-PAT-015-001, -002, and -003 which have successfully been performed with their satisfactory results documented in SNF-W379-TRP-015-001, -002, and -003. Before each PAT was performed in the prerequisite section there is a signature signoff that all perquisites for operation of the associated system of the MHM have been completed.	Closed
59	3.2.3.37	Maintenance Rack	The maintenance rack shall be designed so as to support the retractable shield skirt and allow access for any maintenance that the bottom nose may require.						X	N/A	N/A

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				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
60	3.2.3.39	Motors	Electrical motors shall be in accordance with construction specification W-379-C-CSB-16150. Listed below are the submittals required.								
			1.6.1 Speed/torque and speed/curves shall be submitted for buyer approval for each induction motor.		X					The speed torque curves for the 15 MHM motors were not submitted by the vendor. The DA, as needed, has gone back to the manufacturer and obtained the Speed/Torque curve for the two flux vector drive motors. For the remaining motors, as they need to be replaced the speed torque curve can be obtained to assure the replacement motor meets the requirements of the driven load. An effort could be undertaken to obtain these curves and verify that the motors meet the requirements. However, if we can assume that the design agent selected the correct motor, sized it accordingly, and the installing contractor installed it correctly, the motors will perform their function. As-Built essential drawing H-2-828710 Sh. 3 Rev. 0 shows a list of the MHM motors, which match the same list of motors that were given in MHM 100% Final Design Report. Also, the functionality of the entire MHM including the motors were verified per PATs W-379-PAT-015-001, -002, and -003.	Closed
			1.6.2 Seller shall complete data sheet E350-DS-1 (Attachment A) and submit for furnished equipment.		X					This same data can be obtained from drawings, and the FDR MHM, and the motor nameplate.	Closed

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			Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		1.6.2 Insulation resistance readings for the electric motors shall be completed by seller for Buyer approval (Attachment B).		X					The meggering and continuity test records for the MHM motors were not located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, The prerequisite section of each of the PATs W-379-PAT-015-01, -02, -03 has a signature signoff for all the prerequisites being met before performance of the PAT. Also, each of the PATs passed and the associated MHM Test Result Packages accepted. Which indicates that there are no broken or shorted windings within the motors. Therefore, at this point in time there is little risk in not having these particular submittals.	Closed
		1.6.3 Motor outline drawings showing shaft dimensions and weight.		X					At this point, the design is completed, installed and functionally tested. At time of maintenance, if required, the shaft diameter and weight can be determined either from walkdown, procurement documents, or going directly back to supplier.	Closed
		1.6.4 Detail drawings of main and/or auxiliary junction boxes shall be submitted for Buyer approval.		X					Vendor drawings show the detailed drawings of the junction boxes.	Closed
		1.6.5 A list of manufacturer's recommended spare parts for one (1) year's routine operation. Sufficient data to permit procurement for the original manufacturer or subsupplier shall be included.		X					Spare parts list for the MHM motors are located within VI file 50100 for the MHM in the CSB library.	Closed
		1.6.6 Operation and maintenance data shall be provided in accordance with W-379-C-CSB-01730.		X					Operation and Maintenance data for the MHM motors are located within VI file 50100 for the MHM in the CSB library.	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
			1.6.7 Factory Acceptance Tests (FATs) submitted for buyer approval. See W-379-C-CSB-16150 paragraph 2.6.1.1, 2.6.1.2, and 2.6.1.3.		X					The meggering, continuity and motor test records for the MHM motors were not located within VI file 50100 for the MHM in the CSB library. The sections within the VI file reviewed, include the QA Inspection Package, the FDR for the MHM, and the submittals. However, The prerequisite section of each of the PATs W-379-PAT-015-01, -02, -03 has a signature signoff for all the prerequisites being met before performance of the PAT. Also, each of the PATs passed and the associated MHM Test Result Packages accepted. Which indicates that each motor functioned per design for its application. Therefore, at this point in time there is little risk in not having these particular submittals.	Closed
			2.6.1.1 Motor manufacture test: Submit results of High-Potential Tests in accordance with NEMA MG1, Part 3 and Routine Tests in accordance with IEEE Standard 112.								
			2.6.1.2 Resistance tests: Testes to be performed in accordance with IEEE Standard 43. Insulation resistance measured during these tests shall not be less than 5 megohms.								
			2.6.1.3 Performance Tests: All required electric motor performance tests shall be conducted in accordance with the applicable driven equipment specification, and the performance testing referenced in Section 3 of IEEE standard 112 and NEMA MG1, Part 12.								
61	3.2.4.3	Plug Hoist	The design shall provide appropriate safety factor for lifting a 5,500 lb. tube plug.	X			X			Verified by FDR of MHM and qualification tested in W379-PAT-015-2. Also, validated by SNF-7028 Appendix A requirement #87.	Closed
62	3.2.5.1	MHM Grapple	The MHM grapple shall grip and carry MCOs within the MHM turret. It shall operate with the hoist.	X			X			Verified by FDR of MHM and qualification tested in W379-PAT-015-2. Also, validated by SNF-7028 Appendix A requirement #88.	Closed
63	3.2.5.2	Payload	The MCO payload is approximately 10.5 tons. The grapple shall accommodate a 12 ton lift capacity. The MHM hoist load cell shall provide the signals for grappled weight indication and also shall be used to ensure that the grapple is not overloaded.	X			X			Verified in FDR of MHM and Qualification tested in W379-PAT-015-3. Also, validated by SNF-7028 Appendix A requirement #89.	Closed
64	3.2.5.3	Storage Tube	The CSB storage tube is nominal 27 inch I.D., with standard API pipe tolerances.						X	N/A	N/A
65	3.2.5.4	MCO Grapple	The MCO to be grappled and carried by the	X			X			Verified in FDR of MHM and Qualification	Closed

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		Configuration	grapple is shown on drawings H-2-828041 and H-2-828042.							tested in W379-PAT-015-3.	
66	3.2.5.5	Grapple Locking	The grapple shall incorporate a positive locking mechanism.	X						Vendor drawing 362A0563 shows grapple locking mechanism.	Closed
67	3.2.5.6	Grapple Design	The grapple shall be designed in accordance with ANSI N14.6 with the MCO as a critical item.	X						The grapple calculation 490/1 ESL/R(96)099 meets these requirements.	Closed
68	3.2.5.7	Grapple Tolerances	The grapple shall be capable of retrieving MCOs that are offset to one side of the CSB storage tube and/or positioned in the maximum tilt configuration possible within the storage tube, accounting for worst case tube tolerances.	X			X			Verified in FDR of MHM and FAT for MHM.	Closed
69	3.2.5.8	Power	The maximum power available is 480 V ac.						X	N/A	N/A
70	3.2.5.9	Grapple Recovery	The grapple design shall address recovery from a condition where the grapple fails to disengage.						X	During the design evolution, the cause of the MCO grapple to disengage could only be hypothesized as the loss of plant service air in which the backup reservoir tank on the top of the MCO hoist assembly will provide additional air pressure to manipulate the grapple jaws. If more air pressure is necessary or there is a failure of the primary grapple pneumatic cylinder occurs, there is a backup pneumatic air cylinder that can be pressurized with portable air bottle at a second hose connection located inside the upper hoist enclosure.	N/A
71	3.2.5.10	Mechanical Locking	The grapple shall be designed with mechanical positive locking to not disengage under load.	X			X			Verified in FDR of MHM and qualification tested in W379-PAT-015-1. Also, validated by SNF-7028 Appendix A requirement #93.	Closed
72	4	Design Services							X	N/A	N/A
73	5	Fabrication							X	N/A	N/A
74	6	Quality							X	N/A	N/A

Line #	Spec Section HNF-S-0425		Function/Requirement	Verification/Validation						Reference Document/Comments	Status
				Formal Review	Indep Review	Alt Calc	Qual Test	Informal Review	N/A		
		Assurance									
75	7	Inspection , testing, and Installation							X	N/A	N/A
76	8	Submittals							X	N/A	N/A
77	9	Additional Requirements							X	N/A	N/A

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APPENDIX C

DESIGN VERIFICATION STATUS QUESTIONNAIRE

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(1a) SNF SUB-PROJECT:
(1b) Phase:

(2) Assessment Date:

(3) Self-Assessment prepared by:
(10) Independent Assessment done by:

(9) Brief description of remaining actions

(13) Overall Status of Verification activities:
0 (0%) requirements have been checked as "met" or "acceptable"
16 (100%) requirements needs complementary actions
0 (0%) requirements are not met or not assessed

(4) VERIFICATION REQUIREMENTS ACCORDING TO AP EN-6-027-01	(5) QUESTIONS	Facts or project self-assessment ("X" in 1 column)							Independent assessment			
		(6a) Yes	(6b) Not yet	(6c) Partly	(6d) N/A	(7a) Doc Exist	(7b) Doc TBD	(8) REMARK	(11a) Not Accept.	(11b) To be Compl.	(12) REMARK	(11c) Accept
PLAN AND PREPARE THE VERIFICATION												
1 Ensure Project Requirements are identified	Have all project requirements been identified in one or several documents?	X				X		SNF-6442		X	Exhaustive assessment	
2 Identify Verification methods to be applied on each design requirements	Does a matrix or document exist, defining verification methods for each requirement?	X				X		SNF-6442		X	Exhaustive assessment	
3 Ensure Design Verification responsibilities are defined both internally to PHMC, but also with subcontractors	Does one or several documents exist, defining verification responsibilities within the project team, but also between PHMC and its subcontractors?	X				X		FDI Design Control Procedures Manual		X	Exhaustive assessment	
4 Ensure PHMC and subcontractor personnel involved in Design verification is adequately qualified	Is the qualification of the personnel involved in verification activities adequate and documented?	X								X	Random assessment	

(4) VERIFICATION REQUIREMENTS ACCORDING TO AP EN-6-027-01	(5) QUESTIONS	Facts or project self-assessment							Independent assessment			
		"X" in 1 column				"X" in 1 column						
		(6a) Yes	(6b) Not yet	(6c) Partly	(6d) N/A	(7a) Doc Exist	(7b) Doc TBD	(8) REMARK	(11a) Not Accept.	(11b) To be Compl.	(12) REMARK	(11c) Accept
5 Develop detailed qualification test planning documentation	Have all project requirements subject to qualification testing been included in a test plan ?	X				X		See latest revision of SNF Startup Preoperational Acceptance Test Status for status of CSB System Test Specifications: SNF-W379-TS-001; SNF-W379-TS-003; SNF-W379-TS-004; SNF-W379-TS-005; SNF-W379-TS-006; SNF-W379-TS-007; SNF-W379-TS-010; SNF-W379-TS-011; SNF-W379-TS-012-1; SNF-W379-TS-013; SNF-W379-TS-014-1; SNF-W379-TS-014-2, SNF-W379-TS-015-1; SNF-W379-TS-015-2; SNF-W379-TS-015-3; SNF-W379-TS-015-4; SNF-W379-TS-016; SNF-W379-TS-017-1; SNF-W379-TS-017-2; SNF-W379-TS-018; SNF-W379-TS-019; SNF-W379-TS-020-1; SNF-W379-TS-021; SNF-W379-TS-022-1; SNF-W379-TS-023; SNF-W379-TS-024-1; SNF-W379-TS-025-1; SNF-W379-TBD Building/Balance of Equipment; SNF-W443-001-1; Cask Transportation System Trailer CSB Test Specification		X	Random assessment	
PERFORM THE VERIFICATION												
6 Ensure design verification has been done on all aspect and at all phases of the design	Have all aspects of the design, including: Functional requirements, Design inputs, Design products, As-built documentation, Design changes, Interfaces, Computer software and pressure vessel code items, been subject to verification.	X					X	Documented throughout SNF-6442; SNF-7028; & SNF-7030, Verification of future component installations required.		X	Random assessment (but on each aspect)	
7 Ensure the ALARA principles have been considered	Is there some evidence of ALARA and Radiological design reviews conducted on the project?	X				X		SNF Canister Storage Building ALARA Analysis Rev. 9		X	Exhaustive assessment	

(4) VERIFICATION REQUIREMENTS ACCORDING TO AP EN-6-027-01	(5) QUESTIONS	Facts or project self-assessment							Independent assessment			
		"X" in 1 column				"X" in 1 column						
		(6a) Yes	(6b) Not yet	(6c) Partly	(6d) N/A	(7a) Doc Exist	(7b) Doc TBD	(8) REMARK	(11a) Not Accept.	(11b) To be Compl.	(12) REMARK	(11c) Accept
DOCUMENT THE VERIFICATION												
8 Demonstrate that all design documents have been identified.	Does a complete list of Design documents ("Project file") exist?	X				X		See ABU Checklist, Drawing Index, Specification Index, and Calculation Index.		X	Exhaustive assessment	
9 Demonstrate that all design documents have been adequately verified.	Are there appropriate approval information and signature on EDT and ECN associated to each design document?	X								X	Random assessment	
10 Demonstrate final design meets initial requirements	Does a requirement compliance matrix exist?	X				X		SNF-6442		X	Exhaustive assessment	
11 Gather all elements necessary to demonstrate verification activities have been performed.	Does a final Design Verification Report exist?	X				X		SNF-6442		X	Exhaustive assessment	
12 Demonstrate documents subject of independent review have been adequately verified	Is there evidence of comments recorded and approval documented for each document subject to independent review?	X				X		Compiled list of conference notes.		X	Random assessment	
13 Demonstrate calculation notes subject to alternate calculation have been adequately verified	Does an alternate calculation evidence exist for each calculation subject to alternate calculation requirement?	X				X				X	Random assessment	
14 Demonstrate Design Reviews have been adequately documented.	Does a Design Review Report, and if necessary a Design Review Completion Report, exist for each formal Design Review?	X				X		Formal reviews documented, e g., MHM, Security System, Weld Station.		X	Random assessment	
15 Demonstrate tests results have been documented	Is each qualification test result documented in a test report?	X				X		Test Reports or Test Acceptance Certification Documents issued.		X	Random assessment	
16 Demonstrate comments from verification activities have been dispositioned or taken into account	Have the comments raised during verification activities been dispositioned or considered?	X				X		See conference notes listed for design reviews		X	Random assessment	

APPENDIX D

MCO WELDING COMPLIANCE PLANNING MATRIX

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Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
1.	Individuals performing engineering and design activities within the FH organization shall be qualified in the practice of engineering. Individuals will be considered qualified in the "practice of engineering" if: a. They have a Bachelor of Science or equivalent engineering or technical degree from an accredited university or college. Or They are certified as a professional engineer by any state. Or They have training beyond the high school level, have at least eight years of increasing responsibility practicing engineering under engineering supervision, and are documented as acceptable by the chief engineer for their projects. b. They document that they have been trained to the engineering procedures at the PHMC level by reading and understanding them, preferably as part of a required reading program for their project.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #1		Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1
2.	DAs shall be qualified in the practice of engineering and shall have two years demonstrated job related experience including two years in their specific functional areas.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #2		Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1
3.	For nuclear SSC, they {DAs} shall have at least one-year nuclear experience.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #2		Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
4.	A DA shall be familiar with the project, plant, or program needs and priorities; and having an adequate technical background.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #2		Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1
5.	DAs whose assigned structures, systems and components are affected by a documented safety analysis shall be trained to the bounding safety analysis documentation and the other components of the authorization envelope.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #2		Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1
6.	DA responsible for Vital Safety Systems (VSS) shall be trained and qualified in those systems as established by the POC.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #2		Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1
7.	DAs shall complete Supply Chain Process training (Course 004225 or equivalent) to meet the commitment of Compliance Order Action IV-2, Issue F-2-1 in addition to project specific training	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #2		Training Course Completion, Course Number 004225, 6/17/2002	ED-2

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
8.	Individuals designated as "technical support staff" for nuclear facility SSC shall be qualified in accordance with DOE Order 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, or HNF-PRO-179, Obtaining Training Equivalencies, Waivers, and Extensions, under the training program of the individual project.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #3		Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1
9.	Engineers who stamp any material for use on the Hanford Site shall have a current Washington State Professional Engineer license when required by the State of Washington. Out-of-State licensed engineers may stamp engineering documents when required by code but not the State of Washington.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #4	N/A	N/A	Items required to be stamped for this project are required by code and not the State of Washington.
10.	Personnel assigned to design activities shall be qualified individuals who are trained to conduct the assigned activity.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #4		Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1
11.	The Project Chief Engineers shall be responsible for defining engineering training requirements for their projects.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.1, #5	N/A	N/A	Statement at a level too high for this document.
12.	Each FH Project shall establish a traceable chain of authority extending from the FH Chief Engineer through the Project Chief Engineer to the DA responsible for each SSC for which the Project is responsible.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.2, #1		02-SNF/DBE-001 SNF Interoffice Correspondence Design Authorities and alternate Design Authorities list, Rev. 17, for the Spent Nuclear Fuel Project	ED-3
13.	Each DA shall establish and document a configuration baseline for the SSC as assigned.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.2, #1		02-SNF/DBE-001 SNF Interoffice Correspondence Design Authorities and alternate Design Authorities list, Rev. 17, for the Spent Nuclear Fuel Project	ED-3

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
14.	DAs responsible for SSC shall be assigned during each phase of the facility life cycle which includes, design, construction, operation, transition to deactivation, and decommissioning: · The DA shall possess knowledge of the system configuration basis and operating limits from the safety analysis. · The DA shall have lead responsibility for the configuration management of the design in each of the respective phases of the facility life cycle. · The DA shall be responsible for maintaining the configuration baseline consistent with the physical configuration of the SSC the baseline represents including approving modifications to an existing configuration. · The DA shall ensure that the configuration baseline is technically correct and meets documented design requirements.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.2, #1		02-SNF/DBE-001 SNF Interoffice Correspondence Design Authorities and alternate Design Authorities list, Rev. 17, for the Spent Nuclear Fuel Project Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-3, ED-1
15.	Each FH Project shall establish, document and maintain a configuration baseline.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.3, #1		List of Configuration Baseline Documents for Welding	ED-4
16.	Each FH Project shall ensure that those documents that comprise the configuration baseline are identified as Configuration Baseline (Yes or No) in the Hanford Site Document Control System (DCS) along with the DA designator and number.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.3, #2		List of Configuration Baseline Documents for Welding	ED-4
17.	All configuration baseline drawings shall be as-built and field verified using a graded approach (defined confidence level) and kept current when modified within the change control requirements defined in Section 5 10	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.3, #3		A20-15220-32, List of As-Built Drawings Submittal 32 List of Configuration Baseline Documents for Welding	ED-5, ED-4
18.	As each drawing is revised and field verified/as-built, the DCS database shall be marked with the date the drawing was released into the DCS as Field Verified and As-Built.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.3, #3		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
19.	Any drawings in the Configuration Baseline that are not as-built field verified to a defined confidence level shall be included in a plan for compliance and approved by the Project Chief Engineer.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.3, #4		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
20.	In addition, the FH Project shall verify that all drawings in the configuration baseline are designated as either "essential" (E) or "support" (S) and ensure the DCS has identified the drawings appropriately.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.3, #5		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
21.	The balance of the drawings not in the configuration baseline shall be considered "reference only."	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.3, #5		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
22.	Each FH managed DOE Category 1, 2, and 3 nuclear facilities shall designate qualified DAs for VSS.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #1a		Integrated Training Electronic Matrix for Krieg, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. Kreig Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1
23.	The DA shall include and integrate the elements of identification of systems within its scope, configuration management, and support for operations and maintenance.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #1a		SNF-6151, Rev. 1, Spent Nuclear Fuel Project Canister Storage Building System Design Descriptions, Section 19.0	ED-6
24.	Each FH nuclear facility shall identify the active safety class and safety *significant structures, systems and* components, as defined in the nuclear facility's DOE-approved safety basis and other active systems that perform an important defense-in-depth function for the protection of the public, workers, or the environment within the context of the safety basis, as designated by the facility line management.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #1b		SNF-5991, Rev. 1, Canister Storage Building Safety Equipment List List of Authorization Basis documents for Welding	ED-7, ED-8
25.	A DA shall be designated for each system important to safety.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #2a		02-SNF/DBE-001 SNF Interoffice Correspondence Design Authorities and alternate Design Authorities list, Rev. 17, for the Spent Nuclear Fuel Project	ED-3
26.	The DA shall provide technical assistance in support of line management responsibility to ensure continued operational readiness of the system.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #2b	N/A	N/A	Occurs after start-up. Outside scope of this document.
27.	The DA shall assure that the configuration of assigned system(s) is being effectively managed according to the configuration management elements in Section 4.4 3.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #2c	N/A	N/A	Occurs after start-up. Outside scope of this document.

Rqmt No.	Requirement Text	*Source* Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
28.	The DA shall remain appraised of operational status and ongoing modification activities; assist operations to review key system parameters and evaluate system performance; initiate actions to correct problems; remain cognizant of system-specific maintenance/operations history and industry operating experience; identify trends from operations; provide assistance in determining operability or correcting out-of-specification conditions or evaluating questionable data; provide or support analysis to determine operability when the system is suspected of inoperability or degradation; review and concur with design changes; and provide input to development of special operating/test procedures.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #2d	N/A	N/A	Occurs after start-up. Outside scope of this document.
29.	Specific DA training requirements shall be defined by the POC and documented in the facility's training program on a Qualification Card.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #2e		Integrated Training *Electronic Matrix for Krieg*, Stuart A Integrated Training Electronic Matrix for Goldmann, Louis H Design Authority Qualification Form - Stuart A. *Kreig* Spent Nuclear Fuel Project Engineering Qualification - Louis H. Goldmann	ED-1
30.	Configuration management shall be used to develop and maintain consistency among system requirements and performance criteria, system documentation, and physical configuration.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, *Section 4.4, #3a*		A20-15220-03, AIT Quality Assurance Program, Controlled copy *Standard Procedures* submittal 3	ED-9
31.	Configuration management shall integrate the elements of system requirements and performance criteria, system assessments, change control/work control, and documentation control.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #3a		A20-15220-03, AIT Quality Assurance Program, Controlled copy Standard Procedures submittal 3	ED-9
32.	Documents that define the system design basis and supporting documents shall be compiled and kept current using formal change control/work control	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #3b		A20-15220-11, *Final* Design Package Submittal 11	ED-10
33.	When the design basis is not clearly defined, the identification of system requirements and performance criteria essential to the system's performance of its safety function, the basis for the requirements, and how the current system configuration satisfies the requirements and criteria shall be used for that purpose	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #3c	N/A	N/A	The design basis is well defined.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
34.	Periodic system assessments during facility inspections shall be performed and include review of system operability, reliability, and material condition.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #3d	N/A	N/A	Takes place after start-up and is outside the scope of this document.
35.	These periodic reviews (periodic system assessments) shall assess the system's ability to perform its design and safety functions.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #3d	N/A	N/A	Takes place after start-up and is outside the scope of this document.
36.	The system's physical configuration shall also be periodically compared to the system documentation.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #3e	N/A	N/A	Takes place after start-up and is outside the scope of this document.
37.	System and component performance shall be monitored and compared to established performance criteria.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #3e	N/A	N/A	Takes place after start-up and is outside the scope of this document.
38.	Work on systems, including maintenance and repair, shall be controlled under a formal change control/work control process to ensure that changes are not inadvertently introduced and that required system performance is not compromised.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #3f	N/A	N/A	Takes place after start-up and is outside the scope of this document.
39.	Systems shall be tested after modification to ensure continued capability to fulfill system requirements.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.4, #3f	N/A	N/A	Takes place after start-up and is outside the scope of this document.
40.	A DA's approval shall be required for new configuration baselines and modifications to an existing configuration baseline.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.5, #1	N/A	N/A	Welding does not affect CSB Baseline.
41.	DAs shall approve all design documents that affect their configuration baseline and that are to be issued for retrieval whether initiated through the Engineering Change Process per HNF-PRO-440, Engineering Document Change Control (EDC), through HNF-PRO-2001, Facility Modification Package (FMP) Process, or through the Document Change Notice (DCN) process as defined in HNF-MCP-8016.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.5, #2		Vendor information file	See EDC's in file. ED-11 This is a post-start item.
42.	Reviews required by HNF-RD-8635, Review of Technical Documents, and other applicable review and approval procedures shall be completed after completion of design verification.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.5, #3	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	List USQ's Listing of DCN's SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification	ED-12 ED-13, ED-14, ED-15, ED-16
43.	The DA shall ensure that the preparation of the design documentation is supervised by a professional engineer licensed in the State of Washington when professional engineer stamped documentation is required by regulatory agencies or for other reasons.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 4.5, #4	N/A	N/A	Out of state PE is acceptable for items stamped by AIT, as per e-mail listed as ED-85.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
44.	When further expertise is needed, the DA shall ensure that the individuals reviewing design criteria and configuration baseline documents are qualified per Section 4.1 of this document.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 4.5, #5**	N/A	N/A	Further expertise will not be required.
45.	The DA shall ensure all configuration baseline documents receive clearance reviews per HNF-PRO-407, Obtaining Classification or Declassification Review, (for limited use, classified, or sensitive information) and HNF-PRO-184, Information Clearance, (for limited use information).	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 4.5, #6**		List of Configuration Baseline Documents for Welding	ED-17
46.	A request for engineering services shall be documented by providing the task scope and a description of requirements and deliverables, including cost and schedule constraints.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.1, #1**		Request for Proposal, No. 377 A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-18, ED-12
47.	All engineering services requests shall be reviewed and a determination made if an existing configuration baseline will be affected or a new one will need to be established.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.1, #2**		List of Configuration Baseline Documents for Welding	Welding does not affect CSB Baseline. ED-17
48.	If the configuration baseline is affected, the appropriate design criteria shall be given to the design organization and the design baseline(s) changed to reflect the new information.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.1, #2**	N/A	N/A	Welding does not affect CSB Baseline.
49.	Using a tailored approach with engineering judgment, every proposed configuration change shall be evaluated.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.1, #3**	N/A	N/A	Equipment is owned by AIT.
50.	Design activity, including design verification, shall be documented in an engineering work or project execution plan.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.2, #1**		A20-15220-06, Rev. 2, Engineering Work Plan Submittal 6	ED-19
51.	Significant engineering design activity plans or work scope shall be approved by the design organization before beginning a design task. This applies for design activities external to the DA organization.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.2, #2**		A20-15220-06, Rev. 2, Engineering Work Plan Submittal 6	ED-19
52.	SSC requiring inspection or testing shall be identified early in the design phase.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.2, #3**		A20-15220-06, Rev. 2, Engineering Work Plan Submittal 6	ED-19
53.	Planning shall consider the use of a process tool, such as value engineering, to improve efficiency and cost effectiveness when analyzing physical asset acquisition.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.2, #4**		Request for Proposal, No. 377 A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-18 ED-12

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
54.	Design Input Requirements from Quality Assurance Program Document (QAPD): a. Design inputs include such information as technological decisions, design bases, health and safety considerations, environmental conditions and regulations, expected life cycle, performance parameters, codes and standards requirements, reliability requirements, safety classification, and interfaces with existing structures/equipment. Information derived from experience, as set forth in reports or other documentation, shall be made available to the cognizant design organization.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #1	N/A	N/A	Requirements listed in this section (Section 5.3), whose source is DOE O 420.1, apply to the activities of design and construction of new DOE nuclear facilities and of modifications to existing DOE Hazard Category 1, 2, and 3 non-reactor nuclear facilities when the proposed modifications significantly degrades the approved safety basis for the facility. Modifications to facility design and construction during the design and construction phase shall conform to the requirements for new facilities. Activities associated with facility deactivation at end of life are exempt if justified by safety analysis
55.	Design Input Requirements from Quality Assurance Program Document (QAPD): b. Design inputs shall be identified and documented, and the selection reviewed and approved by the responsible design organization.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #1	N/A	N/A	Requirements listed in this section (Section 5.3), whose source is DOE O 420.1, apply to the activities of design and construction of new DOE nuclear facilities and of modifications to existing DOE Hazard Category 1, 2, and 3 non-reactor nuclear facilities when the proposed modifications significantly degrades the approved safety basis for the facility. Modifications to facility design and construction during the design and construction phase shall conform to the requirements for new facilities. Activities associated with facility deactivation at end of life are exempt if justified by safety analysis.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
56.	Design Input Requirements from Quality Assurance Program Document (QAPD): c. Design input shall be specified and approved prior to use and at a level of detail adequate to support design decisions and design activity, including verification and evaluation of design changes.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #1	N/A	N/A	Requirements listed in this section (Section 5.3), whose source is DOE O 420.1, apply to the activities of design and construction of new DOE nuclear facilities and of modifications to existing DOE Hazard Category 1, 2, and 3 non-reactor nuclear facilities when the proposed modifications significantly degrades the approved safety basis for the facility. Modifications to facility design and construction during the design and construction phase shall conform to the requirements for new facilities. Activities associated with facility deactivation at end of life are exempt if justified by safety analysis.
57.	Design Input Requirements from Quality Assurance Program Document (QAPD): d. Changes from approved design inputs, including the reason for the changes, shall be identified, documented, approved by the responsible design organization, and controlled.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #1	N/A	N/A	Requirements listed in this section (Section 5.3), whose source is DOE O 420.1, apply to the activities of design and construction of new DOE nuclear facilities and of modifications to existing DOE Hazard Category 1, 2, and 3 non-reactor nuclear facilities when the proposed modifications significantly degrades the approved safety basis for the facility. Modifications to facility design and construction during the design and construction phase shall conform to the requirements for new facilities. Activities associated with facility deactivation at end of life are exempt if justified by safety analysis

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
58.	Hazards, Environmental Impacts, and ES&H Requirements shall be identified.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #2	N/A	N/A	Requirements listed in this section (Section 5.3), whose source is DOE O 420.1, apply to the activities of design and construction of new *DOE nuclear facilities* and of modifications to existing DOE Hazard Category 1, 2, and 3 non-reactor nuclear facilities when the proposed modifications significantly degrades the approved safety basis for the facility. Modifications to facility design and construction during the design and construction phase shall conform to the requirements for new facilities. Activities associated with facility deactivation at end of life are exempt if justified by safety analysis.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
59.	Evaluations concerning the following shall be provided: a. Imminent hazards to personnel or the environment - (See HNF-PRO-704, Hazard and Accident Analysis Process.) b. Safe condition of SSC. c. Impacts from Documented Safety Analysis - Perform a USQ screening/evaluation per HNF-PRO-062, Unreviewed Safety Question *Process, to determine if proposed* facility modification requires DOE/RL approval. If the modification is determined to be a USQ, further analysis is required to determine if the modification to the Facility SSC requires a preliminary documented safety analysis (PDSA) and if the project design criteria needs approval by DOE/RL. d. Natural phenomena hazards - analyzed per HNF-PRO-097, Engineering Design and Evaluation. e. Radiological impacts on personnel and the environment - Maintain radiation exposure ALARA through the design of SSC and administrative controls. Use physical design features as the primary methods. Use Administrative controls and procedural requirements only as supplemental methods to control radiation exposure. See HNF-PRO-1622, Radiological Design Review *Process, for implementation* requirements. f. Hazardous materials. g. Environmental compliance - Include in all design activities a review for potential impact by National Environmental Policy Act (NEPA) requirements. See HNF-PRO-8808, NEPA, SEPA, Cultural and Natural Resources, for implementation. h. Required permits. i Security systems and procedures.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #2**	N/A	N/A	Requirements listed in this section (Section 5.3), whose source is *DOE O 420.1, apply to* the activities of design and construction of new DOE nuclear facilities and of modifications to existing DOE Hazard Category 1, 2, and 3 non-reactor nuclear facilities when the proposed modifications significantly degrades the approved safety basis for the facility. Modifications to facility design and construction during the design and construction phase shall conform to the requirements for new facilities. Activities associated with facility deactivation at end of life are exempt if justified by safety analysis.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
60.	Hazards and Environmental Impacts shall be analyzed and controls implemented as part of the Design Criteria or Work Package resolution.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #3	N/A	N/A	Requirements listed in this section (Section 5.3), whose source is DOE O 420.1, apply to the activities of design and construction of new DOE nuclear facilities and of modifications to existing DOE Hazard Category 1, 2, and 3 non-reactor nuclear facilities when the proposed modifications significantly degrades the approved safety basis for the facility. Modifications to facility design and construction during the design and construction phase shall conform to the requirements for new facilities. Activities associated with facility deactivation at end of life are exempt if justified by safety analysis.
61.	Design requirements shall ensure that nuclear facilities are designed and constructed so as to assure adequate protection for the public, workers, and the environment by application of the requirements contained herein.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #4	N/A	N/A	Requirements listed in this section (Section 5.3), whose source is DOE O 420.1, apply to the activities of design and construction of new DOE nuclear facilities and of modifications to existing DOE Hazard Category 1, 2, and 3 non-reactor nuclear facilities when the proposed modifications significantly degrades the approved safety basis for the facility. Modifications to facility design and construction during the design and construction phase shall conform to the requirements for new facilities. Activities associated with facility deactivation at end of life are exempt if justified by safety analysis

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
62.	Design inputs shall include environmental compliance requirements.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #4		DOE/EIS-0245/SA1, August 1998, Supplemental Analysis of Environmental Effects of Changes in DOE's Preferred Alternative for Management of Spent Nuclear Fuel from the K Basins at the Hanford Site, Richland, Washington P02-SNF/RTW-004, New Source Applicability Determination for Spent Fuel Multi-Canister Overpack Welding Activities, June 5, 2002 Pollution Prevention Memo, Re: MCO Welding, June 26, 2002, From: James Zimmerman, To: David Nearing	ED-20, ED-21, ED-22
63.	Detailed application of design requirements shall be guided by safety analyses that establish the identification and functions of safety (safety class and safety significant) Structures, Systems, and Components (SSCs) for a facility and establish the significance to safety of functions performed by those SSCs.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #5		HNF-3553, Rev. 2, Spent Nuclear Fuel Project Final Safety Analysis Report HNF-3553 Annex A, Rev. 2, Spent Nuclear Fuel Project Canister Storage Building Final Safety Analysis Report Annex A	ED-23, ED-23
64.	Safety analyses shall consider facility hazards, natural phenomena hazards, and external man-induced hazards. Factors such as proximity to nearby facilities such as airports, pipelines, and barge traffic peculiar to the site shall also be considered.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #6		HNF-3553, Rev. 2, Spent Nuclear Fuel Project Final Safety Analysis Report HNF-3553 Annex A, Rev. 2, Spent Nuclear Fuel Project Canister Storage Building Final Safety Analysis Report Annex A	ED-23, ED-23
65.	A safety analysis shall be performed at the earliest practical point in conceptual or preliminary design, so that required functional attributes of safety SSCs can be specified in the detailed design.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #7		HNF-3553, Rev. 2, Spent Nuclear Fuel Project Final Safety Analysis Report HNF-3553 Annex A, Rev. 2, Spent Nuclear Fuel Project Canister Storage Building Final Safety Analysis Report Annex A	ED-23, ED-23
66.	Design criteria shall be established for all proposed new designs.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #8		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
67.	New design criteria shall be developed for changes to existing SSC when existing design criteria is not applicable or does not exist.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #8		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
68.	Non-reactor nuclear facilities shall be designed with the objective of providing multiple layers of protection to prevent or mitigate the unintended release of radioactive materials to the environment.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #9		02-SNF/RTW-004, New Source Applicability Determination for Spent Fuel Multi-Canister Overpack Welding Activities, June 5, 2002	ED-21

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
69.	Defense in depth shall include: siting, minimization of material at risk, the use of conservative design margins and quality assurance; the use of successive physical barriers for protection against the release of radioactivity; the provision of multiple means to ensure critical safety functions (those basic safety functions needed to control the processes, maintain them in a safe state, and to confine and mitigate radioactivity associated with the potential for accidents with significant public radiological impact); the use of equipment and administrative controls which restrict deviations from normal operations and provide for recovery from accidents to achieve a safe condition; means to monitor accident releases required for emergency responses; and the provision of emergency plans for minimizing the effects of an accident.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #9		02-SNF/RTW-004, New Source Applicability Determination for Spent Fuel Multi-Canister Overpack Welding Activities, June 5, 2002 Pollution Prevention Memo, Re: MCO Welding, June 26, 2002, From: James Zimmerman, To: David Nearing	ED-21, ED-22
70.	Facilities shall be sited and designed in such a manner that gives adequate protection for the health and safety of the public and for workers, including those at adjacent facilities, from the effects of potential facility accidents involving the release of radioactive materials.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #10		02-SNF/RTW-004, New Source Applicability Determination for Spent Fuel Multi-Canister Overpack Welding Activities, June 5, 2002 Pollution Prevention Memo, Re: MCO Welding, June 26, 2002, From: James Zimmerman, To: David Nearing	ED-21, ED-22
71.	All nuclear facilities with uncontained radioactive materials (as opposed to material contained within drums, grout, and vitrified materials) shall have means to confine them.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #11	N/A	N/A	There is no uncontained radioactive materials in the CSB.
72.	For a specific nuclear facility, the number and arrangement of confinement barriers and their required characteristics shall be determined on a case-by-case basis.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #11	N/A	N/A	MCO welding is not a facility project. The CSB has already completed the start-up process.
73.	Factors that shall be considered in confinement system design shall include type, quantity, form, and conditions for dispersing the material.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #11	N/A	N/A	MCO welding is not a facility project. The CSB has already completed the start-up process.
74.	Engineering evaluations, trade-offs, and experience shall be used to develop practical designs that achieve confinement system objectives.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #11		A20-15220-11, Final Design Package, Submittal 11	ED-10
75.	The adequacy of confinement systems to effectively perform the required functions shall be documented and accepted through the DSA.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #11	N/A	N/A	MCO welding is not a facility project. The CSB has already completed the start-up process.
76.	Facilities shall be designed to facilitate safe deactivation, decommissioning, and decontamination at end of life	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #12	N/A	N/A	MCO welding is not a facility project. The CSB has already completed the start-up process.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
77.	Facilities shall be designed to facilitate inspections, testing, maintenance, repair and replacement of safety SSCs as part of an overall reliability, availability, and maintainability program.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #13	N/A	N/A	MCO welding is not a facility project. The CSB has already completed the start-up process.
78.	The objective is that the facility can be maintained in a safe state, including during these operations, and in keeping with the as low as reasonably achievable (ALARA) principle for occupational radiation exposure.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #13		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
79.	Facilities shall be designed to keep occupational radiation exposure within statutory limits and incorporate ALARA principles in design, including design provisions to facilitate decontamination during the operational period.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #14		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
80.	Facility process systems shall be designed to minimize the production of wastes and minimize the mixing of radioactive and non-radioactive wastes.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #15		Pollution Prevention Memo, Re: MCO Welding, June 26, 2002, From: James Zimmerman, To: David Nearing	ED-22
81.	Measures shall be taken to maintain radiation exposure in controlled areas as low as is reasonably achievable through facility and equipment design and administrative control.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #16		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
82.	The primary methods used (to maintain radiation exposure in controlled areas) shall be physical design features (e.g., confinement, ventilation, remote handling, and shielding)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #16	N/A	N/A	No items being procured as a CGI.
83.	Administrative controls and procedural requirements shall be employed only as supplemental methods to control radiation exposure.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #16		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
84.	For specific activities where use of physical design features are demonstrated to be impractical, administrative controls and procedural requirements shall be used to maintain radiation exposures ALARA.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #16		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25

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			Implementation	Adherence	
85.	During the design of new facilities or modification of old facilities, the following objectives shall be adopted: a. Optimization methods shall be used to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #17		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
86.	During the design of new facilities or modification of old facilities, the following objectives shall be adopted: b. The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy (2000 hours per year) shall be to maintain exposure levels below an average of 0.5 mrem (5 microsieverts) per hour and as far below this average as is reasonably achievable. The design objectives for exposure rates for potential exposure to a radiological worker where occupancy differs from the above shall be ALARA and shall not exceed 20 percent of the applicable standards in Sec. 835 202.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #17		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
87.	During the design of new facilities or modification of old facilities, the following objectives shall be adopted: c. Regarding the control of airborne radioactive material, the design objective shall be, under normal conditions, to avoid releases to the workplace atmosphere and in any situation, to control the inhalation of such material by workers to levels that are ALARA; confinement and ventilation shall normally be used.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #17		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
88.	During the design of new facilities or modification of old facilities, the following objectives shall be adopted: d. The design or modification of a facility and the selection of materials shall include features that facilitate operations, maintenance, decontamination, and decommissioning	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #17		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
89.	The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy (2000 hours per year) shall be to maintain exposure levels below an average of 0.5 mrem (5 microsieverts) per hour and as far below this average as is reasonably achievable.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #18		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
90.	The design objectives for exposure rates for potential exposure to a radiological worker where occupancy differs from the above shall be ALARA and shall not exceed 20 percent of the applicable standards in ' 835.202.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #18		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
91.	During routine operations, the combination of design features and administrative control procedures shall provide that: a. The anticipated magnitude of the total effective dose equivalent shall not exceed 5 rems (0.05 sievert) in a year;	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #19		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
92.	During routine operations, the combination of design features and administrative control procedures shall provide that: b. The anticipated magnitude of the committed dose equivalent to any organ or tissue, plus any deep dose equivalent from external exposure, shall not exceed 50 rems (0.5 sievert) in a year; and	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #19		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
93.	During routine operations, the combination of design features and administrative control procedures shall provide that: c. Exposure levels are as low as reasonably achievable.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #19		SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002 CSB-AL-0009, ALARA Analysis for the CSB 09	ED-24, ED-25
94.	Safety SSCs shall, commensurate with the importance of the safety functions performed, be designed: a. So that they can perform their safety functions when called upon to operate, and b. Under a quality assurance program that complies with HNF-MP-599	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #20		A20-15220-11, Final Design Package Submittal 11 A20-15220-03, AIT Quality Assurance Program, Controlled copy Standard Procedures submittal 3	ED-10, ED-9
95.	Design Criteria requirements for the Hanford fire protection program are documented in HNF-RD-10606, Fire Protection Program Requirements, Section 2.3, PHMC Fire Protection Design Requirements. DAs shall incorporate applicable requirements into design documentation.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #21		HNF-SD-SNF-FHA-002, Rev. 2b, Final Fire Hazards Analysis for the Canister Storage Building, 9/19/2002	ED-26
96.	The FHA shall be developed using a graded approach. The conclusions of the FHA shall be incorporated in the DSA Accident Analysis and shall be integrated into design basis and beyond design basis accident conditions	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #22		HNF-SD-SNF-FHA-002, Rev. 2b, Final Fire Hazards Analysis for the Canister Storage Building, 9/19/2002	ED-26

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97.	The DA shall incorporate Fire Protection requirements in Project design documentation as applicable (Refer to HNF-RD- 9717, Fire Prevention for Construction/Occupancy/Demolition Activities.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #23		HNF-SD-SNF-FHA-002, Rev. 2b, Final Fire Hazards Analysis for the Canister Storage Building, 9/19/2002	ED-26
98.	The DA shall incorporate the requirements of HNF-RD-899, Fire Protection System Testing/Inspection Maintenance/Deficiencies, HNF-RD-8589, Hanford Fire Marshall Permits, and HNF-RD-9900, Hot-Work Performance Requirements, as they apply.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #24		HNF-SD-SNF-FHA-002, Rev. 2b, Final Fire Hazards Analysis for the Canister Storage Building, 9/19/2002	ED-26
99.	Operations with fissionable materials that pose a criticality accident hazard shall be evaluated and documented to demonstrate that the operation will be subcritical under both normal and credible abnormal conditions.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #25		HNF-SD-SNF-HIE-001, Rev. 3, Canister Storage Building Hazard Analysis Report, March 16, 2002 HNF-6025, Rev. 0, Canister Storage Building Hazards Assessment, May 24, 2000	ED-27
100.	Fissionable material operations shall be conducted in such a manner that consequences to personnel and property that result from a criticality accident will be mitigated.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #25		HNF-SD-SNF-HIE-001, Rev. 3, Canister Storage Building Hazard Analysis Report, March 16, 2002 HNF-6025, Rev. 0, Canister Storage Building Hazards Assessment, May 24, 2000	ED-27
101.	No single credible event or failure shall result in a criticality accident having unmitigated consequences.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #25		HNF-SD-SNF-HIE-001, Rev. 3, Canister Storage Building Hazard Analysis Report, March 16, 2002 HNF-6025, Rev. 0, Canister Storage Building Hazards Assessment, May 24, 2000	ED-27
102.	The nuclear criticality safety program shall be evaluated and documented and shall include: a. Nuclear criticality safety evaluations for normal and credible abnormal conditions that document the parameters, limits, and controls required to ensure that the analyzed conditions are subcritical	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #25		HNF-SD-SNF-HIE-001, Rev. 3, Canister Storage Building Hazard Analysis Report, March 16, 2002 HNF-6025, Rev. 0, Canister Storage Building Hazards Assessment, May 24, 2000	ED-27
103.	The nuclear criticality safety program shall be evaluated and documented and shall include: b. Limits and controls identified by the nuclear criticality safety evaluations shall be implemented.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #25		HNF-SD-SNF-HIE-001, Rev. 3, Canister Storage Building Hazard Analysis Report, March 16, 2002 HNF-6025, Rev. 0, Canister Storage Building Hazards Assessment, May 24, 2000	ED-27

Rqmt No.	Requirement Text	*Source* Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
104.	The nuclear criticality safety program shall be evaluated and documented and shall include: c. The need for criticality accident detection devices and alarm systems, and installation of such equipment where total risk to personnel will be reduced shall be assessed.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #25**		HNF-SD-SNF-HIE-001, Rev. 3, Canister Storage Building Hazard Analysis Report, March 16, 2002 HNF-6025, Rev. 0, Canister Storage Building Hazards Assessment, May 24, 2000	ED-27
105.	Facilities shall be designed such that fissionable materials shall be produced, processed, stored, transferred, disposed, or otherwise handled in such a manner that the probability of a criticality accident is acceptably low, and, to the extent practical, all persons, all government, public, and private property, and the environment are protected from damaging effects and undue hazards that may arise from a criticality accident.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #26**		HNF-SD-SNF-HIE-001, Rev. 3, Canister Storage Building Hazard Analysis Report, March 16, 2002 HNF-6025, Rev. 0, Canister Storage Building Hazards Assessment, May 24, 2000	ED-27
106.	Process designs shall incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible (double contingency).	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #27**		HNF-SD-SNF-HIE-001, Rev. 3, Canister Storage Building Hazard Analysis Report, March 16, 2002 HNF-6025, Rev. 0, Canister Storage Building Hazards Assessment, May 24, 2000	ED-27
107.	Protection shall be provided by either: a. The control of two independent process parameters (which is the preferred approach, when practical, to prevent common-mode failure), or b. A system of multiple controls on a single process parameter. The number of controls required upon a single controlled process parameter shall be based upon control reliability and any features that mitigate the consequences of control failure. In all cases, no single credible event or failure shall result in the potential for a criticality accident except as referenced in Requirement 5.1 36.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #27**		HNF-3553, Rev. 2, Spent Nuclear Fuel Project Final Safety Analysis Report HNF-3553 Annex A, Rev. 2, Spent Nuclear Fuel Project Canister Storage Building Final Safety Analysis Report Annex A	ED-23, ED-23
108.	Double contingency shall be demonstrated by documented evaluations.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #29**	N/A	N/A	*No double contingency* associated with welding.
109.	Where a significant quantity of fissionable material is being processed and criticality safety is a concern, passive engineered controls such as geometry control shall be considered as a preferred control method.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #30**		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
110.	Where passive engineered control is not feasible, the preferred order of controls is: active engineered controls, followed by administrative controls. The double contingency analysis shall justify the chosen controls	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #30**		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
111.	All dimensions, nuclear properties, and other features upon which reliance is placed shall be documented and verified prior to beginning operations, and control shall be exercised to maintain them.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #30		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
112.	Nuclear facilities shall be designed, constructed, and/or operated so that the general public, the workers, and the environment are protected from the impact of all Natural Phenomena Hazards (NPHs).	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #31		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
113.	Where no specific requirements are specified, model building codes or national consensus industry standards shall be used.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #31		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
114.	For hazardous facilities, safety analyses shall be performed that include the ability of SCs and personnel to perform the intended safety functions under the effects of natural phenomena. (Refer to HNF-PRO-097, Engineering Design and Evaluation)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #32		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
115.	a. For new facilities, design the facility so that the SSCs will withstand the effects of natural phenomena as necessary to ensure the confinement of hazardous material, the operation of essential facilities, the protection of government property, and the protection of life safety for occupants of DOE buildings. b. Also for new facilities, consider potential damage and failure of SSCs due to both direct and indirect natural phenomena effects, including common cause effects and interactions from failures of other SSCs. c. For additions and major modifications of existing facilities the above (a. & b.) requirements apply and designs shall ensure that the modifications do not degrade the performance of existing SSCs to the extent that they will not withstand the effects of natural phenomena as necessary to ensure the confinement of hazardous material, the operation of essential facilities, the protection of government property, and the protection of life safety for occupants of DOE buildings.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #32		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
116.	Existing SSCs shall be evaluated against Requirement 5.2.32 when there is a significant degradation in the safety basis for the facility or if required by Executive Order 12941.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #33		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
117.	The plan shall incorporate a schedule for evaluation taking into account programmatic mission considerations and the safety significance of the potential failure of SSCs due to natural phenomena. If the evaluation of existing SSCs identifies natural phenomena mitigation deficiencies, an upgrade plan for the affected SSCs shall be established. The upgrade plan shall incorporate a prioritized schedule for upgrading the SSCs. The upgrade plan shall address possible time or funding constraints as well as programmatic mission considerations.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #33	N/A	N/A	There is no degradation in the safety basis or executive order associated with MCO welding.
118.	The design and evaluation of facilities to withstand natural phenomena shall be based on an assessment of the likelihood of future natural phenomena occurrences.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #34		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
119.	The natural phenomena hazards assessment shall be conducted commensurate with a graded approach and commensurate with the potential hazard of the facility.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #34		WHC-SD-SNF-DB-009, Rev. 4, Canister Storage Building Natural Phenomena Hazards, September 1996	ED-29
120.	For new Sites; natural phenomena hazards assessment shall be conducted commensurate with a graded approach to the facility. Site planning shall consider the consequences of all types of natural phenomena hazards.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #34	N/A	N/A	This does not take place at a new site.
121.	For existing Sites; if there are significant changes in natural phenomena hazards assessment methodology or site-specific information, the natural phenomena hazards assessments shall be reviewed and shall be conducted, as necessary	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #34	N/A	N/A	This does not take place at a new site.
122.	A review of the natural phenomena hazards assessment shall be conducted at least every 10 years. The review shall include recommendations to DOE on the need for updating the existing natural phenomena hazards assessments based on identification of any significant changes in methods or data	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #34	N/A	N/A	This does not take place at a new site.
123.	Facility safety class electrical systems shall be designed to the basic approach outlined in Section 5.2.3 (Electrical) of DOE G 420.1-1, Nonreactor Nuclear Safety Design Criteria and Explosives Safety Criteria Guide for Use with DOE O 420.1, Facility Safety, dated 3-28-00.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #35		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
124.	For facilities or sites with hazardous materials, the contractor/operator shall provide instrumentation or other means to detect and record the occurrence and severity of seismic events.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #36		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
125.	Design criteria shall be identified and documented. The following shall be included in the development of design criteria as applicable: a. Description of and basis for the modification. b. Functional and operational requirements for the modification. c. Description of existing SSC and the configuration baselines to be modified. d. Any requirements related to interfaces with other SSC or their configuration baselines. e. Applicable information from any feasibility studies that have been performed. f. Applicable, regulatory requirements, standards, requirements identification document (S/RID) requirements, and specific national consensus codes and standards. National consensus codes and standards [e g., American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI), National Fire Protection Association (NFPA) including National Electrical Code (NEC)], and model building codes shall be used as applicable whenever DOE criteria and standards do not explicitly apply or are not required by contract. (Refer to HNF-GD-8258, Appendix B, Guidance for Use of National Codes and Standards.) g. Constraints (e g., waste handling, permitting, hazard classification, process hazards, functional and physical interfaces, USQ evaluations). h. Other technical considerations to assist in evaluating alternative solutions during design development (e g., preferred technology, major assumptions, previous studies, construction considerations, ALARA, design objectives). i. Provide appropriate inspection, testing, and maintenance for designs to ensure continuing reliability and safety the SSC, and address appropriate disassembly and disposal requirements. j. Use standards NUREG 0700 or MIL-STD-1472 for designs requiring status indicators of systems and components if there is no system, structure, or component specific standard. k. Define Organizational and technical interfaces between different groups that provide input into the design process and document, transmit, and review as deemed necessary by the DA. l. Provide the current revision of design documents, including all	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #37		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 Letter Report: MCO Collar Mockup Weld Shrinkage Data P02-SNF/RTW-004, New Source Applicability Determination for Spent Fuel Multi-Canister Overpack Welding Activities, June 5, 2002 HNF-SD-SNF-HIE-001, Rev. 3, Canister Storage Building Hazard Analysis Report, March 16, 2002 HNF-6025, Rev. 0, Canister Storage Building Hazards Assessment, May 24, 2000 Listing of USQ's Pollution Prevention Memo, Re: MCO Welding, June 26, 2002, From: James Zimmerman, To: David Nearing A20-15220-11, Final Design Package Submittal 11 SNF-5589, Rev. 2, Canister Storage Building Master Equipment List, 9/26/2000 SNF-5991, Rev. 1, Canister Storage Building Safety Equipment List	ED-12, ED-30, ED-21, ED-27, ED-13, ED-22, ED-10, ED-31, ED-7 Master Equipment List and Safety Equipment list do not need to be updated for welding activities.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
	released (existing) engineering change notices (existing ECNs) or facility modification packages (FMPs) or Design Change Notice (DCN), to used in the actual performance of work. m. Identify all SSCs in the configuration baseline as safety class (SC), safety significant (SS), or general service (implied if not SC/SS) in accordance with the documented safety analysis (if applicable). (Refer to HNF-PRO-700, Safety Basis Development. Safety class and safety significant SSCs are subject to more stringent design criteria and verification requirements than those that are general service.) Provide Design criteria that consistent with the documented safety analysis.				
126.	*Design Criteria shall be reviewed* for: a. Technical adequacy; b. Inclusion of safety requirements; c. As low as reasonably achievable (ALARA) requirements for radiation, toxic, and occupational chemical exposure; d. Considerations for economic operation, maintenance functions and constructability; e. Quality assurance requirements; f. Agreement with authorization *basis requirements*; g. Life-cycle cost considerations, including programmatic, fabrication, environmental, security, decontamination and decommissioning, and energy conservation, and h. Environmental Compliance.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #38**		SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification	ED-15, ED-16
127.	Design Criteria shall be approved: a. The documented design criteria for each proposed modification to a configuration baseline shall be approved. If the design criteria is *part of an FMP, the design criteria* is approved as part of the FMP.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #39**		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
128.	Design Criteria shall be approved: b. If Design Criteria for a nuclear facility is other than the design criteria from DOE O 420.1 are used for a Major Modification (i.e., a modification that substantially changes the Safety Basis) DOE/RL approval is required. (See HNF-RD-8317, Safety Basis Requirements)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.3, #39**	N/A	N/A	MCO Welding does not affect the safety basis of the CSB. See closed USQ's (ED-13)
129.	Design Criteria shall be approved: c. The design organization shall *review the design criteria for* technical adequacy. Document additional design criteria (e g , codes and standards) identified by the design organization.	HNF-RD-1819, PHMC Engineering Requirements, *Rev. 0, August 12, 2002,* **Section 5.3, #39**		A20-15220-11, Final Design Package Submittal 11	ED-10

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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130.	Design Criteria shall be approved: d. If approved and released design criteria requires change, the reason for the changes shall be identified and documented in an FMP, EDC or DCN (as applicable), and approved. The responsible design organization shall approve.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #39		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
131.	Design Criteria shall be approved: e. Projects related design criteria shall be approved by Project Management. (Refer to HNF-PRO-1997)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.3, #39		A20-SOW-001, Rev. 4 *Statement of Work for the* MCO Closure Welds, January 13, 2003	ED-12
132.	The design shall be defined, controlled and verified. Design documents shall support the facility design, construction, and operation. The design methods, parts, equipment, and processes that are essential to the function of the items *shall be selected and reviewed for* suitability of application.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.4, #1a		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-11, Final Design Package Submittal 11	ED-12, ED-28, ED-10
133.	Design documents, including changes, shall incorporate applicable requirements and design bases.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.4, #1b		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-11, Final Design Package Submittal 11	ED-12, ED-28, ED-10
134.	The design process shall translate design input into design output documents that are technically correct and meet the end user's requirements.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.4, #1c		A20-SOW-001, Rev. 4 Statement of Work for the *MCO Closure Welds*, January 13, 2003 SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-11, Final Design Package Submittal 11	ED-12, ED-28, ED-10
135.	Technical design interfaces shall be identified, documented, and controlled throughout the design process.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.4, #1d		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-11, *Final* Design Package Submittal 11	ED-12, ED-28, ED-10

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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136.	Administrative interfaces, which include authorities, responsibilities, and lines of communication between project team members, shall be defined in sufficient detail to identify and establish relationships of such team members as end users, stakeholders, responsible design organizations, designers, purchasing agents, suppliers, and testers/inspectors.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.4, #1e**		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
137.	Transmittal of design information *across organizational interfaces* shall be documented and controlled.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.4, #1f**		**AIT Communications File at the end of Phase I**	ED-34 This is a post start item.
138.	Aspects of design that are important to safety, reliability, or environmental considerations shall be identified during the design process.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.4, #1g**		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
139.	Design calculations shall be identifiable by subject (including structure, system or component to which the calculation applies), originator, reviewer and date, or by other data so the calculations are *retrievable (Refer to Section 5 5)*	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.4, #1h**		A20-15220-11, Final Design Package Submittal 11	ED-10
140.	Computer software used to originate or verify safety or other risk-significant design solutions during the design process shall be validated, and the status of validation shall be identified and documented prior to use. (Refer to Section 5.5)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.4, #1i**		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
141.	The organization accomplishing the design shall ensure design output documents meet design input requirements and are useable for their intended purpose. They shall verify any deviations from applicable standards or requirements have been approved and documented	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.4, #1j**		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 A20-15220-11, Final Design Package Submittal 11	ED-12, ED-10
142.	The final design shall be relatable to the design input in sufficient detail to permit design verification. (Refer to Section 5.9)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.4, #1k**		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 A20-15220-11, Final Design Package Submittal 11	ED-12, ED-10
143.	The final design shall specify acceptance and in-service inspections and test requirements, and include or reference appropriate acceptance criteria. (Refer to Section 5.12)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.4, #1l**		A20-15220-11, Final Design Package Submittal 11	ED-10
144.	Design calculations used as a design basis for a configuration baseline shall be identified by subject (including the SSC(s) to which the calculation applies), originator, reviewer, and date, or by other data so that the calculations are retrievable.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.5, #1**		A20-15220-11, Final Design Package Submittal 11	ED-10

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145.	Design analyses or calculations supporting the configuration baseline in an approved form shall be documented (i.e., separate document or FMP) and include the following as applicable: a. Definition of the objective of the analysis. b. Definition of design inputs and their sources. c. Results of literature searches or other applicable background data. d. Identification of assumptions. e. Identification of any computer calculation, including computer type, computer program. f. Revision identification, inputs, outputs, and the bases supporting application of the computer program to the specific physical problem. g. Identification of the originator, reviewer, and approver.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.5, #2**	N/A	N/A	MCO CCA Welding does not affect the CSB Configuration Baseline.
146.	Design analysis documents using computer calculations shall include in the document the computer type, computer program (i.e., name), revision identification, inputs, outputs, evidence of or reference to the computer program verification, and the bases (or reference thereto) supporting application of the computer program to the specific physical problem.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.5, #3**		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
147.	Computer software used in performing calculations and analyses shall be verified and validated for use before approval of the configuration baseline documents.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.5, #4**		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
148.	All calculations and analyses shall be checked to ensure completeness and accuracy. The person checking the calculations shall not be the person who prepared the original document.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.5, #5**		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 A20-15220-11, Final *Design Package* Submittal 11	ED-12, ED-10
149.	The design analysis shall be included in an applicable FMP or as a separate document, and the approved document sent to document control by EDC or FMP for release, change control, retention and retrieval in accordance with HNF-RD- 8310, Document Control Program	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.5, #6**		AIT Design Analysis Report	ED-35 Submitted with A20-15220-11, Final Design Report.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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150.	Design products shall be recorded in design documents such as drawings, specifications, test/inspection plans, maintenance requirements, report, calculations, studies, vendor information, and environmental engineering documentation.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.6, #1	A20-15220-26, FIT Plan Submittal 26 A20-15220-28, FAT Procedure Submittal 28 A20-15220-30, Field Demo Test Procedure Submittal 30 A20-15220-18, Maintenance Procedures Submittal 18 A20-15220-21, Installation Procedures Submittal 21 A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	A20-15220-32, List of As-Built Drawings Submittal 32 A20-15220-27, FIT Report Submittal 27 A20-15220-29, FAT Report Submittal 29 A20-15220-31, Field Demo Test Procedure Report Submittal 31 A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 A20-15220-17, Contractor's Operations and Maintenance Manuals Submittal 17 Feasibility Package A20-15220-20, Recommended Spare Parts List Submittal 20 DOE/EIS-0245/SA1, August 1998, Supplemental Analysis of Environmental Effects of Changes in DOE's Preferred Alternative for Management of Spent Nuclear Fuel from the K Basins at the Hanford Site, Richland, Washington A20-15220-11, Final Design Package Submittal 11	ED-36, ED-37, ED-38, ED-39, ED-40, ED-41, ED-5, ED-42, ED-43, ED-12, ED-46, ED-30, ED-47, ED-20, ED-10
151.	Design document(s) shall have a unique identification number assigned.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.6, #2		List of all documents submitted to Hanford Document Control	ED-48 This is a post-start item.
152.	Engineering documents submitted to DCS, with the exception of vendor information, shall have a document number, page number, and revision status on each page of the document	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.6, #3		List of all documents submitted to Hanford Document Control	ED-48 This is a post-start item.
153.	Vendor information shall contain unique identification to be retrievable. For an SSC in deactivation status, maintain vendor information that will affect the safety of the SSC (such as ventilation equipment that continues to operate after personnel have been removed).	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.6, #4		Vendor Information File	ED-11 This is a post-start item.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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154.	Transmittal of design information from one organization to another shall be documented and controlled.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.6, #5		AIT Communications File at the end of Phase I	ED-34 This is a post-start item.
155.	Drawings depicting a Hanford structure, system, or component, including those provided by design organizations or other suppliers shall meet the approved site standards for the Preparation and Control of Engineering Drawings. (Refer to HNF-RD-709, Preparation and Control Standards for Engineering Drawings)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.7, #1		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
156.	Designers shall ensure an "H-series" identification number is assigned to drawings that depict permanent installation of SSC in a Hanford facility.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.7, #2		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
157.	Each of the FH projects shall be responsible to manage the drawings that depict SSC under their control.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.7, #3		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
158.	Design organizations that prepare drawings shall field verify and as-built the drawings that have been designated by the DA.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.7, #4		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
159.	Classified engineering drawing revisions shall be processed in accordance with Safeguards and Security requirements	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.7, #5	N/A	N/A	MCO CCA Welding does not include any classified engineering drawings

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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160.	Vendor drawings in the Hanford retrieval system (i.e., drawings identified by numbers and title blocks external to the Hanford contractors) shall be revised by creating a new drawing and released as an "H-series" drawing.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.7, #6	A20-15220-26, FIT Plan Submittal 26 A20-15220-28, FAT Procedure Submittal 28 A20-15220-30, Field Demo Test Procedure Submittal 30 A20-15220-18, Maintenance Procedures Submittal 18 Installation Procedures Submittal 21 Preventative Maintenance and Calibration Procedures Submittal 19	A20-15220-32, List of As-Built Drawings Submittal 32 A20-15220-27, FIT Report Submittal 27 A20-15220-29, FAT Report Submittal 29 A20-15220-31, Field Demo Test Procedure Report Submittal 31 A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 A220-15220-17, Contractor's Operations and Maintenance Manuals Submittal 17 Feasibility Package A-20-15220-20, Recommended Spare Parts List Submittal 20 DOE/EIS-0245/SA1, August 1998, Supplemental Analysis of Environmental Effects of Changes in DOE's Preferred Alternative for Management of Spent Nuclear Fuel from the K Basins at the Hanford Site, Richland, Washington VI File Number Application A20-15220-11, Final Design Package Submittal 11	ED-36, ED-37, ED-38, ED-39, ED-40, ED-41 ED-5, ED-42, ED-43, ED-49, ED-12, ED-46, ED-30, ED-47, ED-20, ED-50, ED-10
161.	Unique identifiers on design drawings shall be included and traceable to installed components that are required for safe operation, maintenance, and deactivation.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.7, #7		A20-15220-32, List of As-Built Drawings Submittal 32 Component Tags	ED-5, ED-51
162.	NUREG 0700 or MIL-STD-1472 shall be used as a standard if there is no existing structure, system, or component specific standard.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.7, #7		A20-15220-32, List of As-Built Drawings Submittal 32 Component Tags	ED-5, ED-51

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
163.	Design products, i.e., drawings or specifications, shall be prepared to document requirements, such as design, performance, procurement, fabrication, installation, testing, quality assurance, packaging, storage, and the shipping of such items as engineered equipment, fuel, or software.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #1		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
164.	Requirements or specific quality assurance plan applications shall be identified for subcontractor interface with sub-tier contractors, including inspection/surveillances and reviews.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #1		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
165.	Specifications shall include or reference appropriate acceptance criteria.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #2		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
166.	The specification number, revision, and page number shall be recorded on each page of the specification.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #3		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
167.	Specifications shall stipulate related vendor information requirements. Specifications shall include the requirement that vendor information be traceable to the hardware.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #4		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
168.	Specifications shall be written to comply with federal, state, and DOE pollution prevention and waste minimization requirements. (Refer to HNF-PRO-462, Pollution Prevention.)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #5		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
169.	All specifications shall be reviewed and approved in accordance with HNF-RD-8635 and released into the DCS before being sent to Procurement. This shall apply to internal and external contractor procurements.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #6		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
170.	Specifications shall be prepared for procurement of all quality level 1, 2 or 3 engineered structures, systems, and components, and computer software in nuclear facilities.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #7		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
171.	Construction specifications shall be prepared to document needed equipments, product delivery, handling and storage, execution of work, type of materials, acceptance criteria, submittal and documentation requirements, and the quality of workmanship.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #9	N/A	N/A	There are no construction specifications.
172.	The minimum requirements shall be clearly and concisely stated and consistent with the intended use.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #9		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
173.	Existing designs and specifications shall be used where appropriate.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #9		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
174.	Changes to released specifications shall be by supplemental change or direct revision Engineering Change Notice (page change or complete revision) in accordance with HNF-PRO-440 or HNF-PRO-2001.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #10		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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175.	Upon turnover, the vendor, design contractor, or architect-engineer that provides engineering services shall be required to provide specifications with all changes incorporated and released (as the next revision) into the document control database.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #11	N/A	N/A	There are no vendor specifications associated with welding
176.	As a minimum, specifications required for safe operation of a facility shall be maintained in a real-time incorporation status.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #12	N/A	N/A	This is a CSB facility requirement.
177.	All other specifications shall be revised to incorporate changes when deemed necessary by the Design Authority.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #12	N/A	N/A	This is a CSB facility requirement.
178.	The Design Authority shall determine the technical requirements (designs and specifications) for procurements/acquisition of and the applicability of federal regulations and Department of Energy Acquisition Regulations; and shall ensure procurement/acquisition documents convey this information to the supplier. (Refer to HNF-RD-10320, PHMC Acquisition Program Requirements, Section 2.2 5)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #13		SNF-8991, Rev. 4, MCO Weld System Performance Specification	ED-52
179.	Procurement documents shall indicate if the material or item to be procured is intended to be dedicated for use in a safety class or safety significant installation or application. (Refer to HNF-PRO-123, The Materials Request/Purchase Requisition/Contract Requisition Process)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #14		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	ED-12
180.	Procurement documents for safety class and safety significant SSC or services shall include the following, as they apply: a. Technical requirements specified by reference to specific drawings, specifications, codes, standards, regulations, procedures, or instructions. b. Identification of test, inspection, and acceptance requirements. c. Quality assurance program requirements to be met by the supplier. d. Identification of documentation required to be submitted by the supplier for information, review, or approval by the purchaser, including the submittal schedule	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #15		Pollution Prevention Memo, Re: MCO Welding, June 26, 2002, From: James Zimmerman, To: David Nearing	ED-22

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
181.	Items to be procured as a CGI shall meet all of the following criteria: a. The item is not subject to design or specification requirements that are unique to nuclear facilities. b. The item is used in applications other than nuclear facilities. c. The item is ordered from the manufacturer/ supplier on the basis of specifications set forth in the manufacturer's published product description (e.g., a catalog or national standard such as American Society for Testing and Materials). (Refer to HNF-PRO-268, Control of Purchased/Acquired Items and Services, for additional requirements for Commercial Grade Items.)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.8, #16	N/A	N/A	No items being procured as CGI.
182.	Design verification shall be performed in a planned and controlled manner, and shall provide assurance the final design is correct and satisfactory.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.9, #1		SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-28
183.	The responsible design organization shall identify and document the particular design verification method(s) used.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.9, #1		SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification	ED-15, ED-16
184.	Design verification shall be completed and design outputs released for use, before relying on structures, systems, components, or computer programs to perform their function and before installation becomes irreversible.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.9, #2		A20-15220-31, Field Demo Test Procedure Report Submittal 31 SNF-6442 CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building Revision	ED-49, ED-28
185.	If design outputs are used to support other work (e.g., procurement/acquisition, manufacture, construction, or experiment) before design verification is complete, then the unverified portion of the design outputs shall be identified and controlled. In those cases where design verification results in the need to revise the design output, the affect on previously performed work shall be determined, evaluated, and resolved prior to releasing the design output for use.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.9, #3		A20-15220-31, Field Demo Test Procedure Report Submittal 31 SNF-6442 CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building Revision	ED-49, ED-28
186.	Technically knowledgeable individuals shall perform design verification or groups separate from those who performed the design.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.9, #4		SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification	ED-15, ED-16

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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187.	The results of design verification shall be documented and the identification of the verifier indicated.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.9, #5		SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification	ED-15, ED-16
188.	The extent of design verification shall be commensurate with the design's complexity and importance to safety, the environment, degree of standardization, state of the art, and similarity with previously approved designs.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.9, #6		SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification	ED-15, ED-16
189.	All changes to final designs, field changes, and modifications to operating facilities shall be justified. Design changes shall be controlled by measures equal to those applied to the original design.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #1		Listing of DCN's (See e-mail From: E. Biebesheimer, To: D. Nearing)	ED-14
190.	Design change control measures shall include assurance the design analyses for the structure, system, or components are still valid	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #2		Listing of DCN's (See e-mail From: E. Biebesheimer, To: D. Nearing)	ED-14
191.	With the exception of classified drawings, all configuration baseline documents retained by Hanford Site document control shall be released or changed with an FMP or an EDC. An Engineering Document Change Form (EDC) may be used to release or change text documents not associated with a facility modification (See HNF-PRO-440 and HNFPRO-2001). For Drawings in Project status, a DCN may be used for change control per the DCN process.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #3		List of FMP's (See e-mail From: E. Biebesheimer, To: D. Nearing) List of EDC's (See e-mail From: E. Biebesheimer, To: D. Nearing)	ED-44, ED-45
192.	Each change shall be uniquely identified using the Hanford Document Numbering System (HDNS). Request for document changes using the EDC, DCN, or FMP form(s) as applicable. Prior to submittal for approval, clearly identify the nature of the change, the basis for the change, its impacts, and other information sufficient to provide a basis for making the change authorization decision. Sufficient information in the change documentation for implementation at the level of authorization shall be provided	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #4		List of FMP's (See e-mail From: E. Biebesheimer, To: D. Nearing) List of EDC's (See e-mail From: E. Biebesheimer, To: D. Nearing)	ED-44, ED-45

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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193.	A review and approval designator shall be assigned for all changes per HNF-RD-8635 and other applicable review and approval procedures. A USQ screen/evaluation shall be performed as required per HNF-PRO-062 and project/facility specific procedures. Engineering judgment and a graded approach shall be used to determine the level of review and approval appropriate to the change	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #5		List of USQ's from Phase I	ED-13
194.	To keep in compliance with environmental requirements, the design of modifications that are not administrative in nature shall be reviewed for environmental requirements, as applicable, by an Environmental Compliance Officer (ECO) and/or other environmental IA/SME.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #6		DOE/EIS-0245/SA1, August 1998, Supplemental Analysis of Environmental Effects of Changes in DOE's Preferred Alternative for Management of Spent Nuclear Fuel from the K Basins at the Hanford Site, Richland, Washington P02-SNF/RTW-004, New Source Applicability Determination for Spent Fuel Multi-Canister Overpack Welding Activities, June 5, 2002 Pollution Prevention Memo, Re: MCO Welding, June 26, 2002, From: James Zimmerman, To: David Nearing	ED-20, ED-21, ED-22
195.	An FMP or DCN shall be approved prior to being field worked.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #7		Listing of DCN's (See e-mail From: E. Biebesheimer, To: D. Nearing)	ED-14
196.	Changes to essential drawings shall be incorporated within 30 calendar days from the date the change is signed as work-completed.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #8	N/A	N/A	No essential drawings.
197.	Changes to support drawings shall be incorporated within 90 calendar days from the date the sixth work-completed change is signed-off as work completed.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #9		List of As-Built Drawings Submittal 32	ED-5 Only for vendor drawings that are converted to "H-series" drawings. If vendor drawings are not converted, this requirement is N/A.
198.	Reference drawings shall not be relied upon for any design or operational activity. Reference drawings and the associated unincorporated changes are for reference information and the area depicted on the drawings must be field verified prior to the development of any design documents used with an FMP. The process to field-verify the work-completed change is still required.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #10	N/A	N/A	No reference drawings.

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199.	For procured engineering services, the process for changing architect-engineer (A-E) documents/drawings (including documentation) shall be in accordance with the performer's quality assurance program.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.10, #11		A20-15220-03, AIT Quality Assurance Program, Controlled copy Standard Procedures submittal 3	ED-9
200.	Inspection or test procedures shall be written to define the requirements for activities that verify conformance of any SSC with specified requirements. When applicable, a USQ screening/evaluation shall be performed for Test plans, procedures, and other documents that define test requirements and acceptance criteria. Test documentation shall be reviewed and approved in accordance with HNF-RD- 8635 and other applicable review and approval procedures.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #1	A20-15220-26, FIT Plan Submittal 26	A20-15220-30, Field Demo Test Procedure Submittal 30 A20-15220-28, FAT Procedure Submittal 28 List USQ's A20-15220-29, FAT Report Submittal 29	ED-36 ED-38, ED-37, ED-13, ED-43
201.	Acceptance parameters, inspection or test requirements shall be specified, along with the appropriate referenced sections of approved codes or standards as part of the design documentation and work planning process. These requirements shall be included in work control documents or construction specifications and inspection plans. The test results shall be documented and retained as retrievable records.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #2	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003	A20-15220-11, Final Design Package submittal 11 A20-15220-27, FIT Report Submittal 27 A20-15220-29, FAT Report Submittal 29 A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-12 ED-10, ED-36, ED-37, ED-49
202.	Inspection and acceptance testing procedures shall require that measuring and test equipment used to verify conformance to design requirements are of the proper type, range, accuracy, and are uniquely identified and traceable to their calibration data.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #3	A20-15220-26, FIT Plan Submittal 26	A20-15220-30, Field Demo Test Procedure Submittal 30 A20-15220-28, FAT Procedure Submittal 28	ED-36 ED-38, ED-37
203.	Test procedures shall be used when equipment is important to safe and reliable facility operation, or testing is a condition for the acceptance or for construction operation verification of items, materials, or equipment.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #4	A20-15220-26, FIT Plan Submittal 26	A20-15220-30, Field Demo Acceptance Procedure Submittal 30 A20-15220-28, FAT Procedure Submittal 28	ED-36 ED-38, ED-37
204.	When test(s) involve more than one test group, individuals shall be identified to coordinate the test, review the results, and take corrective action, as necessary.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #5	N/A	N/A	Testing does not involve more then one group.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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205.	Inspection/test documentation shall be written that contain at least the following: a. The test procedure shall include: 1. Test objectives, including characteristics to be tested. 2. Pretest configuration, if applicable, including suitable environmental conditions, personnel training, and safety barriers. 3. Types of equipment to be used (e.g., instruments, tools, gauges, reference and transfer standards, and nondestructive examination equipment) including required precision and accuracy. 4. Acceptance and rejection criteria, including required levels of precision and accuracy. 5. Quality organization hold, witness, and verification points, if required. 6. Safety instructions relating to the test being performed. 7. Provisions for performing necessary monitoring. 8. Conditions under which retesting is permitted or required. 9. Methods for documenting test data, data analysis, and acceptance/rejection status of test. 10. Post-test conditions, if applicable.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #6	A20-15220-26, FIT Plan Submittal 26	A20-15220-30, Field Demo Acceptance Procedure Submittal 30 A20-15220-28, FAT Procedure Submittal 28	ED-36 ED-38, ED-37
206.	Inspection/test documentation shall be written that contain at least the following: b. Test records (maintained as QA records in accordance with HNF-MP-599, Section 4) shall identify: 1. The item tested. 2. The date tested. 3. The tester (name of individual[s] performing the test) and data recorder. 4. The applicable technical procedure(s) and revision(s). 5. A description of any known conditions that adversely affected the results of the test. 6. The test results and acceptability. 7. Calibrated measuring and test equipment used, recording the unique identification number and calibration due date. 8. Any deviation experienced during conduct of the test and the action taken in connection with the noted deviation. 9. The signature of the person evaluating the test results and the date the evaluation was completed. 10. Any nonconformance report or other deficiency documentation initiated as a result of the test (refer to HNF-PRO-298, Nonconforming Item Reporting and Control).	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #6	N/A	N/A	Vendor has own QA program, which covers Control & Inspections. The test records are transferred to Hanford Document Control at the end of Phase I.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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207.	Testing shall be planned and controlled. The test plan, test specification and other appropriate documentation, shall identify the change control process to be used in the test. Changes to facility configuration that are not planned as part of the testing process shall be performed with an FMP.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #7	A20-15220-26, FIT Plan Submittal 26	A20-15220-30, Field Demo Acceptance Procedure Submittal 30 A20-15220-28, FAT Procedure Submittal 28	ED-36 ED-38, ED-37
208.	Testing procedures shall be changed with an FMP or EDC. If a need for a test procedure change is discovered in the course of running the test, the person administering the test, with concurrence from the DA, may make changes that do not affect the design baseline by clearly crossing out and marking up the procedure. These changes shall be incorporated into the original test documentation. If the Test Director is the DA, additional independent approval must be obtained.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #8	N/A	N/A	Test procedures are prepared and controlled by Vendor QA program and FMP process will not be used.
209.	If it is discovered in the course of conducting the tests that a design baseline change is required, a change request shall be prepared to document and authorize the facility configuration change.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #9	N/A	N/A	Design baseline change is not required.
210.	Test status shall be identified and documented in accordance with HNF-PRO-297, Inspection, Test, and Operating Status.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #10	N/A	N/A	Tests are covered by Vendor QA program.
211.	Test results shall be approved and the results shall be evaluated and incorporated into the original test or inspection document or developed into a separate test report.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #11		A20-15220-29, FAT Report Submittal 29 A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-43, ED-49
212.	Where required by contract, acceptance inspection of construction shall be arranged to be performed by an organization that is independent of the construction organization.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.12, #12	N/A	N/A	Preparations for MCO Welding are not a construction activity.
213.	The provider of design services shall submit to the DA drawings, specifications, and any other design documentation designated as new or modified configuration baseline information.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.13, #1	N/A	N/A	Welding does not impact CSB Baseline
214.	The DA(s) shall ensure the modification of existing configuration baselines and establishment of new baselines reflect construction activity changes. The documentation of the facility modifications shall be done via the FMP/DCN process if facility drawings are used and by new drawings if not associated directly or applicable to the facility drawings.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, Section 5.13, #2	N/A	N/A	Welding does not impact CSB Baseline

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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215.	The DA(s) shall ensure that *authorization basis documentation* reflects the construction activity changes.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.13, #3**		HNF-3553, Rev. 2, Spent Nuclear Fuel Project Final Safety Analysis Report HNF-3553 Annex A, Rev. 2, Spent Nuclear Fuel Project Canister Storage Building Final Safety Analysis Report Annex A	ED-23
216.	All new and modified approved design baseline documents *(drawings, specifications, etc.)* shall be issued to HDCS in accordance with HNF-RD-8310, Document Control Program.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.13, #4**	N/A	N/A	Not Construction Forces Project.
217.	Any open engineering/design issues *shall be documented and* dispositioned (i.e., under formal control until resolved)	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.13, #5**	N/A	N/A	Not Construction Forces Project.
218.	Engineering managers responsible for purchased engineered items and *engineering services shall provide* feedback to FH Acquisition Verification Services regarding significant poor contractor performance (Refer to HNF-PRO-3144, Supplier Quality Assurance Program Evaluation).	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.14, #1**		Evaluated Supplier List	ED-54
219.	Procurement of engineered items and engineering services shall be in accordance with: *a.* HNF-RD-10320, PHMC Acquisition System Requirements. b. HNF-PRO-186, Preparing a Statement of Work for Services, regarding preparation of the Statement of Work. c. HNF-PRO-268, Control of Purchased/Acquired Items and Services, regarding supplier selection, procurement documentation, quality requirements, source and receipt inspection. d. HNF-PRO-3144, Supplier Evaluation, regarding use of evaluated or new suppliers. e. HNF-PRO-192, Buyer's Technical Representative Assignment and Duties	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.15, #1**		A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 , has been issued and approved, and contractor has been selected. (HNF-PRO-186, HNF-PRO-268) Evaluated Supplier List (HNF-PRO-3144) Procurement Routing List (HNF-PRO-3144)	ED-12, ED-54, ED-55 HNF-PRO-183 is not applicable because we are not using the A/E Pool.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
220.	The following shall be appropriately addressed in the procurement documentation: a. Pass-down of technical and quality assurance program requirements to sub-tier contractors. b. Engineering process requirements such as required quality assurance program, personnel qualification, engineering standards (e.g., HNF-RD-709, Preparation and Control Standards *for Engineering Drawings*) and Design Authority involvement (e.g., in change control). c. Requirements for in-process inspection/surveillance/ reviews and tests. d. Requirements for final engineering deliverables and engineering document acceptance criteria. e. Requirements for verifying the conduct of engineering process (surveillance plans, etc).	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.15, #2**		Request for Proposal	ED-18
221.	*Engineering* changes to and from the A-E shall be communicated through the Buyer's Technical Representative (BTR). (Refer to HNF-PRO-192), and involve appropriate coordination of the Buyer.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.15, #3**		**AIT Communications File at the end of Phase I**	ED-34 This is a post startup item.
222.	Sufficient engineering information shall be provided so that spare parts, spare equipment, and special tools may be established in inventory, as appropriate, to maintain continuity of facility *operations and reduce system and* facility downtime through availability of equipment, parts, and components.	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.16, #1**		A20-15220-20, Recommended Spare Parts List Submittal 20	ED-47
223.	The process for design and fabrication of prototype, experimental, and other developmental equipment shall be controlled by individual FH project procedures. The development process shall include appropriate need, planning, criteria, solution, and design verification *documentation. Change control* shall be specified. If developmental equipment is used in a structure, system, or component, the DA shall ensure that the equipment meets applicable codes, standards, and other requirements before being used. Acceptance testing shall be performed for development equipment used as SSC(s).	HNF-RD-1819, PHMC Engineering Requirements, Rev. 0, August 12, 2002, **Section 5.17, #1**	N/A	N/A	No developmental equipment.
224.	The Contractor shall be responsible for the cover cap welds to the same standard....(In accordance with ASME Boiler and Pressure Vessel Code (1998 edition) Section III, Subsection NB).	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 2 Background/Introduction**	**A20-15220-22, Welding Procedure, Submittal 22**	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ASME Code Data Report ED-56 ED-49

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
225.	The Contractor shall have the proper certifications to "N Stamp" the MCO's subsequent to completion of cover cap welding.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 2 Background/Introduction**	Request for Proposal Letter Contract 15220	A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ASME Code Data Report ED-18, ED-57 ED-58
226.	The Contractor shall furnish labor, materials, and supplies to design, procure, fabricate, and factory test a system to rig, pick, align, fit-up and make the closure weld between the CCA and canister shell.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3 Work Scope # 3.1**	Request for Proposal Letter Contract 15220	OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-18, ED-57 ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
227.	The Contractor shall furnish labor, materials, and supplies to design, procure, fabricate, and factory test a system to rig, pick, align, fit-up and make the weld between the test plug cover plate and MCO cover cap.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3 Work Scope # 3.1**	Request for Proposal Letter Contract 15220	OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-18, ED-57 ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
228.	The Contractor will be responsible for furnishing applicable portions (mock-ups) of MCO's and CCA's for factory testing and field testing.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3 Work Scope #3.1.1**	A20-15220-30, Field Demo Test Procedure Submittal 30 *A20-15220-28, FAT Procedure* Submittal 28	A20-15220-29, FAT Report Submittal 29 A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-38 ED-37 ED-43, ED-49
229.	The system shall include a welding enclosure to control weld off-gases and potential radiological airborne contamination.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3 Work Scope #3.2**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
230.	The Contractor shall be responsible for CCA placement and welding with Buyer furnished labor.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3 Work Scope #3.3**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
231.	The Contractor shall perform all required inspections and/or examinations.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3 Work Scope #3.4**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
232.	*The Contractor shall complete* the ASME code data report.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3 Work Scope #3.5**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ASME Code Data Report ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
233.	The Contractor shall apply an "N" symbol stamp to each MCO vessel.	A20-SOW-001, Rev. 2 Statement of Work for the MCO Closure Welds May 30, 2002 **Section 3 Work Scope #3.5**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ASME Code Data Report ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
234.	The Contractor is responsible for identifying required preventive maintenance and the frequency on items furnished to the Contractor identified in section 3.6 and Contractor furnished items. The Contractor is also responsible for identifying required corrective maintenance on these items. The Contractor will furnish all parts for *preventive and corrective* maintenance on the items furnished to the Contractor.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3 Work Scope #3.7.1**		A20-15220-19, *Preventative Maintenance* and Calibration Procedures Submittal 19	ED-41 *Sentence 2 & 3 are* intended only to define scope for phase 2.
235.	The Buyer will provide craft labor for maintenance on Contractor furnished sacrificial items (*i.e.* tungsten, torch, etc.) and on items furnished to the Contractor. The Contractor will provide labor for maintenance of the welding machines and other Contractor furnished equipment beyond the capability of Buyer furnished craft.	A20-SOW-001, Rev. 4 Statement of Work for the *MCO Closure Welds, January* 13, 2003 **Section 3 Work Scope #3.7.2**	N/A	N/A	Jurisdictional issue only.
236.	The Contractor shall perform a site walk-down of the weld station locations within the CSB to verify and/or establish dimensions necessary to provide a complete design of the MCO Weld System *and welding enclosure* (or use existing weld hood)	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.1**		Site Kickoff Meeting Notes	ED-60
237.	The Contractor shall design and fabricate equipment per *SNF-8991, CSB Weld System Performance Specification, (See Attachment 1)* and ensure the system and welding enclosure function per this specification.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.2**	Letter Contract 15220	A20-15220-11, Final Design Package Submittal 11	ED-57 ED-10
238.	The Contractor shall facilitate formal design reviews of the 30% and 90% Design Packages at the Buyer's facility.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.2**		SNF-11951, Rev. 0, MCO *Cover Cap Assembly* Welding 60% Design Verification SNF-12232, Rev. 0, MCO *Cover Cap Assembly* Welding 90% Design Verification	ED-15, ED-16
239.	The Contractor shall perform a FAT (*Factory Acceptance Test*).	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.3**		A20-15220-29, FAT Report Submittal 29	ED-43
240.	The FAT (Factory Acceptance Test) shall replicate the critical field conditions in the Contractor's facility, and shall demonstrate and qualify that the Contractor-supplied equipment, materials, procedures, welders etc. will produce welds in accordance with the performance specification.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 ***Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.3.1***		A20-15220-29, FAT Report Submittal 29	ED-43

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
241.	The FAT (Factory Acceptance Test) shall demonstrate proper cover cap placement, enclosure performance, NDE, cover plate welding, weld repairs, etc.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.3.2**		A20-15220-29, FAT Report Submittal 29	ED-43
242.	Contractor shall submit a FAT (Factory Acceptance Test) plan and implementing procedures for Buyer approval.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.3.3**		A20-15220-29, FAT Report Submittal 29	ED-43
243.	Buyer representatives shall witness the FAT (Factory Acceptance Test).	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.3.4**		A20-15220-29, FAT Report Submittal 29	ED-43
244.	Buyer shall be notified at least five days in advance of the FAT (Factory Acceptance Test).	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 ***Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.3.4***	Letter Contract 15220	**AIT Communications File at the end of Phase I**	ED-57 ED-34 This is a Post Start Item.
245.	The Contractor shall be responsible for providing any training and access requirements as required to allow the Buyer access to the test facility.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.3.5**		E-Mail from Jim Snyder, to Michael Anderson A20-15220-29, FAT Report Submittal 29	ED-61, ED-43
246.	The Contractor shall ensure the safety of Buyer personnel while the Buyer's personnel are within the Contractor's facility.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.3.5**		E-Mail from Jim Snyder, to Michael Anderson A20-15220-29, FAT Report Submittal 29	ED-61, ED-43
247.	The Contractor shall submit a FAT (Factory Acceptance Test) report.	A20-SOW-001, Rev. 4 Statement of Work for the *MCO Closure Welds, January* 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.3.6**		A20-15220-29, FAT Report Submittal 29	ED-29
248.	The Contractor shall perform a field demonstration within the CSB facility.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.4**		Field Demo Test Procedure Report submittal 31	ED-49
249.	The Contractor shall use contractor-supplied materials and Buyer-supplied craft labor to demonstrate the operation of the weld system in accordance with the requirements of the performance specification, the statement of work, and the Contractor-supplied procedures.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.4.1**	N/A	N/A	Jurisdictional statement only.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
250.	The Contractor shall submit a field *demonstration plan.*	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.4.2**		A20-15220-30, Field Demo Test Procedure Submittal 30	ED-38
251.	The Contractor shall submit implementing procedures for Buyer approval.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.4.2**		A20-15220-21, Installation Procedures Submittal 21 OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-23, Weld Repair Procedures submittal 23 A20-15220-18, Maintenance Procedures Submittal 18 A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-40, ED-59, ED-72, ED-39, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
252.	The Contractor shall submit a field demonstration report.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.4.3**	A20-15220-30, Field Demo Test Procedure Submittal 30	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-38 ED-49
253.	The Contractor shall provide preventative maintenance, and calibration procedures for the CCA welding enclosure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.5**		A20-15220-19, Preventative Maintenance *and Calibration* Procedures Submittal 19 OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-41, ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
254.	The Contractor shall provide preventative maintenance, and calibration procedures for the CCA Welding Equipment.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.5**		A20-15220-19, Preventative Maintenance and Calibration *Procedures* Submittal 19 OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-41, ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
255.	The Contractor shall provide preventative maintenance, and calibration procedures for the CCA picking/alignment/placement equipment for Buyer approval.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.5**		A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19 OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-41, ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
256.	The Contractor shall develop a final Design Package with a final Design Analysis Report (DAR) for the CCA Weld Station and submit it to the Buyer for approval.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, *Fabrication, Testing, and* Qualifications #3.8.6.1**		A20-15220-11, Final Design Package Submittal 11	ED-10

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
257.	All computer codes used in these analyses shall be verified and validated in accordance with the Contractor's QA program.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.1**	AIT Quality Assurance Program, Controlled copy Standard Procedures Sec. 5.3.5	A20-15220-11, Final Design Package Submittal 11 SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-9 ED-10, ED-28
258.	The final design report shall be stamped by a registered Professional Engineer.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.1**		A20-15220-11, Final Design Package Submittal 11	ED-10
259.	{Design and analysis} Calculations shall be performed in a documented, controlled manner.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.2**	AIT Quality Assurance Program, Controlled copy Standard Procedures Sec. 5.3.5	A20-15220-11, Final Design Package Submittal 11 SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-9 ED-10, ED-28
260.	{Design and analysis} Calculations shall be detailed to allow verification by technically qualified personnel without recourse to the calculation originator.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.2**	AIT Quality Assurance Program, Controlled copy Standard Procedures Sec. 5.3.5	A20-15220-11, Final Design Package Submittal 11 SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-9 ED-10, ED-28
261.	{Design and analysis} Calculations shall include (as applicable) an objective, inputs, references, assumptions, methods used, findings, and conclusions.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.2**	AIT Quality Assurance Program, Controlled copy Standard Procedures Sec. 5.3.7	A20-15220-11, Final Design Package Submittal 11 SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-9 ED-10, ED-28
262.	Calculations performed by the Contractor shall be independently verified by the Contractor.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.2**	AIT Quality Assurance Program, Controlled copy Standard ProceduresSec. 5.3.8	A20-15220-11, Final Design Package Submittal 11 SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building	ED-9 ED-10, ED-28
263.	All {design and analysis} calculations prepared in the performance of this Statement of Work shall be submitted to the Buyer in the final deliverable.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.2**		A20-15220-11, Final Design Package Submittal 11	ED-10
264.	The DAR {Design Analysis Report} shall include: Computer code descriptions if used.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.3**		A20-15220-11, Final Design Package Submittal 11	ED-10

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
265.	The DAR (Design Analysis Report) shall include a listing of material and properties.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.3**		A20-15220-11, Final Design Package Submittal 11	ED-10
266.	The DAR (Design Analysis Report) shall include Structural Analysis of CCA picking/alignment/placement equipment.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.3**		A20-15220-11, Final Design Package Submittal 11	ED-10
267.	The DAR (Design Analysis Report) shall include Structural Analysis of CCA welding enclosure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.3**		A20-15220-11, Final Design Package Submittal 11	ED-10
268.	The DAR (Design Analysis Report) shall include safety factors of the CCA welding enclosure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.3**		A20-15220-11, Final Design Package Submittal 11	ED-10
269.	The DAR (Design Analysis Report) shall be reviewed and approved by the Buyer and become the property of the Buyer at time of delivery.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.3**		A20-15220-11, Final Design Package Submittal 11	ED-10
270.	The Contractor shall use no proprietary codes, designs, etc. without advanced Buyer approval.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.3**	N/A	N/A	No exceptions were requested by the contractor in the Bid Cycle.
271.	The Contractor shall provide the DAR (Design Analysis Report) in reproducible hardcopy, and *electronically in Microsoft Word* format, Version 97 or later.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.3**		A20-15220-11, Final Design Package Submittal 11	ED-10
272.	The Contractor shall provide design media meeting American Society of Mechanical Engineers (ASME) Y14 series, *Engineering Drawing and* Related Documentation Practices.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.4**		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
273.	The contractor shall submit drawing sets in reproducible hard copy, and in electronic form using AutoCAD *2000 or newer version.*	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.4**		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
274.	Prior to shipment of the CCA Weld Systems to the site, the Contractor shall perform a FAT (Factory Acceptance Test).	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.5**		A20-15220-29, FAT Report Submittal 29	ED-43
275.	The Buyer shall witness the FAT (Factory Acceptance Test) of the complete system.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.8 Phase I Design, Fabrication, Testing, and Qualifications #3.8.6.5**		A20-15220-29, FAT Report Submittal 29	ED-43
276.	The Contractor shall follow the rules of ASME, Section III, Subsection NB for Nuclear Class 1.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.2**	Letter Contract 15220	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ASME Code Data Report ED-57 ED-49
277.	The Contractor shall provide adequate staff and supervision to: · Manage field operations · Prepare the appropriate ASME code data report for each MCO · Apply the ASME code "N" symbol stamp for each MCO · Prepare the input for each MCO data package	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.3**		AIT organizational chart A20-15220-24, Contractor Welder Qualifications submittal 24	ED-87, ED-62
278.	The Contractor shall provide spare parts to maintain Contractor-supplied equipment as required to maintain Buyer schedule.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.4**		A20-15220-20, Recommended Spare Parts List Submittal 20	ED-47
279.	The Contractor shall qualify and certify the Buyer's welders, secunded to Contractors, and qualify the welding procedures and equipment, and use the Buyer's personnel for welding the MCO CCA in accordance with ASME code Section IX requirements.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.5**		A20-15220-24, Contractor Welder Qualifications submittal 24 OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-62, ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
280.	The Contractor shall qualify and certify the Buyer's welders, secunded to Contractors, and qualify the welding procedures and equipment, and use the Buyer's personnel for welding the test plug cover plate in accordance with ASME code Section IX requirements.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.5**		A20-15220-24, Contractor Welder Qualifications submittal 24 OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-62, ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
281.	The Contractor shall use the Buyer's labor to operate the weld system.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.6**	N/A	N/A	Jurisdictional statement
282.	The Contractor shall furnish welding supplies, NDE supplies, rods, welding wire, and consumables including grinding disks, except welding gas, to complete the MCO vessel welds.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.7**	Letter Contract 15220	A20-15220-31, Field Demo Test Procedure Report Submittal 31 OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-57 ED-49, ED-59

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			Implementation	Adherence	
283.	The Contractor shall be responsible for on-site storage of Contractor-supplied materials, and control the materials in accordance with ASME NQA-1, Subpart 2.2, as applicable.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.7**		A20-15220-33, Packaging/Shipping Plan submittal 33	ED-63
284.	Field operations performed on production MCO's shall be done in accordance with applicable portions of the MCO Fabrication Specification *HNF-S-0453*, Revision 6, and drawings of the MCO listed on H-2-828040 sheet 1 for index.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.9**	N/A	N/A	Applicable MCO welding requirements from HNF-S-0453 for Phase I are listed later in this matrix.
285.	Dye penetrant material shall not be allowed to go down between the sides of the MCO shell and the shielding on the weld pits.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.10**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
286.	Dye penetrant method shall use color contrast.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.10**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
287.	No water washdown is allowed.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.10**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
288.	All liquid penetrant must be removed.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3.9 Phase II - Field Operations #3.9.10**		A20-15220-30, Field Demo Test Procedure Submittal 30 OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-38, ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
289.	The Contractor shall provide submittals per the submittal register shown in Attachment 3.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables**		**AIT Communications File at the end of Phase I**	ED-34 This is a post start item.
290.	The Contractor shall provide ASME N Certificate. If the ASME N Certificate does not specify authorization to field locations, the Contractor shall specify plans for compliance with code case N-595-3 paragraph 5(c) including identification on Phase 1 schedule.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.1**		A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-58
291.	The Contractor shall provide the Contractors Project Schedule.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.2**		AIT Project Schedule	ED-64
292.	Contractor shall prepare an Engineering Work Plan for Phase I that shall include the Scope.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.3**		A20-15220-06, Engineering Work Plan submittal 06	ED-65
293.	Contractor shall prepare an Engineering Work Plan for Phase I that shall include deliverables, i.e., report, calculations, etc.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.3**		A20-15220-06, Engineering Work Plan submittal 06	ED-65

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			Implementation	Adherence	
294.	Contractor shall prepare an Engineering Work Plan for Phase I that shall include responsible discipline(s).	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.3**		A20-15220-06, Engineering Work Plan submittal 06	ED-65
295.	Contractor shall prepare an Engineering Work Plan for Phase I that shall include expected duration, in both calendar time and man-hours	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.3**		A20-15220-06, Engineering Work Plan submittal 06	ED-65
296.	30% Design Package shall include identification of preferred CCA Welding System.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.4**		A20-15220-08, 30% Design Package submittal 08	ED-67
297.	30% Design Package shall include preliminary arrangement of CCA welding enclosure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.4**		A20-15220-08, 30% Design Package submittal 08	ED-67
298.	30% Design Package shall include conceptual design of CCA picking/alignment/placement equipment.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.4**		A20-15220-08, 30% Design Package submittal 08	ED-67
299.	30% Design Package shall include identification of design codes.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.4**		A20-15220-08, 30% Design Package submittal 08	ED-67
300.	30% Design Package shall include identification of Critical Analysis. (Critical analysis are defined as those analysis which could result in the design approach being declared non-viable).	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.4**		A20-15220-08, 30% Design Package submittal 08	ED-67
301.	30% Design Package shall include Preliminary NDE test equipment layouts and systems.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.4**		A20-15220-08, 30% Design Package submittal 08	ED-67
302.	60% Design Package shall include critical analysis performed, and preliminary, internally verified results issued in the form of a draft report.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
303.	60% Design Package shall include preliminary analysis and calculations for CCA welding enclosure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
304.	60% Design Package shall include preliminary analysis and calculations for CCA picking/alignment/placement equipment.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
305.	60% Design Package shall include preliminary general arrangement drawings.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
306.	60% Design Package shall include preliminary design drawings for CCA welding enclosure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	*Adherence*	
307.	60% Design Package shall include preliminary design drawings for CCA picking/alignment/placement equipment.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
308.	60% Design Package shall include final material selections with Material Safety Data Sheets.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
309.	60% Design Package shall include final equipment sizing calculations.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
310.	60% Design Package shall include draft code data report (typical) and draft Part IV MCO data package Contractor contributions.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
311.	60% Design Package shall include draft location, type and description of "N" stamp application to the MCO's for 450psi service.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
312.	60% Design Package shall include NDE equipment, systems and procedures for leakage rate testing.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		60% Design Package submittal 90% Design with letter	ED-68
313.	60% Design Package shall include NDE equipment, systems and procedures for dye penetrant examination	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.5**		A20-15220-09, 60% Design Package submittal 09	ED-68
314.	90% Design Package shall include Final Design Analysis Report.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
315.	90% Design Package shall include final analysis and calculations.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
316.	90% Design Package shall include final design drawings.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
317.	90% Design Package shall include final installation drawings and procedures.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
318.	90% Design Package shall include final material selections with Material Safety Data Sheets.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
319.	90% Design Package shall include final procedures.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
320.	90% Design Package shall include equipment sizing calculations.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
321.	90% Design Package shall include elementary/schematic drawings.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
322.	90% Design Package shall include wiring diagrams.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
323.	90% Design Package shall include equipment specifications.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
324.	90% Design Package shall include equipment arrangement drawings.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
325.	90% Design Package shall include code data report (typical) and draft Part IV MCO data package Contractor contributions.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
326.	90% Design Package shall include location, type and description of "N" Stamp application to the MCO's for 450-psi service.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.6**		A20-15220-10, 90% Design Package submittal 10	ED-69
327.	Final Design Package shall include Design Analysis Report with comments incorporated.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.7**		AIT Design Analysis Report, Rev. 4	ED-70
328.	Final Design Package shall include Complete (100%) design of the CSB Weld Station with Buyer approval and Contractor reviews complete, comments incorporated, and design resubmitted. This includes design drawings and any necessary details to support unique aspects of fabrication or installation such as tie-in points for the control and power distribution systems. 100% design shall include fabrication/shop drawings.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.7**		A20-15220-11, Final Design Package Submittal 11	ED-10
329.	Final Design Package shall include installation drawings and procedures.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.7**		A20-15220-11, Final Design Package Submittal 11	ED-10
330.	Contractor shall submit: Authorized Nuclear Inspector Qualifications.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.9**		A20-15220-16, ANI Qualification submittal 16	ED-71

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331.	Contractor shall submit: Contractor Operations and Maintenance Manuals.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.10**		A20-15220-17, Contractor's Operations and Maintenance Manuals Submittal 17	ED-46
332.	Contractor shall submit: Maintenance Procedures.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.11**		A20-15220-18, Maintenance Procedures Submittal 18	ED-39
333.	Contractor shall submit: *Preventative Maintenance* and Calibration Procedures *for Contractor supplied equipment.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.12**		A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-41
334.	Contractor shall submit: Recommended spare parts *reference Section 3.8.4.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.13**		A20-15220-20, Recommended Spare Parts List Submittal 20	ED-47
335.	Contractor shall submit: Installation Procedures(s) for lifting, positioning and placing the cap.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.13**		A20-15220-21, Installation Procedures Submittal 21	ED-40
336.	Contractor shall submit: Installation *Procedures for positioning*, placing and connecting weld equipment and weld enclosure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.14**		A20-15220-21, Installation Procedures Submittal 21	ED-40
337.	Contractor shall submit: Welding procedures and procedure qualifications records for welding and the examination/inspection of *the weld for the* MCO CCA and Test Plug Cover Plate	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.15**		A20-15220-22, *Welding* Procedure, Submittal 22	ED-56
338.	Contractor shall submit: Weld Repair Procedures.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.16**		A20-15220-23, Weld Repair Procedures submittal 23	ED-72 Approved weld repair procedure is included in 100% design package comment letter.
339.	Contractor shall submit: Contractor *Welder Qualifications for Welders* used for the Hanford Site Field Demonstration Test.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.17**		A20-15220-24, Contractor Welder Qualifications submittal 24	ED-62
340.	Contractor shall submit: Contractors Inspection Qualifications for Fabrication.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.18**		A20-15220-25, Contractors Inspection Qualifications for Fabrication submittal 25	ED-73
341.	Contractor shall submit: Fabrication, Inspection and Test (FIT) Plan.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.19**		A20-15220-26, FIT Plan Submittal 26	ED-36

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			Implementation	Adherence	
342.	Contractor shall submit: FIT (Fabrication, Inspection and Test) Report.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.20**		A20-15220-27, FIT Report Submittal 27	ED-42
343.	Contractor shall submit: Factory Acceptance Test Procedure *See Section 5.2.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.21**		A20-15220-28, FAT Procedure Submittal 28	ED-37
344.	Contractor shall submit: Factory Acceptance Report * A report documenting the results of the FAT (Factory Acceptance Test).	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.22**		A20-15220-29, FAT Report Submittal 29	ED-43
345.	Contractor shall submit: Field Demonstration Test Procedure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.23**		A20-15220-30, Field Demo Test Procedure Submittal 30	ED-38
346.	Contractor shall submit: Field Demonstration Test Procedure Report.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.24**		A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-48
347.	Contractor shall submit: As-Built Drawings for CCA Welder Station/including Weld Enclosure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.24**		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
348.	Contractor shall submit: As-Built Drawings for CCA picking/alignment/placement equipment.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.25**		A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
349.	Contractor shall submit: Packaging/Shipping Plan (if required).	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.26**		A20-15220-33, Packaging/Shipping Plan submittal 33	ED-63
350.	Contractor shall submit: Safety Plan; Plan shall identify hazards associated with the Hanford Site Field Demonstration Test, and measures to mitigate those hazards.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.27**		A20-15220-36, Safety Plan submittal 36	ED-74
351.	Contractor shall submit: Rigging Plans. This will include rigging the mock-up MCO and CCA, including the welded assembly, into and out of the welding pit.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.28**		A20-15220-37, Rigging Plans submittal 37	ED-75
352.	Contractor shall submit: Two complete systems to pick, rig, set in place, align, fit up and weld the CCA to the MCO.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.3.1**		**Readiness Self Assessment Report**	ED-76 This is a post start item.

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			Implementation	Adherence	
353.	The CCA and the canister shell test materials may be of material, grade or type other than ASME, section III, Class 1 material except that the material shall be of the same chemical specification as the MCO's.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.1**		A20-15220-28, FAT Procedure Submittal 28	ED-37
354.	Weld wire shall meet delta ferrite limits specified by applicable ASME Code requirements.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.1**		CMTR's	ED-77
355.	The Contractor shall prepare a step-by-step Factory Acceptance Test (FAT) procedure for Buyer approval.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance *Criteria #5.2.1***		A20-15220-28, FAT Procedure Submittal 28	ED-37
356.	The FAT (Factory Acceptance Test) shall include a mock up of the functional aspects of the Weld Station, to include the welding enclosure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1**		A20-15220-28, FAT Procedure Submittal 28	ED-37
357.	The Contractor shall build the mock-up to actual field dimensions, that the Contractor has verified at the CSB facility.	A20-SOW-001, Rev. 4 *Statement of Work for the* MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1**		A20-15220-28, FAT Procedure Submittal 28	ED-37
358.	The FAT (Factory Acceptance Test) shall include a Control System and Remote Color Monitor operation.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1**		A20-15220-28, FAT Procedure Submittal 28	ED-37
359.	The FAT (Factory Acceptance Test) *shall include a load test for rigging* to 150% of load.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1**		A20-15220-28, FAT Procedure Submittal 28	ED-37
360.	The FAT (Factory Acceptance Test) shall include the following as a minimum: operation of the control system and remote color monitor as defined in the performance specification.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1.1**		A20-15220-29, FAT Report Submittal 29	ED-43
361.	The FAT (Factory Acceptance Test) shall include the following as a minimum: Burn-in tests of the welding control system shall be for a minimum period of two days (Equipment turned on for two days)	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1.1**		A20-15220-28, FAT Procedure Submittal 28	ED-37
362.	Any failures during the FAT (Factory Acceptance Test) shall be documented and corrected by the Contractor.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1.1**		A20-15220-29, FAT Report Submittal 29	ED-43

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			Implementation	Adherence	
363.	The FAT {Factory Acceptance Test} shall include the following, as a minimum, for the mechanical components: the contractor shall, at their facility, furnish equipment, materials, consumables and services necessary to rig, pick, align, and fit up a CCA to a canister shell as to demonstrate that the weld system will perform as specified in the performance specification.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1.2**		A20-15220-28, FAT Procedure Submittal 28	ED-37
364.	The FAT {Factory Acceptance Test} shall include, as a minimum for the welding enclosure, a smoke test to demonstrate negative pressure.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1.3**		A20-15220-28, FAT Procedure Submittal 28	ED-37
365.	The FAT {Factory Acceptance Test} shall include, at the minimum for the welding enclosure, the ability to remove welding gas.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1.3**		A20-15220-28, FAT Procedure Submittal 28	ED-37
366.	The FAT {Factory Acceptance Test} shall include, as a minimum for the welding enclosure, the ability to remove weld fumes and potential air borne contaminants.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1.3**		A20-15220-28, FAT Procedure Submittal 28	ED-37
367.	The FAT {Factory Acceptance Test} shall include, as a minimum for testing to determine the Weld Station features, the contractor shall qualify the welding system, procedures, and personnel utilizing 2G mockup position during the FAT.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1.4**		A20-15220-28, FAT Procedure Submittal 28	ED-37
368.	The FAT {Factory Acceptance Test} shall include a leak tests of the qualification mock-up CCA to MCO weld and the CCA test plug.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.1.5**		A20-15220-28, FAT Procedure Submittal 28	ED-37
369.	The Contractor shall provide any special equipment necessary for test completion.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.2.2**		A20-15220-29, FAT Report Submittal 29	ED-43
370.	Final acceptance of the Weld Stations SHALL not occur until all tests have been successfully completed and test reports have been reviewed and approved accepted by the Buyer.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.3**		A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-49
371.	The Contractor shall participate and provide evidential documentation to support the Buyer's management Self-Assessment and subsequent formal readiness activities.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.3**		**Readiness Self Assessment Report**	ED-76
372.	The Contractor shall be responsible for any repairs and or modifications required in order to pass the tests.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 5 Acceptance Criteria #5.3**		A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-49

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			Implementation	Adherence	
373.	The Contractor shall participate in a Project Kickoff meeting to be held at the Buyer's Site.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 6.0 Schedule #6.1**		Site Kickoff Meeting Notes	ED-60
374.	The Buyer shall provide the time, date and agenda for the meeting to the Contractor.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 6.0 Schedule #6.1**		Site Kickoff Meeting Notes	ED-60
375.	Contractor shall notify the Buyer immediately of anticipated schedule delays.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 6.0 Schedule #6.2**		***AIT Communications*** **File at the end of Phase I**	ED-34 This is a post start item.
376.	Contractor shall include detailed information as to the nature and extent of the impending delay and identify mitigating measures to recover the schedule.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 6.0 Schedule #6.2**		**AIT Communications** **File at the end of Phase I**	ED-34 This is a post start item.
377.	All Contractors telephone *notifications of delays must be* confirmed in writing to the Buyer.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 6.0 Schedule #6.2**		**AIT Communications** **File at the end of Phase I**	ED-34 This is a post start item.
378.	*The Buyer's response or failure to* respond to such notices shall not, except as may expressly be provided in a written response, *excuse Contractor for such delays*	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 6.0 Schedule #6.2**	N/A	N/A	Statement of fact for the Contractor's benefit
379.	The Contractor shall supply applicable safety training for Buyer personnel entering Contractor facilities.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 7.0 Safety #7.1**		A20-15220-28, FAT Procedure Submittal 28	ED-37
380.	Buyer shall supply applicable safety training for Contractor personnel entering Buyer facilities.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 7.0 Safety #7.1**		Training Records (e-mail from M. Bush, to D. Nearing)	ED-79
381.	Contractor personnel shall comply with Buyer direction in regards to safety provisions within Buyer facilities.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 7.0 Safety #7.1**		Training Records (e-mail from M. Bush, to D. Nearing)	ED-79
382.	The Contractor shall develop a safety plan for the Hanford Site Field Demonstration. The plan shall identify hazards associated with the Hanford Site Field Demonstration, and measures to mitigate those hazards.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 7.0 Safety #7.1**		*A20-15220-36, Safety* Plan submittal 36	ED-74
383.	The Buyer's Safety Program shall cover contractor personnel working on the Hanford Site.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 7.0 Safety #7.2**		A20-15220-36, Safety Plan submittal 36	ED-74
384.	The Buyer shall complete form A-6003-147 prior to commencement of any job where Contractor's *employees have actual/potential* exposure to hazardous chemicals used/controlled, or Buyer's employees have actual/potential *exposure to hazardous* chemicals used/controlled by the contractor.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 7.0 Safety #7.3**		Completed Form A-6003-147	ED-80

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			Implementation	Adherence	
385.	The Contractor shall ensure that Contractor supplied/managed materials are used, stored, and disposed in accordance with Washington State and federal codes/regulations.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 8.0 ES&H Requirements #8.1**		Health Physisics Records Supporting Release of Materials (e-mail From: T. Southerland, To: D. Nearing)	ED-81
386.	The Contractor is required to have a Quality Assurance Program that has been accredited by ASME for compliance with Section III, Division 1, NCA-4000. It shall be in effect at time of contract award and be fully implemented throughout all activities specified for performance during Phases I and II of this contract.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 9.0 Quality Assurance (QA) Requirements #9.1**		A20-15220-03, AIT Quality Assurance Program, Controlled copy Standard Procedures submittal 3	ED-9
387.	Non-conformances with purchase documents, drawings, approved procedures, or materials requirements dispositioned as Repair, Rework, or Use-As-Is shall be submitted to the Buyer for review and approval prior to implementation.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 9.0 Quality Assurance (QA) Requirements #9.3.1.1**		**List Non-Conformances During Phase I**	ED-82
388.	The Contractor shall submit to the Buyer a recommended disposition for each nonconformance.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 9.0 Quality Assurance (QA) Requirements #9.3.1.1**		**List Non-Conformances During Phase I**	ED-82

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
389.	The Contractor shall implement the requirements of the QA (Quality Assurance) Clauses identified in Table 2 (below). QA Clause Title B-01 Quality Assurance Program Submittal and Pre-Award Survey B-07 Certified Quality Program B-13 Fabrication/Inspection/Test Plan for control of production welding B-16 Source Inspection for Phase I activities performed at Contractor's facility B-22 Non-conformance Reporting B-25 Certified Weld Inspectors (for Contractor Supplied Inspectors) B-28 Welding Procedures and Qualifications B-31 Nondestructive Examination Process B-37 Identification and Traceability of Items B-49 Certified Material Test Reports for weld filler material B-52 Inspection and Test Reports B-58 Calibration Reports for mass spectrometer, Liburdi welding machines, torque wrench, pyrometer B-61 Certification of Calibration for mass spectrometer, Liburdi welding machines, torque wrench, pyrometer B-73 Control of Graded Fasteners B-76 Procurement of Potentially Suspect or Counterfeit Items B-79 Certificate of Conformance for welding gas (FH provided), helium (FH provided), NDE chemicals, tungsten electrodes, and markers for use on MCO/CCA.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 9.0 Quality Assurance (QA) Requirements #9.3.3**	Procurement Quality Clauses Oct. 25, 2001	Evaluated Supplier Listing for B-01, B-07B-13: FIT Plan; Field Demo Test Procedure B-28: Welding Procedure, Contractor; Welder Qualifications B-31:AIT Quality Assurance Program, controlled copy Standard Procedures Section 11. B-37, B-49, B-52, B-73, B-76, B-79: Verified by surveillance during Field Demo Test, and will be contained in the Field Demo Test Procedure Report B-58: Calibration Reports	ED-70 ED-36, ED-38, ED-56, ED-62, ED-9, ED-49, ED-83 B-22 and B-25 are not applicable.
390.	Contractor shall notify the Buyer's representative a minimum of five working days prior to the time any hold/witness point is reached for Phase I.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 10.0 Hold Points #10.1**		***AIT Communications* File at the end of Phase I**	ED-34 This is a post start item
391.	The following courses provided by the Buyer are required for the Contractors personnel involved in the Field Demonstration activities located at CSB. Hanford General Employee Training, SNF Onentation, Radiological Worker II, Confined Space Entry, Facility Specific Training	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 11.1 Training**		Training Records (e-mail from M. Bush, to D. Nearing)	ED-79
392.	Contractor shall have a current ASME "N" stamp with remote site capability or the capability to obtain a remote site "N" stamp prior to the scheduled Phase II start date.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 12.0 Minimum Qualifications #12.1**		A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-58
393.	Contractor shall be capable of meeting Buyers schedule for welding the MCO's on a two shift per day per the standard Buyer schedule.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 12.0 Minimum Qualifications #12.2**		AIT Project Schedule	ED-64

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			Implementation	Adherence	
394.	The Contractor shall have an Authorized Nuclear Inspector (ANI) onsite at Hanford to provide oversight of all ASME Code work performed by the Contractor.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 12.0 Minimum Qualifications #12.3**		A20-15220-16, ANI Qualification submittal 16	ED-71
395.	For Phase I, the Contractor shall make provisions for office space at the Contractor's facility with analog phone lines and Internet access for two (2) Buyer representatives.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 13.0 Unique Requirements #13.1**		A20-15220-29, FAT Report Submittal 29	ED-43
396.	Contractor shall pass pre-award surveillance of their "N" Stamp Program. The Buyer shall conduct this surveillance.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 13.0 Unique Requirements #13.2**		A20-15220-03, AIT Quality Assurance Program, Controlled copy Standard Procedures submittal 3 Letter Contract 15220 A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-9, ED-57, ED-58
397.	Contractor shall utilize the codes and standards identified below unless an alternative approach is submitted to and approved by the Buyer.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents**		A20-15220-11, Final Design Package Submittal 11	ED-10
398.	Contractor must demonstrate the validity of any alternative approach and provide evidence that the approach satisfies the intended engineering function prior to its application.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents**		A20-15220-11, Final Design Package Submittal 11	ED-10
399.	The lifting attachment(s) on the equipment (lifting eyes, lugs, ears, etc) are included in the definition of below-the-hook lifting devices and shall conform to the same requirements.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19**		A20-15220-11, Final Design Package Submittal 11	ED-10
400.	Contractor shall submit documentary evidence to the Buyer that the appropriate design factors, welding codes, qualified welders, non-destructive examination procedures, testing requirements, etc., have been used.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19**		A20-15220-11, Final Design Package Submittal 11	ED-10
401.	Structural and mechanical below-the-hook lift devices shall have a minimum safety factor of 3, based on the yield strength, for load-bearing structural components.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.1**		A20-15220-11, Final Design Package Submittal 11	ED-10
402.	Welding of Structural and mechanical below-the-hook lift devices shall be in accordance with the requirements of ANSI/AWS D1.1, ANSI/AWS D1.2, or other buyer approved national welding standards.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.2**		A20-15220-11, Final Design Package Submittal 11	ED-10

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
403.	Structural and mechanical below-the-hook lifting devices shall be provided with identification in the form of a nametag, nameplate, metal stamp, or other permanent marker displaying the following data: A. Rated Load B. Manufacturer's name (or fabricator's name) C. Lifting device weight, if over 45.4 kg (100 pounds) D. Drawing number (if applicable) E. Serial number (if applicable)	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.3**		A20-15220-11, Final Design Package Submittal 11	ED-10
404.	Individual lifting devices which devices, which are assembled together to form a below-the-hook lifting device, but can be detached from the assembly, shall each be marked with an individual load rating	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.4**		A20-15220-11, Final Design Package Submittal 11	ED-10
405.	Any modification or re-rating of below-the-hook lifting devices shall require documented analysis by a professional engineer or the manufacturer of the lifting device.	A20-SOW-001, Rev. 2 Statement of Work for the MCO Closure Welds May 30, 2002**Section 14.0 Codes, Standards, and Documents #14.19.5**		A20-15220-11, Final Design Package Submittal 11	ED-10
406.	Any re-rated or modified lifting device requires a new load test.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.5**		A20-15220-11, Final Design Package Submittal 11	ED-10
407.	A re-rated lifting device also must be appropriately relabeled with the new rated load capacity.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.5**		A20-15220-11, Final Design Package Submittal 11	ED-10
408.	Before initial use at CSB all used, new, altered, modified or repaired below-the-hook-lifting devices shall be loaded, tested and inspected.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.6**		A20-15220-11, Final Design Package Submittal 11	ED-10
409.	Load testing and inspection shall be completed within one year of use at CSB.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.6**		A20-15220-11, Final Design Package Submittal 11	ED-10
410.	Rated load test shall be done under the direction of a qualified person.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.6**		A20-15220-11, Final Design Package Submittal 11	ED-10
411.	A written report shall be furnished by such person confirming the load rating of the lifter.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.6**		A20-15220-11, Final Design Package Submittal 11	ED-10

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412.	The load rating shall not be more than 80% of the maximum load sustained during test.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.6**		A20-15220-11, Final Design Package Submittal 11	ED-10
413.	Test loads shall not be more than 125% of the maximum rated capacity unless otherwise recommended by the manufacturer.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.6**		A20-15220-11, Final Design Package Submittal 11	ED-10
414.	The Buyer will perform the required load tests.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 14.0 Codes, Standards, and Documents #14.19.6**	N/A	A20-15220-11, Final Design Package Submittal 11	ED-10
415.	The Buyer's points of contact shall be designated in the contract.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 ***Section 17 Administrative Aspects***		Contract 15220 sections 5 and 6	ED-57
416.	Each weld station shall require equipment sufficient to place an MCO cover cap on the MCO in the CSB weld pit.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
417.	Each weld station shall require equipment sufficient to ensure that the MCO cover cap is placed in the correct orientation relative to the ports in the MCO shield plug.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 ***Section 2 Scope***	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
418.	Each weld station shall require equipment sufficient to inert the cover cap with argon backing gas through the penetration plug and continue purge until welding machine is removed.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
419.	Each weld station shall require equipment sufficient to weld the MCO cover cap to the MCO utilizing an automated welding machine.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
420.	Each weld station shall require equipment sufficient to conduct required dye penetrant examinations.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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421.	Each weld station shall require equipment sufficient to remove the argon backing gas from the cover cap and fill the cover cap with helium.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field *Demo Test Procedure* Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
422.	Each weld station shall require equipment sufficient to perform helium leak testing of completed MCO cover cap welded assembly.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
423.	Each weld station shall require equipment sufficient to install penetration test plug.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49

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			Implementation	Adherence	
424.	Each weld station shall require equipment sufficient to perform leak testing on the penetration test plug and seal.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
425.	Each weld station shall require equipment sufficient to weld the test plug cover plate on the MCO cap (manually with two passes).	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
426.	Each weld station shall require equipment sufficient to perform needed weld repairs with manual welding equipment using Gas Tungsten Arc Welding equipment.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
427.	Each weld station shall require equipment sufficient to preclude a radiological release, capture fumes/off-gases generated by the welding process.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
428.	Each weld station shall require equipment sufficient to shield the weld flash from the CSB operating gallery.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 2 Scope**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
429.	Each weld station shall require equipment sufficient to perform liquid penetrant examination of root, each 0.25-inch lift, and the final weld passes.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 3 Existing Services/Building Configuration**	A20-15220-08, 30% Design Package submittal 08 A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10 A20-15220-11, Final Design Package Submittal 11	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification SNF-6442, Rev. 3, CSB Design Verification Report Spent Nuclear Fuel Project Canister Storage Building A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-67, ED-68, ED-69, ED-10 ED-15, ED-16, ED-28, ED-49
430.	Weld procedures shall address corrective action in the event of a power failure during a weld.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 3 Existing Services/Building Configuration**		A20-15220-22, Welding Procedure, Submittal 22 A20-15220-23, Weld Repair Procedures submittal 23	ED-56, ED-72

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
431.	Weld procedures shall have a step to ensure that there is adequate weld gas to complete a weld pass, before the weld pass is started.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 3 Existing Services/Building Configuration**		A20-15220-22, Welding Procedure, Submittal 22 A20-15220-23, Weld Repair Procedures submittal 23	ED-56, ED-72
432.	Hanford Contractor personnel shall remove all smearable contamination before the MCO is released for welding operations (including cap placement).	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 3 Existing Services/Building Configuration**	OP-23-004S, MCO to CCA Welding Process (OCRWM)	OP-23-004S, MCO to CCA Welding Process (OCRWM) SNFP Interoffice Correspondence, 02-SNF/DTS-043, "Canister Storage Building ALARA Plan for Welding of MCOs and SSFCs," September 26, 2002	ED-59 ED-59, ED-24 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
433.	No water is allowed in the CSB.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 3 Existing Services/Building Configuration**	A20-15220-30, Field Demo Test Procedure Submittal 30	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-38 ED-49
434.	Contractor furnished mechanical cooling assembly or dye penetrant removal process must be water free unless specifically approved by the Buyer.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003**Section 3Existing Services/Building Configuration**	A20-15220-30, Field Demo Test Procedure Submittal 30	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-38 ED-49
435.	The circumferential closure weld shall be performed in the 2G position. Shield Metal Arc Welding (SMAW) and flux cored arc welding shall not be used	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
436.	The welding system shall be capable of producing sound welds with a final weld surface-requiring no conditioning prior to visual and liquid penetrant examination.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
437.	The circumferential welding process shall be limited to Automatic Arc Welding.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
438.	Welding operator control console shall have sufficient extension cable such that it may be located 40 feet from the welding head.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
439.	Remote video operator viewing of the weld both fore and aft of the electrode shall be included.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
440.	The welding system shall be programmable with computer storage of all relevant welding parameters.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
441.	The welding system shall be capable of completing each weld pass without interruption.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
442.	Adequate lighting for the set-up, inspections, testing, and examinations shall be provided.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
443.	Welding system shall possess a remote hand held pendant capable of starting and stopping the weld sequence, adjusting the pre-set weld program's function up to 40 feet from the power supply.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
444.	Welding system shall be hand movable to either welding pit.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
445.	Welding system shall utilize a remote orbiting weld head possessing the following: A flexible or rigid track permitting a continuous circumferential weld on a cylindrical container nominally 25.3 inches in diameter.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
446.	Welding system shall utilize a remote orbiting weld head possessing the following: an internally contained torch cooling system.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
447.	Welding system shall utilize a remote orbiting weld head possessing the following: Welding gas control.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
448.	Welding system shall utilize a remote orbiting weld head possessing the following: Jog and weld sequence controls.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
449.	Welding system shall utilize a remote orbiting weld head possessing the following: Remote video viewing with a remote color monitor and video recorder.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
450.	The weld system shall provide adequate equipment to allow simultaneous welding in Weld Pits 2 and 7.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**		**Readiness Self Assessment**	ED-79 This is a post start item.
451.	The weld system shall provide adequate equipment to allow for a machine weld on the MCO circumferential closure weld, a manual weld on the test plug cover plate, and rework of weld flaws.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
452.	Welding procedures, equipment and personnel shall be qualified in accordance with applicable ASME code requirements prior to making the initial weld.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**		A20-15220-22, Welding Procedure, Submittal 22 A20-15220-23, Weld Repair Procedures submittal 23 A20-15220-24, Contractor Welder Qualifications submittal 24 A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-56, ED-72, ED-62, ED-49
453.	The mechanism for placing/holding the weld head shall be designed such that the weld head track can be removed and replaced following each weld pass without having to repeat the track set up procedure.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
454.	The mechanism for placing and holding the weld head cannot extend more than 1" below the base of the bevel on the lip of the MCO.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 4 Weld System**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
455.	The picking mechanism shall have a positive locking mechanism such that the cap will not accidentally release from the picking mechanism.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5 MCO Cover Cap Placement**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
456.	The picking mechanism shall be designed to prevent damage to the weld joint area.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5 MCO Cover Cap Placement**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
457.	The cap shall be placed so that the test plug penetration is aligned over Port 2 in the MCO Shield Plug, and the magnetic readout location is aligned over Port 1 in the MCO Shield Plug	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003**Section 5 MCO Cover Cap Placement**	OP-23-004S, MCO to CCA Welding Process (OCRWM)	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-59 ED-66
458.	The mechanism for ensuring alignment shall provide for visual verification following weld fit-up, but prior to the start of the first weld. Tolerance on the rotational fit-up is ±0.025 inches at a radius of 4.515 inches (or 0.3°).	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5 MCO Cover Cap Placement**	OP-23-004S, MCO to CCA Welding Process (OCRWM)	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-59 ED-66
459.	The Contractor will apply external (not scratched into surface) match-marks on the MCO and CCA or develop a suitable alternative to ensure proper alignment.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5 MCO Cover Cap Placement**	OP-23-004S, MCO to CCA Welding Process (OCRWM)	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-59 ED-66
460.	Prior to welding, alignment will be functionally verified by the Buyer.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5 MCO Cover Cap Placement**	OP-23-004S, MCO to CCA Welding Process (OCRWM)	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-59 ED-66

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
461.	After the cap is placed, the mechanism for placing the cap shall be removed from the weld pit, or the mechanism shall be designed such that it shall not interfere with the placement of the automatic weld head, cooling cap or weld enclosure	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5 MCO Cover Cap Placement**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
462.	The design for the cap placement mechanism shall ensure that the MCO cap is lowered onto the MCO in such a way that the horizontal axis of the cap remains perpendicular to the vertical axis of the MCO.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5 MCO Cover Cap Placement**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
463.	Provision shall be made for weld joint rework of the fit-up zone to facilitate seating of the cap.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5 MCO Cover Cap Placement**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
464.	The {weld} hood shall be connected to the existing 6-inch exhaust vent.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003**Section 6 Weld Area Hood**	A20-15220-30, Field Demo Test Procedure Submittal 30	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-38 ED-49
465.	The {weld hood} connection to the 6-inch exhaust vent shall include an adjustable damper for regulating airflow. Maximum airflow from the weld area hood is limited to 250 CFM.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-30, Field Demo Test Procedure Submittal 30	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-38 ED-49
466.	The {weld} hood shall have a no flow alarm.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-30, Field Demo Test Procedure Submittal 30	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-38 ED-49
467.	The enclosure shall be designed so that the following functions can be performed: weld repairs.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
468.	The enclosure shall be designed so that the following functions can be performed: weld inspections.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
469.	The enclosure shall be designed so that the following functions can be performed: weld equipment adjustments.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
470.	The enclosure shall be designed so that the following functions can be performed: weld NDE.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
471.	The enclosure shall be designed so that the following functions can be performed: removal of excess welding gas following weld completion.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
472.	The hood shall be made of light durable materials and designed such that: materials of construction are fire retardant.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43

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			Implementation	Adherence	
473.	The hood shall be made of light durable materials and designed such that: it can be placed and removed by one operator.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
474.	The hood shall be made of light durable materials and designed such that: the operator will not have to lift in excess of 20 pounds when moving or placing the hood	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
475.	The enclosure shall be designed such that it is not necessary to remove weld pit handrails during placement/removal.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 6 Weld Area Hood**	A20-15220-28, FAT Procedure Submittal 28	A20-15220-29, FAT Report Submittal 29	ED-37 ED-43
476.	Design, fabrication, qualification and/or installation shall be done in accordance with appropriate industry codes and standards.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 7 Applicable Codes and Standards**	A20-15220-09, 60% Design Package submittal 09 A20-15220-10, 90% Design Package submittal 10	SNF-11951, Rev. 0, MCO Cover Cap Assembly Welding 60% Design Verification SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification	ED-68, ED-69 ED-15, ED-16
477.	Before equipment provided under this specification is placed into service, the Buyer must approve at the 30% design review, the industry codes and standards used for the design, fabrication, qualification and/or installation.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 7 Applicable Codes and Standards**		A20-15220-08, 30% Design Package submittal 08	ED-67
478.	MCO welding operations will be provided by an ASME N-Stamp qualified vendor using HAMTC welding personnel.	FH-0201191 Letter, March 12, 2002, Contract Number DE-AC06-96RL13200 - Activities Required to initiate and complete multi-canister overpack welding at the canister storage building		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-59, ED-58 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
479.	Measures will be taken to ensure the adequacy of the mechanical seal prior to MCO welding (on MCO's 1 through 40).	FH-0201191 Letter, March 12, 2002, Contract Number DE-AC06-96RL13200 - Activities Required to initiate and complete multi-canister overpack welding at the canister storage building	OP-23-004S, MCO to CCA Welding Process (OCRWM)	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-59 ED-66
480.	Prior to welding MCO's 1 through 40 locking ring bolt torque will be verified. If bolt movement is detected, the bolt torque will be adjusted to an appropriate value. In addition if movement is detected MCO gas pressure will need to be verified and adjusted if necessary using the CSB Sampling system.	FH-0201191 Letter, March 12, 2002, Contract Number DE-AC06-96RL13200 - Activities Required to initiate and complete multi-canister overpack welding at the canister storage building	OP-23-004S, MCO to CCA Welding Process (OCRWM)	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-59 ED-66
481.	Welding will be performed by the Hanford Atomic Metal Trades Council (HAMTC).	Questions & Answers in Response to Request for Proposal 377		Letter From: Jessie Hill Roberson, Department of Energy, To: John T. Conway, Defense Nuclear Facilities Safety Board OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-86, ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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482.	Exhaust of fumes is required for any welding associated with the 25.3-inch circumferential weld.	Questions & Answers in Response to Request for Proposal 377	A20-15220-30, Field Demo Test Procedure Submittal 30 A20-15220-31, Field Demo Test Procedure Report Submittal 31	OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-38, ED-49 ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
483.	The leakage rate of the welded MCO must be less than 1.0E-07 sccs. This leakage rate for air, which corresponds to 2.3E-07 cc/sec for helium.	Questions & Answers in Response to Request for Proposal 377	A20-15220-30, Field Demo Test Procedure Submittal 30 A20-15220-31, Field Demo Test Procedure Report Submittal 31	OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-38, ED-49 ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
484.	The Contractor is responsible for verifying all field dimensions of the CSB.	Questions & Answers in Response to Request for Proposal 377	A20-15220-30, Field Demo Test Procedure Submittal 30	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-38 ED-49
485.	NDE is required on the "canister cover to canister weld", the 25.3 inch circumferential weld for the CCA to the MCO, is as follows: a. Perform PT on the root pass b. Perform PT on each additional 0.25 inch weld buildup c. Perform helium leak check on weld d. Perform PT on final weld pass	Questions & Answers in Response to Request for Proposal 377	A20-15220-30, Field Demo Test Procedure Submittal 30 A20-15220-28, FAT Procedure Submittal 28 OP-23-004S, MCO to CCA Welding Process (OCRWM)	A20-15220-31, Field Demo Test Procedure Report Submittal 31 A20-15220-29, FAT Report Submittal 29 OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-38, ED-37, ED-59 ED-49, ED-43, ED-66 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
486.	Equipment shall be provided to cool the MCO welded surface before manual examination and testing of the closure welds.	HNF-S-0425 Rev. 4 Canister Cover Cap Welding Facilities and Process **Section 1.1 Multi-Canister Overpack Welding Facilities/Equipment**	N/A	N/A	Cooling equipment already in use by the sampling operation.
487.	The Subcontracted supplier will provide the welding equipment for the production of canister cover weld caps.	HNF-S-0425 Rev. 4 Canister Cover Cap Welding Facilities and Process**Section 1.1 Multi-Canister Overpack Welding Facilities/Equipment**	A20-15220-30, Field Demo Test Procedure Submittal 30	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-38 ED-49
488.	Post weld cleaning shall be limited to light brushing.	HNF-S-0425 Rev. 4 Canister Cover Cap Welding Facilities and Process **Section 1.1 Multi-Canister Overpack Welding Facilities/Equipment**	A20-15220-30, Field Demo Test Procedure Submittal 30	A20-15220-31, Field Demo Test Procedure Report Submittal 31 OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-38 ED-49, ED-59

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
489.	The following equipment utilities are required to be available to service each of the two workstations for the monitored MCO sampling, welding, leakage rate testing, penetrant testing, possible ultrasonic testing activities, and other examination and/or testing: a. Helium gas supply (canister cover cap and cover plate back gas, leak testing, monitored MCO gas venting, and monitored MCO reinerting) b. Welding gas supply (Argon) c. Electric power - (2ea) 120 VAC, 1 phase, 20 amp circuit; (1 ea) 480 VAC, 3 phase, 50 amp circuit d. Compressed air - 100 psig. supply e. Cooling system to maintain MCO top surface temperatures.	HNF-S-0425 Rev. 4 Canister Cover Cap Welding Facilities and Process **Section 1.1 Multi-Canister Overpack Welding Facilities/Equipment**	N/A	N/A	These were examined as part of the CSB ORR.
490.	Surface temperature of MCO must be below 120F for dye penetrant testing.	HNF-S-0425 Rev. 4 Canister Cover Cap Welding Facilities and Process **Section 1.1 Multi-Canister Overpack Welding Facilities/Equipment**	OP-23-004S, MCO to CCA Welding Process (OCRWM)	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-59 ED-66
491.	Systems or components needed to house and enable gas sampling, cooling of the MCO top, helium reinerting, welding, and post welding of MCO's shall have a minimum design life of 10 years.	HNF-S-0425 Rev. 4 Canister Cover Cap Welding Facilities and Process **Section 1.1 Multi-Canister Overpack Welding Facilities/Equipment**		A20-15220-10, 90% Design Package submittal 10 SNF-12232, Rev. 0, MCO Cover Cap Assembly Welding 90% Design Verification	ED-68, ED-16 Welding operation will only take place over 2 years. Sampling components are not in the scope of this document.
492.	HEPA Filter, CSB-AH-006 must meet all requirements of ASME N-509 and ASME N-510 including design, fabrication, shipping, installation, testing, and quality assurance (NQA-1).	SNF-6154 REV 0A SNF Project CSB Design Basis Document **Section 6.3 ECN-666551**	N/A	N/A	During FAT prior to MCO Welding, off gas temperature was shown to be below the design limits of the filter.
493.	The calculated weld stress shall meet the requirements of the design rules in NB-3000, NE-3000, or NC-3200 for the Class of construction used. Final end closure welds, made after the canister is loaded with spent fuel, shall be full or partial penetration using the stress reduction facts of Table 1, and helium leak tested.	Requirements for Spent Fuel Storage Canisters Section III, Division 1, December 8, 2000, Case N-595-3, Cases of ASME Boiler and Pressure Vessel Code	A20-15220-22, Welding Procedure, Submittal 22	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ASME Code Data Report ED-56 ED-66 Stress reduction factor of 0.90 was specified in SOW rev 2 step 3.9.2.
494.	*Vent and drain cover plate welds* shall be full or partial penetration welds using the stress reduction factors of Table 1.	*Requirements* for Spent Fuel Storage Canisters Section III, Division 1, December 8, 2000, Case N-595-3, Cases of ASME Boiler and Pressure Vessel Code	A20-15220-22, Welding Procedure, Submittal 22	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ASME Code Data Report ED-56 ED-66 Stress reduction factor of 0.90 was specified in SOW rev 2 step 3 9 2.
495.	Helium leak testing shall be in accordance to Section V, Article 10, Appendix IV or V. The test will be considered acceptable when no leakage is detected that exceed the rate of 1 x 10^{-4} std cc/sec.	Requirements for Spent Fuel Storage Canisters Section III, Division 1, December 8, 2000, Case N-595-3, Cases of ASME Boiler and Pressure Vessel Code	A20-15220-22, Welding Procedure, Submittal 22	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ASME Code Data Report ED-56 ED-66 Leakage acceptance criteria in SOW is more limiting at 1e-7 sccs.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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496.	While used for storage, overpressure protection devices are not permitted. For the Class of construction used, spent fuel storage canisters shall meet the requirements of NB-7000, NC-7000 or NE-7000 for components not requiring overpressure protection devices.	Requirements for Spent Fuel Storage Canisters Section III, Division 1, December 8, 2000, Case N-595-3, Cases of ASME Boiler and Pressure Vessel Code	N/A	N/A	This design of the MCO's is outside the scope of MCO welding. Additionally, there are no overpressure devices associated with the MCO's.
497.	In lieu of the requirements of NCA-8151, N-Type Certificate Holders making final closure welds at field locations, after the canisters are loaded with spent fuel, may extend their Certificate of Authorization to field locations without a site-specific implementation survey by the Society provided: (1) The control of material, special processes, examinations, inspections, tests, and certification at field locations shall be described in the certificate Holders Quality Assurance Manual, including involvement of the ANI. (2) The procedures for controlling the canister's serial number for shells and cover plates shall be included in the Certificate Holder's Quality Assurance Plan. (3) The Certificate Holder's Quality Assurance program has been reviewed and accepted by the Authorized Inspection Agency to confirm the above prior to any welding being performed at field locations.	Requirements for Spent Fuel Storage Canisters Section III, Division 1, December 8, 2000, Case N-595-3, Cases of ASME Boiler and Pressure Vessel Code		A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-58 Will require contractor to obtain remote site capability. When QA manual revised from NA Stamp to N Stamp.
498.	The Certificate (NCA-3120) will identify the shop or field facility covered and state the scope of activities.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8120 Scope of Certificates**	A20-SOW-001, Rev. 2 Statement of Work for the MCO Closure Welds May 30, 2002	A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-12 ED-58 When QA manual revised from NA Stamp to N Stamp
499.	Certificate of Authorization will be issued by the Society to an organization for the use of a Code Symbol Stamp, certifying a data report form, or performing welding or certifying joining	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports**NCA-8120 Scope of Certificates**	A20-SOW-001, Rev. 2 Statement of Work for the MCO Closure Welds May 30, 2002	A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-12 ED-58 When QA manual revised from NA Stamp to N Stamp
500.	The installation of items by mechanical means need not be performed by a Certificate Holder. The responsibility for the hydrostatic or pneumatic test of completed components must be assumed by a holder of a Certificate of Authorization and witnessed by the Authorized Nuclear Inspector regardless of the method of assembly. This does not preclude an organization that installs items by mechanical means only from obtaining a Certificate of Authorization.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8120 Scope of Certificates**	N/A	N/A	FDH & DOE-RL are not invoking this requirement. Not required by ASME 595-3.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
501.	Certificate Holders and Owners shall possess an agreement with an Authorized Inspection Agency to provide inspection and audit services. The agreement with the Authorized Inspection Agency shall be made prior to application for a survey or, in the case of the Owner, an interview. Certificate Holders and owners shall notify the Society whenever their agreements with an Authorized Inspection Agency are cancelled or changed to another Authorized Inspection Agency.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8130 Inspection Agreement Required**	AIT Org Chart	**Readiness Self Assessment Report** A20-15220-25, Contractors Inspection Qualifications for Fabrication submittal 25	ED-87 ED-76, ED-73
502.	It is a requirement that a Certificate Holder have a Quality Assurance Program {NCA-4000} which has been evaluated and accepted by the Society.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8140 Quality Assurance Program Requirements**		A20-15220-03, AIT Quality Assurance Program, Controlled copy Standard Procedures submittal 3 A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-9, ED-58
503.	Miscellaneous items as described in NCA-1270 shall be code symbol stamped and listed on the appropriate Data Report For, when constructed and an "N" or "NPT" item or installed under an "NA" Certificate. When furnished as a material, an appropriate Certified Material Test Report or Certificate of Compliance is required in lieu of data reports and stamping.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8140 Quality Assurance Program RequirementsTable NCA-8100-1 NOTES**	N/A	N/A	The items listed in NCA-1270 are not applicable to this project.
504.	The N, NA or NPT certificates may be extended to include field operations such as installation, completion, or repair of components, parts, or appurtenances constructed under the authorization. The Society requires that an audit acceptable to the Society be performed at each field site to assure that the Quality Assurance program described in the Manual is implemented and enforced.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8151 Field Operations**		A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-58
505.	Applicants for a new or renewed Certificate for Class 1, 2, 3, CS, CB, CC, or MC construction require a survey of their shop or field facilities.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8161 Evaluation for a Certificate**	N/A	N/A	AIT already has an N-stamp.
506.	Authorization to apply a Code Symbol Stamp to an item will be granted only after a survey by the Society has satisfactorily demonstrated the adequacy and implementation of the Quality Assurance Program.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8161 Evaluation for a Certificate**	N/A	N/A	AIT already has an N-stamp.
507.	The owner, after receipt of notification from the regulatory authority that an application for a construction permit for a specific plant has been docketed, shall obtain an Owner's Certificate (NCA-3230) from the Society for unit(s) docketed concurrently for each nuclear power plant site prior to field installation.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports**NCA-8162 Evaluation for an Owner's Certificate**	N/A	N/A	Not a nuclear power plant requiring an owner's certificate.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
508.	Not later than 6 months prior to the date of expiration of any certificate, the Certificate Holder shall apply for renewal of such authorization and the issuance of a new Certificate.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8180 Renewal**	N/A	N/A	Not applicable to start-up since AIT already has their N stamp
509.	A Certificate issued for a specific field site, or a Certificate which has been extended to a specific field site activity, is valid for the duration of the contract at the specified site or 3 years, whichever occurs first. The Owner's Certificate expires when all N-3 Data reports for the units listed on the Certificate have been completed	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8180 Renewal**	**Readiness Self Assessment Report**	A20-15220-01, AIT N-stamp with Remote Site capability, Submittal 01	ED-76 ED-58 When QA manual revised from NA Stamp to N Stamp.
510.	The nameplate shall be attached by a method (acceptable to the designer for Division 2 items) that will not affect the structural integrity of the item.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8213 Attachment of Nameplates**	N/A	N/A	The label is etched.
511.	If the nameplate is marked before it is attached, the Certificate Holder shall assure that the nameplate with the correct marking has been attached.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8213 Attachment of Nameplates**	N/A	N/A	The label is etched.
512.	The Inspector shall verify that this has been done.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports**NCA-8213 Attachment of Nameplates**	N/A	N/A	The label is etched.
513.	When nameplates are attached with pressure sensitive acrylic adhesive systems, in addition to the requirements of this Article, those of Appendix XXI shall be met.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8213 Attachment of Nameplates**	N/A	N/A	The label is etched.
514.	If nameplates secured as noted in NCA-8220 are removed from items which have been installed in a nuclear power plant system, the Certificate Holder responsible for completion of the N-5 Data Report shall verify and document that the required nameplate had been attached to the item	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8240 Removed Nameplates**	N/A	N/A	The label is etched.
515.	The Owner who has obtained an Owner's certificate shall be responsible for completing one or more of form N-3. The Owner shall certify, by signing the form, that each Certificate Holder was the holder of the appropriate Certificate and that components and installation comply with the applicable requirements of this Section.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8420 Owner's Data Report**	N/A	N/A	DOE does not obtain an owner's certificate.
516.	Review of the completed Owner's Data report Form N-3, including attached Data Reports for all components and installation as required to verify Code Compliance, plus provisions of the Overpressure Protection Report or the Overpressure Protection Analysis, when required, shall be the Inspector's authority to sign the Owner's Data Report.	ARTICLE NCA-8000 Certificates, Nameplates, Code Symbol Stamping, and Data Reports **NCA-8420 Owner's Data Report**		Overpressure Protection Report SNF-7191	ED-32

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
517.	Nondestructive examination personnel shall be qualified in accordance with the requirements of the referencing Code Section.	Nondestructive Methods of Examination; **Subsection A, Article 1 *General Requirements* T-140 Requirements**	A20-SOW-001, Rev. 2 Statement of Work for the MCO Closure Welds May 30, 2002	A20-15220-25, Contractors Inspection Qualifications for *Fabrication submittal 25*	ED-12 ED-73
518.	The Manufacturer, fabricator, or installer shall assure that all equipment calibrations required by Subsection A and/or Subsection B are performed.	Nondestructive Methods of Examination;**Subsection A, Article 1 General RequirementsT-160 Calibration**	A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-41 ED-83 Calibration of mass spectrometer is covered under ASME Article 10 requirements.
519.	When special procedures are developed [seeT-150 (a)], the Manufacturer, fabricator, or installer shall specify what calibration is necessary, when calibration is required.	Nondestructive Methods of Examination; **Subsection A, Article 1 General Requirements T-160 Calibration**	A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	OP-23-004S, MCO to CCA Welding Process (OCRWM) Data Sheet	ED-41 ED-83 Calibration of mass spectrometer is covered under ASME Article 10 requirements.
520.	The user of this Article shall obtain certification of contaminant content for all liquid penetrant materials used on nickel base alloys, austenitic stainless steels, and titanium. These certifications shall include the penetrant manufacturers' batch numbers and the test results obtained in accordance with (b) below. (b) When examining austenitic stainless steel or titanium, all material shall be analyzed individually for chlorine and fluorine content *(as per method provided in* Article 6, Subsection T-641,(1-4))	Nondestructive Methods of Examination; **Subsection A, Article 6 Liquid Penetrant Examination T-641 Control Of Contaminants**	A20-15220-22, Welding Procedure, Submittal 22 A20-15220-03, AIT Quality Assurance Program, Controlled copy Standard Procedures submittal 3	Certificate of Compliance from liquid penetrant manufacturer	ED-56, ED-9 ED-33
521.	Cleaning solvents shall meet the requirements of T-641. The cleaning method employed is an important part of the examination process.	Nondestructive Methods of Examination; **Subsection A, Article 6 Liquid Penetrant Examination T-642 Surface Preparation**	N/A	N/A	No cleaning solvents allowed per SOW section 4.3 of attachment A
522.	*After cleaning, drying of the surfaces* to be examined shall be accomplished by normal evaporation or with forced hot or cold air.	*Nondestructive Methods of* Examination; **Subsection A, Article 6 Liquid Penetrant Examination T-643 Drying After Preparation**	N/A	N/A	*No cleaning allowed per* SOW section 4.3 of attachment A
523.	When it is not practical to conduct a liquid penetrant examination within the temperature range of 50°F to 125°F (10°C to 52°C), the examination procedure at the proposed lower or higher temperature range requires qualification.	Nondestructive Methods of Examination; **Subsection A, Article 6 Liquid Penetrant Examination T-653 Techniques for Nonstandard Temperatures**	N/A	N/A	N/A Temperatures will be maintained < 120 F for the liquid penetrant test through use of mechanical cooling.
524.	The liquid penetrant comparator blocks shall be made of aluminum, ASTM B 209, Type 2024, 3 /8 in. (10 mm) thick, and should have approximate face dimensions of 2 in. × 3 in. (52 mm × 76 mm).	Nondestructive Methods of Examination;**Subsection A, Article 6 Liquid Penetrant ExaminationT-653.2 Liquid Penetrant Comparator**	N/A	N/A	N/A Temperatures will be maintained < 120 F for the liquid penetrant test through use of mechanical cooling.

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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525.	Liquid penetrant comparator blocks shall be prepared for use in accordance with Section V, T-653.2.	Nondestructive Methods of Examination; **Subsection A, Article 6 Liquid Penetrant Examination T-653.2 Liquid Penetrant Comparator**	N/A	N/A	N/A Temperatures will be maintained < 120 F for the liquid penetrant test through use of mechanical cooling.
526.	As an alternate to the requirements of T-653.3 (a) and T-653.3 (b) when using color contrast penetrants, it is permissible to use a single comparator block for the standard and nonstandard temperatures and to make the comparison by photography.	Nondestructive Methods of Examination; **Subsection A, Article 6 Liquid Penetrant Examination T-653.3 Comparator Application**	N/A	N/A	N/A Temperatures will be maintained < 120 F for the liquid penetrant test through use of mechanical cooling.
527.	When the single comparator block and photographic technique is used, the processing details (as applicable) described in T-653.3 (a) and T-653.3 (b) apply. The block shall be thoroughly cleaned between the two processing steps. Photographs shall be taken after processing at the nonstandard temperature and then after processing at the standard temperature. The indication of cracks shall be compared between the two photographs. The same criteria for qualification as T-653.3 (a) shall apply.	Nondestructive Methods of Examination; **Subsection A, Article 6 Liquid Penetrant Examination T-653.3 Comparator Application**	N/A	N/A	N/A Temperatures will be maintained < 120 F for the liquid penetrant test through use of mechanical cooling.
528.	With fluorescent penetrants the examination shall be performed as follows: (a) It shall be performed in a darkened area. (b) The examiner shall be in the darkened area for at least 1 min prior to performing the examination tenable his eyes to adapt to dark viewing. If the examiner wears glasses or lenses, they shall not be photosensitive. (c) The black light shall be allowed to warm up for a minimum of 5 min prior to use or measurement of the intensity of the ultraviolet light emitted. (d) The black light intensity shall be measured with a black light meter. A minimum of 1000 mW/cm^2 on the surface of the part being examined shall be required. The black light intensity shall be measured at least once every 8 hr, and whenever the workstation is changed.	Nondestructive Methods of Examination;**Subsection A, Article 6 Liquid Penetrant ExaminationT-676.4 Fluorescent Penetrants**	N/A	N/A	Color contrast liquid penetrant specified by the SOW

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
529.	When written procedures are required by the referencing Code Section, they shall include, as a minimum, the following information: (a) extent of the examination; (b) type of equipment to be used for detecting leaks or measuring leakage rates; (c) surface cleanliness preparation and type of equipment used; (d) method or technique of the test that will be performed; (e) temperature, pressure, gas, and percent concentration to be used.	ARTICLE 10 Leak Testing **T-1021 Procedure Requirements**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
530.	For the leak testing method(s) or technique(s) specified by the referencing Code, the referencing Code Section shall then be consulted for the following:(a) personnel qualification / certification;(b) technique(s) / calibration standards;(c) extent of examination;(d) acceptable test sensitivity or leakage rate;(e) report requirements;(f) retention of records	ARTICLE 10 Leak TestingT-**1022 Referencing Code**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
531.	The surface areas to be tested shall be free of oil, grease, paint, or other contaminants that might mask a leak. If liquids are used to clean the component or if a hydrostatic or hydropneumatic test is performed before leak testing, the component shall be dry before leak testing	ARTICLE 10 Leak Testing **T-1041 Cleanliness**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
532.	All openings shall be sealed using plugs, covers, sealing wax, cement, or other suitable material that can be readily and completely removed after completion of the test. Sealing materials shall be tracer gas free	ARTICLE 10 Leak Testing **T-1042 Openings**	N/A	N/A	No openings
533.	The permeation type leak standard shall be a calibrated permeation type leak through fused glass or quartz. The standard shall have a helium leakage rate in the range of 1E-06 to 1E-10 std cubic centimeters / sec. (1E-07 to 1E-11 Pa m^3 /s)	ARTICLE 10 Leak Testing **T-1063.1 Permeation Type Leak Standard**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
534.	The capillary type leak standard shall be a calibrated capillary type leak through a tube. The standard shall have a leakage rate equal to or smaller than the required test sensitivity times the actual percent test concentration of the selected tracer gas.	ARTICLE 10 Leak Testing **T-1063.2 Capillary Type Leak Standard**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
535.	Unless otherwise specified in the referencing Code Section, the acceptance criteria given for each method or technique of that method shall apply. The supplemental leak testing formulas for calculating leakage rates for the method or technique used are stated in the Mandatory Appendices of this Article.	ARTICLE 10 Leak TestingT-**1081 Acceptance Standards**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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536.	The test report shall contain, as a minimum, the following information as applicable to the method or technique: (a) date of test; (b) certification level and name of operator; (c) test procedure (number) and revision number; (d) test method or technique; (e) test results; (f) component identification; (g) test instrument, standard leak, and material identification; (h) test conditions, test pressure, tracer gas, and gas concentration; (i) gage(s) —manufacturer, model, range, and identification number; (j) temperature measuring device(s) and identification number(s); (k) sketch showing method or technique setup.	ARTICLE 10 Leak Testing **T-1091 Test Report**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
537.	The test report shall be maintained in accordance with the requirements of the referencing Code Section.	ARTICLE 10 Leak Testing **T-1092 Record Retention**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
538.	A helium mass spectrometer leak detector capable of sensing and measuring minute traces of helium shall be used.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1031 Instrument**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
539.	Leakage shall be indicated by one or more of the following signaling devices: (a) Meter (Tracer Probe and Hood Technique) — a meter on or attached to the test instrument. (b) Audio Devices (Tracer Probe Technique) — a speaker or set of headphones that emits audible indications. (c) Indicator Light (Tracer Probe Technique) — a visible indicator light	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique V-1031 Instrument		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
540.	A constant voltage transformer shall be used in conjunction with the instrument when line voltage is subject to variations	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1032 Auxiliary Equipment**	N/A	N/A	Line voltage is relatively constant in the CSB

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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541.	When the size of the test system necessitates the use of an auxiliary vacuum pump system, the ultimate absolute pressure and pump speed capability of that system shall be sufficient to attain required test sensitivity and response time.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1032 Auxiliary Equipment**	N/A	N/A	Small volume
542.	The vacuum gage(s) for large systems shall be located on the system as far as possible from the inlet to the pump system.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1032 Auxiliary Equipment**	N/A	N/A	The volume to be evacuated is not large
543.	The calibration leak standard may be either permeation or a capillary type standard as per T-1063.1 and T-1063.2. The type of standard leak used shall be established by the instrument or test sensitivity requirements or as specified by the referencing Code Section.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1033 Calibration Leak Standard**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
544.	The leak test instrument shall be turned on and allowed to warm up for the minimum time specified by the instrument manufacturer prior to calibrating with the leak standard.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1061.1 Warm-up**		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-59, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
545.	(Calibrate the helium mass spectrometer) as specified by the instrument manufacturer using a permeation type standard as stated in T-1063.1.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1061.2 Calibration**		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-59, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
546.	The instrument (Helium Mass Spectrometer) the sensitivity of the instrumentshall be a minimum of 1 $\times 10^{-6}$ std cm^3 /sec. If the sensitivity of the instrument at any calibration isless than 1 $\times$ 10^{-6} std cm^3 /sec, the instrument shall be retuned, cleaned or repaired, and recalibrated until this sensitivity can be attained.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1061.3 Calibration**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
547.	A calibrated leak CL standard as per T-1063.1 with 100% helium shall be attached, where feasible, to the component as far as possible from the instrument connection to the component.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.1 Standard Leak Size**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
548.	With the component evacuated to an absolute pressure sufficient for connection of the helium mass spectrometer to the system, the system shall be calibrated by opening the leak standard to the system.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Response Time**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
549.	The leak standard shall remain open until the instrument signal becomes stable.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Response Time**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

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550.	The time shall be recorded when the leak standard is first opened to the component and again when the increase in output signal becomes stable.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Response Time**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
551.	The stable instrument reading shall be noted and recorded as M_1 in divisions.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Response Time**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
552.	Background M_2 in divisions is established after determining response time. The leak standard shall be closed to the system and the instrument reading shall be recorded when it becomes stable.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Background Reading**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
553.	The preliminary system sensitivity shall be calculated as follows: $S_1 = CL/(M_1 - M_2)$ = std cm^3 / s / div (Pa m^3 / s / div).	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood TechniqueV-**1062.2 Preliminary Calibration**		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-59, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
554.	The calibration shall be repeated when there is any change in the leak detector setup or any change in the leak standard.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Preliminary Calibration**		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-59, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
555.	The leak standard shall be isolated from the system upon completing the preliminary system sensitivity calibration.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Preliminary Calibration**		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-59, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
556.	Upon completing the test of the system, and with the component still under the hood, the instrument output reading M_3 shall be determined with the calibrated leak closed.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Final Calibration**		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-59, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
557.	The increase in instrument output shall be noted and recorded as M_4 in divisions and used in calculating the final system sensitivity as follows: $S_2 = CL/(M_4 - M_3)$ = std cm^3 / s / div (Pa m^3 / s / div).	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Final Calibration**		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-59, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
558.	If the final system sensitivity S_2 has decreased below the preliminary system sensitivity S_1 by more than 35%, the instrument shall be cleaned and/or repaired, recalibrated, and the component retested.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1062.2 Final Calibration**		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ED-59, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
559.	After completing preliminary calibration per V-1062.2 (d), the space between the component outer surface and the hood shall be filled with helium after the component has been evacuated.	ARTICLE 10 - APPENDIX IX Helium Mass Spectrometer Test - Hood Technique **V-1072.2 Filling Of Hood with Tracer Gas**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
560.	The tracer gas concentration shall be determined or estimated in the hood enclosure.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1072.3 Estimating or Determining Hood Tracer Gas Concentration**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
561.	Unless otherwise specified by the referencing Code Section, the component tested is acceptable when the actual leakage rate Q_2 is equal to or less than 1×10^{-6} std cm^3 / sec of helium.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1071.5 System Measured Leakage Rate**		N/A	The Statement of Work specifies a more stringent leak rate.
562.	When the leakage rate exceeds the permissible value, all welds or other suspected areas shall be retested using a tracer probe technique. All leaks shall be marked and temporarily sealed to permit completion of the tracer probe retest. The temporary seals shall be of a type which can be readily and completely removed after testing has been completed.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1082 (a) Leakage**	N/A	N/A	Leak configuration would not allow a tracer probe. Only the weld will be under test. Failure of the leak test will require the weld to be reworked.
563.	The component shall then be vented and the leak(s) repaired as required by the referencing Code Section. After repairs have been made, the repaired area or areas shall be retested in accordance with the requirements of this Appendix.	ARTICLE 10 - APPENDIX V Helium Mass Spectrometer Test - Hood Technique **V-1082 (b) Repair/Retest**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
564.	Rupture disk devices certifies in accordance with NB-7720 are subject to the following: (a) rupture disk devices shall not be used as the sole pressure relief devices: (b) rupture disk devices used in conjunction with pressure relief valves shall be located only on the outlet side of the valve (NB-7623)	NB-7000 OVERPRESSURE PROTECTION **NB-7610 Rupture Disk Devices**	N/A	N/A	No rupture discs
565.	The burst pressure tolerance at the specified disk temperature shall not exceed + 2 psi (+ 13.8 kPa) for stamped burst pressure up to and including 40 psi (276 kPa) and + 5% for stamped burst pressure above 40 psi (276 kPa) as established by the rules of NB-7613, unless other values have been established in the Design Specification and are covered in the Overpressure Protection Report.	NB-7000 OVERPRESSURE PROTECTION **NB-7611 Burst Pressure Tolerance**	N/A	N/A	No rupture discs

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
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566.	Every rupture disk shall have a stamped burst pressure established by rules of NB-7611 within a manufacturing design range at a specified disk temperature and shall be stamped with a lot number.	NB-7000 OVERPRESSURE PROTECTION**NB-7612 Tests to Establish Stamped Burst Pressure**	N/A	N/A	No rupture discs
567.	Each lot of rupture disks shall be tested in accordance with one of the following methods [NB-7612b (1-3)]. All tests of disks for a given lot shall be made in a holder of the same form and pressure area dimensions as that being used in service.	NB-7000 OVERPRESSURE PROTECTION **NB-7612 Tests to Establish Stamped Burst Pressure**	N/A	N/A	No rupture discs
568.	The rupture disk Manufacturer shall certify the stamped burst pressure of the disk.	NB-7000 OVERPRESSURE PROTECTION **NB-7720 Responsibility for Certification of Nonreclosing Pressure Relief Devices**	N/A	N/A	No rupture discs
569.	Inert gas supply has a nominal pressure of 120 psig for distribution to the sampling/weld station.	SAR HNF-3553 Rev. 1, Annex A- Canister Storage Building		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
570.	Inert gas system piping and components for the CSB support and operations area are designed to meet ASME B31.1, *Power, Power Piping*, for the general service portion that supply inert gas to the sampling/weld stations.	SAR HNF-3553 Rev. 1, Annex A- Canister Storage Building		SNF-6131 Sec. 15061	ED-53
571.	Pressure relief devices, PSV-728 and PSE-1 provide pressure relief if the helium supply pressure exceeds 135 psig or 150 psig, respectively.	SAR HNF-3553 Rev. 1, Annex A- Canister Storage Building		P & ID MCO Sampling System H-2-123397	ED-65
572.	Acceptance Standards for PT only imperfections producing indications with major dimensions greater than 1/16 in. (1.6 mm) shall be considered relevant imperfections.	ARTICLE NB-5000 Examination **NB-5352 Acceptance Standards**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
573.	Imperfections producing the following indications are unacceptable.(1) any cracks or linear indications(2) rounded indications with dimensions greater than 3/16 in. (4.8 mm).(3) four or more rounded indications in a line separated by 1/16 in. (1.6 mm) or less edge to edge(4) ten or more rounded indications in any 6 sq. in. (3.871 mm^2) of surface with the major dimensions of this area not to exceed 6 in. 9152 mm) with the area taken to the most unfavorable location relative to the indication being evaluated.	ARTICLE NB-5000 Examination**NB-5352 Acceptance Standards**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
574.	Vendor supplied welding material shall conform to NB-2400 requirements.	ARTICLE NB-2000 **NB-2400 Welding Material**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

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575.	Tack welds used to secure alignment shall either be removed completely, when they have served their purpose, or their stopping and starting ends shall be properly prepared by grinding or other suitable means so that they may be satisfactorily incorporated in the final weld.	ARTICLE NB-4000 **NB-4231.1 Tack Welds**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
576.	Tack welds shall be made by qualified welders using qualified welding procedures.	ARTICLE NB-4000 **NB-4231.1 Tack Welds**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
577.	When tack welds are to become part of the finished weld, they shall be visually examined and defective tack welds shall be removed.	ARTICLE NB-4000 **NB-4231.1 Tack Welds**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
578.	The weld joining the closure cap to the MCO shell be helium leak tight to 1×10^{-7} scc/sec.	HNF-S-0426 Rev. 6 , Performance Specification for the Spent Nuclear Fuel Project Multi-Canister Overpack **Section 4.11 MCO Closure Design**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
579.	The test plug in the cover cap shall be helium leak tight to 1×10^{-7} scc/sec.	HNF-S-0426 Rev. 6 , Performance Specification for the Spent Nuclear Fuel Project Multi-Canister Overpack **Section 4.11 MCO Closure Design**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
580.	All MCO fabricator pressure boundary welds shall be made in accordance with ASME Section III requirements.	HNF-S-0426 Rev. 6 , Performance Specification for the Spent Nuclear Fuel Project Multi-Canister Overpack **Section 4.17 Welded Joints**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
581.	All welds (of the MCO) shall be sufficiently smooth to enable easy decontamination.	HNF-S-0426 Rev. 6 , Performance Specification for the Spent Nuclear Fuel Project Multi-Canister Overpack **Section 4.17 Welded Joints**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
582.	Weld Joint designs shall avoid potential contamination traps to the greatest extent practicable.	HNF-S-0426 Rev. 6 , Performance Specification for the Spent Nuclear Fuel Project Multi-Canister Overpack **Section 4.17 Welded Joints**	N/A	N/A	MCO's and CCA's are already designed and fabricated and meet this requirement. Out of scope for MCO welding
583.	All MCO pressure boundary welds and welds bearing the weight of the fully loaded MCO must be designed for and pass nondestructive examination per ASME Section III, Division I requirements.	HNF-S-0426 Rev. 6 , Performance Specification for the Spent Nuclear Fuel Project Multi-Canister Overpack **Section 4.17 Welded Joints**		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
584.	Two weld hoods may operate simultaneously for a maximum combined flow of 500 cfm.	HVAC MCO Sampling/Weld Station Flow Diagrams, H-2-129455		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

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585.	Weld hood dampers shall be adjustable to achieve desired flow or pressure.	HVAC MCO Sampling/Weld Station Flow Diagrams, H-2-129455		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
586.	Weld hood exhaust rate shall be varied manually.	HVAC MCO Sampling/Weld Station Flow Diagrams, H-2-129455		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
587.	Weld hood shall operate between 250 cfm (max) and 0 cfm (min).	HVAC MCO Sampling/Weld Station Flow Diagrams, H-2-129455		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
588.	Field assemble and torque (test plug) to 60± 5 FT-LB after cover cap to collar weld.	MCO Mechanical Closure Canister Collar H-2-828042 Rev. 5		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
589.	Helium leak test shall be in accordance with section V, Article 10, Appendix IV. Acceptance criteria is less then 1E-7 cc/sec.	MCO Mechanical Closure Canister Collar H-2-828042 Rev. 5, Multi-Canister Overpack Assembly Mech Closure SubassyH-2-82041		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
590.	The maximum preheat and interpass temperature for welding austenitic stainless steel materials shall be 350 F.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.3 Preheat and Interpass Temperatures		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
591.	Preheat and interpass temperature shall be determined by temperature indicating crayons, contact pyrometers, or other suitable means accepted by the Buyer.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.3 Preheat and Interpass Temperatures		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
592.	Temperature indicating crayons shall not be used on austenitic stainless steel, except for weld interpass temperature measurements, in which case all crayon markings shall be removed by using acetone or isopropyl alcohol prior to any heat treatment.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.3 Preheat and Interpass Temperatures		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
593.	Interpass temperature requirements listed above shall also apply to tack welding, fillet welds, attachment welds, and thermal gouging and cutting.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.3 Preheat and Interpass Temperatures		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
594.	Each weld shall be essentially uniform in width and size throughout its full length. Each layer of welding shall be visually free of slag, inclusions, cracks, porosity, and lack of fusion.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.4 Workmanship and Visual Quality		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

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595.	Fillet welds shall be of the specified size with full throat thickness as required. Excessive convexity or concavity shall be avoided. Fillet welds shall always develop the minimum size required by the Design Drawing, but my vary in size above the minimum as long as a reasonably uniform appearance is maintained.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.4 Workmanship and Visual Quality		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
596.	Elimination of defects and surface preparation of welds by chipping, grinding or gouging shall be done in such a manner as not to gouge, groove, or reduce the adjacent base-material thickness below the required design thickness. Buyer approved repair procedures and verification reports shall be used.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 20026.5.4 Workmanship and Visual Quality		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
597.	Precautions shall be taken to minimize weld splatter and arc strikes. If these occur, they shall be removed by procedures approved by the Buyer.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.4 Workmanship and Visual Quality		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
598.	Peening shall not be used without prior written Buyer acceptance of the method and controls to be used.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.4 Workmanship and Visual Quality		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
599.	Weld caps on all seams shall be a maximum of .03 inches high.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.4 Workmanship and Visual Quality		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
600.	If grinding is required to maintain the maximum weld height, the finish shall be equivalent to a finish produced by 80 grit or finer abrasive media.	HNF-S-0453, Rev. 6, MCO Fabrication Specification, March 20, 2002 6.5.4 Workmanship and Visual Quality		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
601.	All nondestructive examinations (NDE) shall be performed after final machining or surfacing.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5 5 Non-Destructive Examination - General		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
602.	All welds shall be examined in accordance with the requirements of ASME Section III.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - General		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
603.	Personnel performing NDE shall be qualified and certified in accordance with the American Society of Nondestructive Testing (ASNT) SNTASNT) SNT-TC-1A-92.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - General		A20-15220-25, Contractors Inspection Qualifications for Fabrication submittal 25	ASME Code Data Report ED-73
604.	Level I personnel shall not interpret the results of an examination or make determination of the acceptability of an examined part or weld.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 20026.5.5 Non-Destructive Examination - General		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)

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605.	The Seller shall submit the Sellers NDE personnel qualification and certification written practice which practice, which is In accordance with ANST's SNT-TC-1A-92 for Buyers approval.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - General		A20-15220-25, Contractors Inspection Qualifications for Fabrication submittal 25	ASME Code Data Report ED-73
606.	Sellers NDE personnel qualification and certification records shall include: a. Valid vision acuity and color differentiation examination; b. Objective evidence of NDE training, experience, and examinations; c. Level of formal education d. Statement of certification (certification (level and method) signed by a company official attesting to personnel qualifications. e. Dates of certification and/or recertification and the dates of assignment to NDE, for the Buyers approval.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - General		A20-15220-25, Contractors Inspection Qualifications for Fabrication submittal 25	ASME Code Data Report ED-73
607.	Seller shall submit Seller's NDE method procedures which procedures, which are in accordance with ASME Code Section III for Buyers approval.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 20026.5.5 Non-Destructive Examination - General		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
608.	Unacceptable welds shall be repaired in accordance with ASME Code Section III and reexamined by the same methods that detected the original defect.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5 5 Non-Destructive Examination - General		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
609.	All welds designated on the Design Drawings to be examined by liquid penetrant methods shall be examined in accordance with the requirements of ASME Code Section III, Division 1.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - Liquid Penetrant		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
610.	The weld joint preparation surfaces for plate and forgings shall be examined by the liquid penetrant method for all butt welds requiring radiography and ultrasonic examinations.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - Liquid Penetrant		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
611.	The weld and adjacent base materials for at least {1/2 inches} on each side of the weld at the external and accessible internal surfaces shall be included in the examination.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - Liquid Penetrant		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
612.	Penetrant materials used for examination of austenitic stainless steels and nickel-base alloys shall be analyzed for contaminant as specified in ASME Code Section V, Article 6, T-640. Copies of the analysis reports shall be included in the document package.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - Liquid Penetrant		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
613.	Liquid penetrant testing shall be by the solvent or water washable removal method. Except where water washable is specifically noted on the design drawings.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - Liquid Penetrant		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
614.	Flushing the surface with solvent, following the application of the penetrant and prior to application of developer is prohibited.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 2002 6.5.5 Non-Destructive Examination - Liquid Penetrant		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
615.	The penetrant materials shall be thoroughly removed after the examination has been completed, *followed by a wiping or flushing of* the area with demineralized water, approved solvents, or isopropyl alcohol.	HNF-S-0453 Rev. 6, MCO Fabrication Specifications, March 20, 20026.5.5 Non-*Destructive Examination* - Liquid Penetrant		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in *the OP-23-004S, MCO* to CCA Welding Process (OCRWM).
616.	The leakage test shall be in accordance with ANSI N14.5 fabrication test requirements and ASME Code Section V, Article 10, Appendix V, Hood Technique.	HNF-S-0453 Rev. 6, MCO Fabrication Specification, March 20, 20027.4.3 Helium Leakage Test of the MCO Canister Cover and Test Plug		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
617.	The leakage test shall be performed using a pressure differential of 0.1 MPa (1 Atmosphere). The maximum acceptable leakage is 1×10^{-7} atm-cm^3/sec helium.	HNF-S-0453 Rev. 6, MCO Fabrication Specification, March 20, 2002 7.4.3 Helium Leakage Test of the MCO Canister Cover and Test Plug		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
618.	The helium leakage test system must be calibrated with National Institute of Standards and Technology (NIST) traceable calibrated standard in the $X10^{-7}$ atm-cm^3/sec range.	HNF-S-0453 Rev. 6, MCO Fabrication Specification, March 20, 2002 7.4.3 Helium Leakage Test of the MCO Canister Cover and Test Plug		OP-23-004S, MCO to CCA Welding Process (OCRWM) A20-15220-19, Preventative Maintenance and Calibration Procedures Submittal 19	ASME Code Data Report ED-59, ED-41 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
619.	The helium standard must be continuously evacuated by an auxiliary pump just prior to being released into the system.	HNF-S-0453 Rev. 6, MCO Fabrication Specification, March 20, 2002 7.4.3 Helium Leakage Test of the MCO Canister Cover and Test Plug		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM)
620.	The helium response time and system sensitivity shall be included in the test report.	HNF-S-0453 Rev. 6, MCO Fabrication Specification, March 20, 2002 *7.4.3 Helium Leakage Test of* the MCO Canister Cover and Test Plug		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in *the OP-23-004S, MCO* to CCA Welding Process (OCRWM).
621.	The Seller shall provide the Buyer with written procedures for the leakage test for approval prior to the start of testing.	HNF-S-0453 Rev. 6, MCO Fabrication Specification, March 20, 2002 7.4.3 Helium Leakage Test of the MCO Canister Cover and Test Plug		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
622.	The helium leakage test procedure shall include the method used to *ensure that the helium concentration* inside the hood or enclosure is approximately 100 percent across the entire surface of the MCO cover cap machined forging.	HNF-S-0453 Rev. 6, MCO Fabrication Specification, *March 20, 20027.4.3 Helium* Leakage Test of the MCO Canister Cover and Test Plug		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).
623.	The results of each leakage test shall be provided to the Buyer as part of the applicable document package.	HNF-S-0453 Rev. 6, MCO Fabrication Specification, March 20, 2002 7.4.3 Helium Leakage Test of the MCO Canister Cover and Test Plug		OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-59 Welding and Leak Test activities are covered in the OP-23-004S, MCO to CCA Welding Process (OCRWM).

Rqmt No.	Requirement Text	Source Document ID	Evidence of Compliance		Remarks
			Implementation	Adherence	
624.	Category SC Code material shall be procured from a supplier/manufacturer who's QA (Quality Assurance) program has been audited and approved by the Contractor or accredited by ASME for compliance with ASME Section III, NCA-3800.	A20-SOW-001, Rev. 2 Statement of Work for the MCO Closure Welds May 30, 2002 **Section 9.0 Quality Assurance (QA) Requirements #9.2.1**	AIT Quality Assurance Program, Controlled copy Standard Procedures submittal 3	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-9 ED-49
625.	Contractor is responsible to assure that materials comply with applicable requirements upon receipt, and prior to introduction into the Contractor's fabrication environment	A20-SOW-001, Rev. 2 Statement of Work for the MCO Closure Welds May 30, 2002 **Section 9.0 Quality Assurance (QA) Requirements #9.2.2**	AIT Quality Assurance Program, Controlled copy Standard Procedures submittal 3	A20-15220-31, Field Demo Test Procedure Report Submittal 31	ED-9 ED-49
626.	Match marks shall be limited to the area adjacent to the weld prep and shall be within 1.5-inches of the weld joint edge.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5. MCO Cover Cap Placement**		Drawing N262-4, 4A From A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
627.	If punch marks are used (to make the match marks), each punch mark shall be no larger than 0.03 inches in diameter and depth.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5. MCO Cover Cap Placement**		Drawing N262-4, 4A From A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
628.	A scribe would be acceptable if not more than 0.03 inches deep and wide.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5. MCO Cover Cap Placement**		Drawing N262-4, 4A From A20-15220-32, List of As-Built Drawings Submittal 32	ED-5
629.	If dye is used in conjunction with the scribe, the halogen and sulfur concentration limitations described in the MCO Fabrication Specification, HNF-S-0453, would apply.	SNF-8991 Rev. 4, MCO Weld System Performance Specifications, January 13, 2003 **Section 5. MCO Cover Cap Placement**		N/A	No dye to be used.
630.	Field testing will include the field demonstration test, welding validations, and readiness testing.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 3 Work Scope #3.1.1**		A20-15220-29, FAT Report Submittal 29 A20-15220-31, Field Demo Test Procedure Report Submittal 31 OP-23-004S, MCO to CCA Welding Process (OCRWM)	ED-43, ED-49, ED-59
631.	The Contractor shall supply MSDSs for materials the contractor plans to use on the Hanford Site.	A20-SOW-001, Rev. 4 Statement of Work for the MCO Closure Welds, January 13, 2003 **Section 4 Deliverables #4.1.8**		A20-15220-09, 60% Design Package submittal 09	ED-68