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1	1	Cog.Eng. L. J. Garvin	<i>L. J. Garvin</i>	7/13/98					
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Spent Nuclear Fuel Project - Criteria Document Cold Vacuum Drying Facility Phase 2 Safety Analysis Report

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Abstract: The criteria document provides the criteria and planning guidance for developing the SNF CVDF Phase 2 SAR. This SAR will support the U.S. Department of Energy, Richland Operations Office decision to authorize the procurement, installation, and installation acceptance testing of the CVDF systems.

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SPENT NUCLEAR FUEL PROJECT - CRITERIA DOCUMENT COLD VACUUM DRYING FACILITY PHASE 2 SAFETY ANALYSIS REPORT

PURPOSE

This document provides criteria and planning guidance for developing the Spent Nuclear Fuels (SNF) Project Cold Vacuum Drying Facility (CVDF) Phase 2 Safety Analysis Report (SAR). The SAR will support the U.S. Department of Energy (DOE) Richland Operations Office (RL) decision to authorize the procurement, installation, and installation acceptance testing of the CVDF systems. This criteria document has been prepared based on the guidance provided in HNF-PRO-705, *Safety Basis Planning, Documentation, Review, and Approval*.

REQUIREMENTS

The CVDF Phase 2 SAR will be prepared in compliance with DOE Order 5480.23, *Nuclear Safety Analysis Reports*, including Attachment 1, which contains specific guidance pertaining to SAR content. DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports*, will be used as the preparation guide for the SAR format and chapter content.

Several chapters include additions beyond the DOE requirements based on the U.S. Nuclear Regulatory Commission (NRC) Equivalency Policy. The additional NRC equivalency information required for the CVDF Final SAR (FSAR) is presented in Table 5 of HNF-SD-SNF-SP-012, *Additional Guidance for Including Nuclear Safety Equivalency in the Canister Storage Building and Cold Vacuum Drying Facility Final Safety Analysis Reports*.

The criteria used for the preparation of the CVDF Phase 2 SAR are described in this document. Also provided is a description of the basis for the format and content of the information presented in these chapters. A chapter-by-chapter description of the content of the SAR programmatic chapters is provided in Appendix A.

IMPLEMENTATION

In compliance with HNF-PRO-705, Section 2.2, Item 1, this criteria document defines the basis for developing an acceptable and adequate CVDF Phase 2 SAR. Developing the criteria document is a requirement of Fluor Daniel Hanford, Inc. (FDH); it is not a DOE requirement.

Purpose and Scope

- The CVDF Phase 2 SAR documents of the safety analysis of the CVDF and provides a basis for DOE authorization of CVDF equipment procurement, installation, and installation acceptance testing. Although information applicable to pre-operational testing, initial testing, and operation is provided, authorization for these life-cycle activities is not being sought with this SAR revision. A CVDF FSAR will be prepared to document the safety basis for authorizing of CVDF operation.
- The Phase 2 SAR (Systems and Structural) will replace the previously approved Phase I SAR (structural only), and will update the Phase I SAR information as appropriate to implement DOE Safety Evaluation Report (SER) requirements and dispositioned review comments. Comments previously deferred to the CVDF FSAR will be screened for resolution and incorporation in this Phase 2 SAR. The Phase 2 SAR will also incorporate more current system design information than was available at the time of Phase I SAR approval, as well as evolutions in safety analysis methodology and assumptions.
- Specific considerations associated with SAR preparation will include the following:
 - The SAR will reflect the current status of facility design and technical issue resolution. Any hold points that might be required due to incomplete information or analysis will be identified either within the Phase 2 SAR or in separate documentation that accompanies the Phase 2 SAR submittal.
 - The safety analysis document will incorporate a level of design detail obtainable and consistent with the design stage of the project. Open design issues and areas of incomplete design will be summarized. Programmatic risks associated with proceeding with open items will be assessed within the Phase 2 SAR or in separate documentation that accompanies the Phase 2 SAR submittal.
 - The final safety analysis document will be fully integrated with other relevant safety analyses and defense-in-depth measures (e.g., K Basin emergency response procedures apply to CVDF workers).

SAR Preparation

- The Phase 2 SAR will be prepared in accordance with DOE requirements using the strategy specified by the Key Drivers Resolution Committee (LeRoy 1997), Recommendation 2. The Phase 2 CVDF SAR will be prepared and reviewed to the following criteria:

- Detail content and quality shall be, as a minimum, consistent with Preliminary Safety Analysis Report (PSAR) requirements.
 - Permit open enabling assumptions (EAs) that are clearly defined and do not pose unacceptable risk that could result in excessive design costs or a high potential for significant design changes if the EA is not confirmed.
 - Strive for the early closure of EAs and minimize open EAs such that the cumulative programmatic risk of authorizing early procurement and installation of CVDF processing equipment is acceptable.
 - Identify closed EAs in the SAR transmittal.
- Prior to final release for equipment procurement, installation, and installation testing, the content of the Phase 2 SAR should encompass a review of the overall facility configuration for compliance with safety guidelines (e.g., worker safety, accident analysis, design description, and hazard analysis, developed to a PSAR level of content, detail, and quality).
- The FDH nuclear safety procedures, HNF-PRO-430, 517, 700, 701, 702, 703, 704, and 705, will be used to develop and maintain SNF Project safety basis documents.
- The SAR will address CVDF interfaces with existing K Basin systems and other SNF projects to ensure that overall SNF Project safety is addressed. The interfaces include controls placed on CVDF processes by safety considerations of other SNF projects and those controls placed on other projects by CVDF safety considerations. The interface and role of the Multi-canister Overpack (MCO) Topical Report will be identified by the CVDF Phase 2 SAR.
- CVDF-specific and/or unique assumptions and agreements that are necessary to support the safety basis will be identified and their bases appropriately described, as a minimum, for SAR reviewers and Unresolved Safety Question evaluators.
- The SAR will identify current programs that apply to the procurement, installation, and installation acceptance testing of the CVDF systems. Revisions to the existing programs and/or K Basins SAR that are necessary for performing these CVDF activities will be identified in the SAR.

SAR Format and Content

This criteria document commits to preparing the CVDF Phase 2 SAR in accordance with DOE-STD-3009-94 format and content guidance. Therefore, repetition of these DOE

requirements and guidance in this document is minimized. Instead, pertinent details regarding each chapter's content and format are provided in Appendix A of this criteria document. The outline information contained in Appendix A represents planning guidance only for use by authors and reviewers. This outline guidance should not be construed as prescriptive requirements.

The programmatic chapters of the SAR (Chapters 7-12, 14-15, and 17) describe the generic programs that are to be used by the SNF Project for all Project facilities (i.e., K Basins, CVDF, and the Canister Storage Building [CSB]). Because the SNF operating crews will be working at all the SNF facilities, the control programs described in the programmatic chapters must be nearly identical to avoid confusion, possible errors, and accidents as workers move from facility to facility and as the SNF is moved to storage at the CSB. It is the intent of the SNF Project to submit the programmatic chapters of the facility SARs so that it is clear that the programs are as near to identical as possible.

The programmatic information presented in the CVDF Phase 2 SAR is generic to the SNF Project except as indicated by the shaded portions of the text, which represent the CVDF facility-specific details that are required by DOE Order 5480.23 or DOE-STD-3009-94. Following the approval of the CVDF Phase 2 SAR, identical programmatic chapters will be submitted as part of the CSB SAR.

SAR Design Basis

The CVDF Phase 2 SAR will clearly describe the facility systems design that is used as the basis for the safety analysis. The maturity of the CVDF systems design is sufficient to support the DOE decision for the procurement, installation, and installation acceptance testing of the CVDF systems. Regardless of the design status of individual systems and components, the safety analyses will always be supported by the design requirements established for the equipment. Although there are a small number of open design issues and remaining efforts to complete the design documentation (some of which potentially impact the SAR design descriptions and analysis results), the issues and deficiencies are being identified and resolution plans for each are being prepared. The programmatic risk associated with each remaining issue or deficiency will be assessed and documented either in the Phase 2 SAR or in a separate document available at the time of the Phase 2 SAR submittal.

As issues are resolved, the Title II design documents will be updated. The design documentation will be controlled to ensure consistency with the SAR. The CVDF Phase 2 SAR is a formally controlled document.

Design objectives supporting the SAR preparation include the following:

- Design media should be sufficiently complete to support CVDF systems procurement and installation.
- Design information used by SAR preparers is the most current available, or deltas to the most current are assessed and demonstrated to have no unacceptable safety impacts and acceptable programmatic risks.
- There is to be full integration of information exchange, task assignments, and resolution of issues between the designers and SAR preparers. These integrated efforts will facilitate the final resolution of outstanding issues.

REFERENCES

- DOE 5480.23, 1992, *Nuclear Safety Analysis Reports*, U.S. Department of Energy, Richland, Washington.
- DOE-STD-3009-94, 1994, *Preparation Guide for U.S. Department of Energy Non-reactor Nuclear Facility Safety Analysis Reports*, U.S. Department of Energy, Washington, D.C.
- HNF-PRO-430, 1997, *Safety Analysis Program*, Revision 1, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-PRO-517, 1997, *Safety Analysis Program Glossary*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-PRO-700, 1997, *Safety Analysis and Technical Safety Requirements*, Revision 1, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-PRO-702, 1997, *Safety Analysis Process - Facility Change or Modification*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-PRO-703, 1997, *Safety Analysis Process - New Project*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-PRO-704, 1997, *Hazard and Accident Analysis Process - Waiver 1*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-PRO-705, 1998, *Safety Basis Planning, Documentation, Review, and Approval*, Revision 1, Fluor Daniel Hanford, Inc., Richland, Washington.

- HNF-SD-SNF-DRD-002, 1997, *Cold Vacuum Drying Facility Design Requirements*, Revision 2, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-SD-SNF-HIE-004, 1997, *Cold Vacuum Drying Facility Hazards Analysis Report for Building Confinement*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-SD-SNF-RD-001, 1997, *Spent Nuclear Fuel Project, K Basins/Cold Vacuum Drying Facility Standards/Requirements Identification Report*, Revision 1, DE&S Hanford, Inc., Richland, Washington.
- HNF-SD-SNF-SAR-002, 1997, *Safety Analysis Report for the Cold Vacuum Drying Facility, Phase 1, Supporting Civil/Structural Construction*, Revision 1B, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-SD-SNF-SP-012, 1997, *Additional Guidance for Including Nuclear Safety Equivalency in the Canister Storage Building and Cold Vacuum Drying Facility Final Safety Analysis Reports*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.
- LeRoy, P. G., 1997, *Key Drivers Resolution Committee Agreement* (Internal Memo 2T600:PGL-015 to Distribution, October 1), DE&S Hanford, Inc., Richland, Washington.
- WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, Westinghouse Hanford Company, Richland, Washington.

APPENDIX A**SAFETY ANALYSIS REPORT FORMAT AND CONTENT DIRECTION
COLD VACUUM DRYING FACILITY
PHASE 2 SAFETY ANALYSIS REPORT****INTRODUCTION**

The development of the CVDF Phase 2 SAR will be based on the following:

- The format and content, and hazards/accident analysis methodology guidance provided in DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Non-reactor Nuclear Facility Safety Analysis Reports*.
- The requirements of DOE Order 5480.23, *Nuclear Safety Analysis Reports*.
- The direction in Attachment 1 of DOE Order 5480.23, "Interim Guidance for DOE Order 5480.23."
- The direction in the Key Drivers Resolution Committee.
- The instructions in the Project Hanford procedures.
- SP-012

Chapter outlines are explicitly given in this appendix for the equipment description and safety analyses provided in Chapters 2, 3, and 4. Pertinent details regarding the format and content of the remaining SAR chapters are provided; however, repetition of the requirements, guidance, and direction provided in the governing documents is minimized.

NOTE:

- During the CVDF Phase 2 SAR preparation, the applicability of some of the planning guidance contained in this appendix may evolve or change. SAR reviewers should use judgement when determining the degree to which the criteria document instructions remain applicable to the Phase 2 SAR. For example, although specific revision numbers of reference documents are provided in the criteria document, the documents could be revised before the SAR is issued. In some cases, the entire reference document could become inapplicable and therefore would not be included in the reference sections.
- Text in Chapters 7 through 12, 14 through 15 and Chapter 17 of the SAR that is applicable to the CVDF only will be shaded; the normal text in these chapters is common to all SNF Project facilities.

EXECUTIVE SUMMARY

The Executive Summary states the purpose of the CVDF Phase 2 SAR, which is to provide the authorization basis for the procurement, installation, and installation-acceptance testing of the CVDF systems. The requested activities and scope of the submittal that supports this purpose will be clearly identified and will be based on the safety analysis conclusions. The design basis accident analysis results will be summarized.

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 1. In addition, the format of this section shall conform to the requirements of DOE-STD-3009-94.

References

References for this chapter could include the following:

HNF-SD-SNF-SAR-002, 1997, *Safety Analysis Report for the Cold Vacuum Drying Facility, Phase 1, Supporting Civil/Structural Construction*, Revision 1B, Fluor Daniel Hanford, Inc., Richland, Washington.

LeRoy, P. G., 1997, *Key Drivers Resolution Committee Agreement* (Internal Memo 2T600:PGL-015 to Distribution, October 1), DE&S Hanford, Inc., Richland, Washington.

WHC-EP-0830, 1994, *Hanford Spent Nuclear Fuel Project Recommended Path Forward*, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

1.0 SITE CHARACTERISTICS

This chapter need not be rewritten as part of the CVDF Phase 2 SAR. However, the chapter was updated to include new information. Additionally, the chapter was made self standing removing the K Basins material. The CVDF is located near the K Basins and the existing description of the K Basin site characteristics are applicable to this new facility.

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 3. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

NRC Requirements

There are no additional NRC requirements.

Deferred Items

There are no items that are to be deferred and addressed in the FSAR.

References

References for this chapter could include the following:

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

2.0 FACILITY DESCRIPTION

This chapter will describe the CVDF in sufficient detail to provide an overall understanding of the facility and will provide the basis for the assumptions used in the hazards and accident analysis. The chapter outline is as follows:

2.1 Introduction

2.2 Requirements

2.2.1 U.S. Department of Energy Regulations, Orders, and Standards

2.2.2 U.S. Nuclear Regulatory Commission Regulations

2.2.3 Other Requirements, Documents, and Standards

2.3 Facility Overview

2.3.1 CVDF Hazards

2.3.2 CVDF Operation Summary

2.3.3 CVDF Confinement

2.3.4 CVDF Systems

2.4 Facility Structure

2.5 Process Description

2.5.1 CVD Process Overview

2.5.2 Cask / Multi-canister Overpack Systems

2.5.3 Vacuum and Purge Systems

2.5.4 Helium Systems

2.5.5 Condensate Collection Systems

- 2.5.6 Effluent Drain Systems
- 2.5.7 Process Water Systems
- 2.5.8 Cooling Water Systems
- 2.5.9 Instrumentation and Control Systems
- 2.6 Confinement Systems
 - 2.6.1 Confinement Approach
 - 2.6.2 HVAC Ventilation Systems
- 2.7 Safety Support Systems
 - 2.7.1 Personnel Monitoring Systems
 - 2.7.2 Fire Protection System
 - 2.7.3 Criticality Protection
- 2.8 Electrical Systems
 - 2.8.1 Electrical Power Distribution System
 - 2.8.2 Lighting
 - 2.8.3 Ground System
 - 2.8.4 Facility Uninterruptible Power Supply
 - 2.8.5 Lightning/Surge Protection System
- 2.9 Auxiliary Systems And Support Facilities
 - 2.9.1 Communications Systems
 - 2.9.2 Compressed Air Systems
 - 2.9.3 Cranes and Hoists
 - 2.9.4 Service Water System
 - 2.9.5 Deionized Water
 - 2.9.6 Potable Water System
 - 2.9.7 Sanitary Collection System
 - 2.9.8 Security System
 - 2.9.9 Speciality Equipment
 - 2.9.10 Special Tools
- 2.10 Open Safety Issues and Potential Design Evolution
- 2.11 References

The sub-outline for individual systems described in Chapter 2 is as follows:

- Summary Description
 - Description of system configuration and key components
 - Description of process functions performed by the system

- Composite P&ID and flow drawings (for key systems)
- Major System Hazards and Safety Considerations

Brief summary only; will not duplicate the detailed hazards assessment of Chapter 3 or 4.

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 4. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

NRC Requirements

Additional information that may be added to the Phase 2 SAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 5 of HNF-SD-SNF-SP-012.

- Describe the type and exposure of the fuel to be conditioned.
- Include a summary description of the conditioning process to be used, including process origin and background. For the product or products resulting from operation of the CVDF, provide the details of the system and the methods that will be used for their handling and storage.
- Discuss support systems, the interfaces between these systems, ancillary activities, and the main process.
- Discuss the process design bases, including materials of construction, pressure and temperature limits, and detailed dimensions. (In conjunction with Chapter 4.0).

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

- Identify the products, including the product characteristics and specifications, and byproducts that result from the plant operation.
- Describe the general plant conditions and surveillance needs in various shutdown modes—extended, short-term, and emergency.

- Provide a summary description of the instruments used to detect process conditions and the systems used to control the process.
- Discuss the instrumentation and control features associated with process control, process monitors, and alarms, and the relationship of one to the other. Identify aspects that must be relied upon to ensure continued safe operation or safe shutdown under accident conditions.
- Discuss each method of confinement that will be used to ensure that there will be no uncontrolled release of radioactivity to the environment.

References

References for this chapter could include the following:

HNF-SD-SNF-DRD-002, 1997, *Cold Vacuum Drying Facility Design Requirements*, Revision 2, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-RD-001, 1997, *Spent Nuclear Fuel Project, K Basins/Cold Vacuum Drying Facility Standards/Requirements Identification Report*, Revision 1, DE&S Hanford, Inc., Richland, Washington.

3.0 HAZARD AND ACCIDENT ANALYSES

This chapter will be revised based on the design requirements document (DRD) and project documentation and will provide a description of the hazard and accident analyses. The chapter outline is as follows:

3.1 Introduction

Expand to summarize chapter contents more clearly, including the analysis methodology figure adapted from DOE-STD-3009-94.

3.2 Requirements

- 3.2.1 U.S. Department of Energy Rules, Orders, and Standards
- 3.2.2 U.S. Nuclear Regulatory Commission Requirements and Guidelines
- 3.2.3 Other Spent Nuclear Fuel Project Requirements

3.3 Hazards Analysis

- 3.3.1 Methodology
- 3.3.2 Hazards Analysis Results

3.4 Accident Analysis

- Expand introductory paragraphs to include a basic executive summary level discussion of each of the five selected design basis accident scenarios, safety equipment, and mitigated consequences (i.e., consequences taking credit for preventive and mitigative safety Structures, Systems, and Components [SSCs]).
- A summary table of consequences will be included for both unmitigated and mitigated design basis accident scenarios.

3.4.1 Methodology

3.4.2 Design Basis Accidents

3.4.2.1 Gaseous Release

3.4.2.2 Liquid Release

3.4.2.3 Multi-Canister Overpack Internal Hydrogen Explosion

3.4.2.4 Multi-Canister Overpack External Hydrogen Explosion

3.4.2.5 Thermal Runaway Accident

The sub-outline for the individual systems described above is as follows:

3.4.2.X.1 Scenario Development

3.4.2.X.2 Source Term Analysis

3.4.2.X.3 Consequence Analysis

- Unmitigated

- Mitigated

3.4.2.X.4 Comparison to Guidelines

- Unmitigated

- Mitigated

3.4.2.X.5 Summary of Safety-Class Structures, Systems, and Components and TSRs

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 5. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

NRC Requirements

Provide a detailed description of the physical, chemical, and radiological characteristics of the SNF to be conditioned or provide a reference for this information.

Deferred Items

There are no items that are to be deferred and incorporated into the FSAR.

References

References for this chapter could include the following:

- DOE/RL-97-SFD-172, 1997, *Contract No. DE-AC06-96RL13200 - Risk Evaluation Guidelines (REGs) To Insure Inherently Safer Designs*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- DOE-STD-1027-92, 1992, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis*, U.S. Department of Energy, Washington, D.C.
- HNF-SD-SNF-RD-001, 1997, *Spent Nuclear Fuel Project, K Basins/Cold Vacuum Drying Facility Standards/Requirements Identification Report*, Revision 1, DE&S Hanford, Inc., Richland, Washington.

4.0 SAFETY STRUCTURES, SYSTEMS, AND COMPONENTS

This chapter will provide the details (safety functions, support systems, functional requirements, and performance criteria) for safety SSCs identified in Chapter 3. The chapter outline is as follows:

- 4.1 Introduction
- 4.2 Requirements
 - 4.2.1 U.S. Department of Energy Rules, Orders, and Standards
 - 4.2.2 U.S. Nuclear Regulatory Commission Requirements and Guidelines
- 4.3 Safety Class Systems Structures, and Components
 - 4.3.1 Safety-Class Instrumentation and Control System (see sub out-line below)
 - 4.3.2 Safety-Class Helium System
 - 4.3.3 Multi-canister Overpack cask Safety-Class Components
 - 4.3.4 Tempered Water Annulus System Safety-Class Components
 - 4.3.5 Vacuum and Purge System
 - 4.3.6 General-Service Helium System Safety-Class Components
 - 4.3.7 Process Water Conditioning System Safety-Class Components

4.4 Safety-Significant Structures, Systems and Components

- 4.4.1 Building Features (See sub-outline below)
- 4.4.2 Process General Supply/Exhaust Heating, Ventilating, and Air Conditioning System
- 4.4.3 Process Bay Local Exhaust Heating, Ventilating, and Air Conditioning and Process Vent System
- 4.4.4 Reference Air System
- 4.4.5 Cold Vacuum Drying Facility Safety-Significant Speciality Equipment

The sub-outline for individual systems described in Sections 4.3 and 4.4 is as follows:

- 4.3.X.1 Safety Function
- 4.3.X.2 System Description
- 4.3.X.3 Functional Requirements
- 4.3.X.4 System Evaluation
- 4.3.X.5 Controls (Technical Safety Requirements)

4.5 References

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 6. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

NRC Requirements

Additional information that may be added to the Phase 2 SAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 5 of HNF-SD-SNF-SP-012.

- Demonstrate implementation of the NRC nuclear safety equivalency requirements documented in WHC-SD-SNF-DB-003.
- If the CVDF includes safety-class electrical and/or instrumentation and control systems, commit to using IEEE Standard 603-1991.
- If the safety-class electrical or instrumentation and control systems also use safety-class lead storage batteries, commit to using IEEE Standard 484-1987 and IEEE Standard 535-1986.
- If the CVDF includes safety-class electrical equipment that may be exposed to harsh environments during off-normal or postulated accident conditions, commit to

the additional environmental qualification requirements identified in WHC-SD-SNF-DB-003.

- If the CVDF uses safety-class instrument air, motor-operated valves, or an open-cycle cooling system, document the use of NRC Generic Letters 88-14, 89-10 (with supplements), and 89-13 as appropriate.
- State that the requirements of ASME N509-1989 and ASME N510-1989 have been incorporated into the design of safety-significant heating, ventilating, and air conditioning systems used to achieve on-site radiological limits or to implement ALARA principles.

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

None

References

References for this chapter could include the following:

HNF-SD-SNF-DRD-002, 1997, *Cold Vacuum Drying Facility Design Requirements*, Revision 2, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-RD-001, 1997, *Spent Nuclear Fuel Project, K Basins/Cold Vacuum Drying Facility Standards/Requirements Identification Report*, Revision 1, DE&S Hanford, Inc., Richland, Washington.

5.0 TECHNICAL SAFETY REQUIREMENTS

Preliminary Technical Safety Requirement (TSR) information for the CVDF SSCs will be provided in this chapter. An overview of the TSR plan will also be given; however, detailed information regarding CVDF TSRs will be included in the FSAR.

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 16. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

NRC Requirements

There are no additional NRC requirements.

Deferred Items

There are no items that are to be deferred and incorporated into the FSAR.

References

References for this chapter could include the following:

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

6.0 PREVENTION OF INADVERTENT CRITICALITY

Detailed criticality analysis information for the MCO and Process Water Conditioning System (PWCS) will be provided in this chapter, including the limits and controls to be implemented in design and operation.

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 8. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

NRC Requirements

Additional information that may be added to the Phase 2 SAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 5 of HNF-SD-SNF-SP-012.

- Include a commitment to a criticality safety k_{eff} value of 0.95.

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

None

References

References for this chapter could include the following:

HNF-SD-SNF-CSER-005, 1996, *Criticality Safety Evaluation Report for Spent Fuel Processing and Storage Facilities*, Revision 2, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-CSER-006, 1998, *Criticality Safety Evaluation Report for the Process Water Conditioning System at the Cold Vacuum Drying Facility*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.

7.0 RADIATION PROTECTION

DOE Requirements

The content shall address DOE Order 5480.23, Attachment 1, Topic 9. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

This chapter is to contain sufficient information to demonstrate compliance with the radiation protection requirements of DOE Order 5480.11, *Radiation Protection for Occupational Workers*. The provisions for radiation protection based on facility hazards will be summarized to provide a basic understanding of the scope of the radiation protection program. The chapter is not intended to be the vehicle for review and approval of the radiation protection program, but is to describe the essential features of the program that relate to facility safety.

Existing supporting documentation is to be referenced. Brief abstracts of referenced documentation are to be included in sufficient detail to provide an understanding of the referenced documentation.

NRC Requirements

Additional information that is to be added to the SAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 5 of HNF-SD-SNF-SP-012.

- State that the CVDF has incorporated control devices for access to high-radiation areas that conform to the requirements of 10 CFR 20.1601.
- Show that the design requirements of NRC Regulatory Guide 8.8 have been implemented.

- Document that the provisions for radiological monitoring will meet the requirements of 10 CFR 20 and 10 CFR 835.
- Discuss the shielding provisions provided in the facility to limit radiological exposure.

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

- The results of the final ALARA analyses will be presented in the FSAR and will be supported by final dose rate analyses to define neutron and gamma doses.
- The final listing of the types of radiation detection instruments will be provided in the FSAR.

References

References for this chapter could include the following:

- HNF-SD-SNF-CN-026, 1997, *MCO Shield Plug Dose Rate Analysis*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.
- HNF-SP-1145, 1997, *Fluor Daniel Hanford Radiation Protection Program, Implementation of Title 10, Code of Federal Regulations, Part 835*, Revision 2, Fluor Daniel Hanford, Inc., Richland, Washington.
- HSRCM-1, 1995, *Hanford Site Radiological Control Manual*, Revision 2, Westinghouse Hanford Company, Richland, Washington.
- Merrick, 1997, *Shielding and Radiation Exposure analysis for the Cold Vacuum Drying Facility of the K-Basin Spent Nuclear Fuel Storage Project*, Project No. 30012288, Merrick & Company, Los Alamos, New Mexico.

8.0 HAZARDOUS MATERIAL PROTECTION

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 10. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

This chapter is to contain sufficient information to demonstrate compliance with applicable requirements for control of personnel exposures to hazardous materials. The provisions for hazardous material protection other than those provided for radiological protection are to be summarized. Topic summaries are to focus on hazardous material protection based on facility hazards to provide a basic understanding of the scope of the hazardous material protection program. The chapter is not intended to be the vehicle for review and approval of the hazardous material protection program, but is to describe the essential features of the program that relate to facility safety.

Existing supporting documentation is to be referenced. Brief abstracts of referenced documentation are to be included in sufficient detail to provide an understanding of the referenced documentation.

NRC Requirements

There are no additional NRC requirements.

Deferred Items

There are no items that are to be deferred and addressed in the FSAR.

References

References for this chapter could include the following:

HNF-MP-003, *Integrated Environment, Safety and Health Management System Plan*,
Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.

9.0 RADIOACTIVE AND HAZARDOUS WASTE MANAGEMENT

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 7. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

This chapter is to contain sufficient information to support the determination of adequate protection of the public, workers, and the environment. The provisions for radiation and hazardous waste protection are to be summarized. The chapter is not intended to be the vehicle for review and approval of the radiation and hazardous waste management program, but is to describe the essential features of the program that relate to facility safety.

Existing supporting documentation is to be referenced. Brief abstracts of referenced documentation are to be included in sufficient detail to provide an understanding of the referenced documentation.

NRC Requirements

There are no additional NRC requirements.

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

- Detailed CVDF waste inventories will be provided in the FSAR.
- The FSAR will provide details of the methods selected to ensure that the replacement criteria, as described in Section 9.4.2, are met for process water conditioning ion exchange modules.

References

References for this chapter could include the following:

- HSRCM-1, 1995, *Hanford Site Radiological Control Manual*, Revision 2, Westinghouse Hanford Company, Richland, Washington.
- WHC-EP-0063-04, 1993, *Hanford Site Solid Waste Acceptance Criteria*, Westinghouse Hanford Company, Richland, Washington.
- WHC-EP-0438, 1991, *A Guide for Preparing Hanford Facility Effluent Monitoring Plans*, Westinghouse Hanford Company, Richland, Washington.
- WHC-EP-0496, 1991, *Westinghouse Hanford Company Waste Minimization and Pollution Prevention and Awareness Program Plan*, Revision 1, Westinghouse Hanford Company, Richland, Washington.
- WHC-EP-0846, 1995, *Waste Specification System*, Westinghouse Hanford Company, Richland, Washington.
- WHC-SD-LEF-RPT-001, 1995, *Liquid Effluent Sampling and Analysis Plan (SAP) Implementation summary Report*, Revision 1, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-WM-PLN-115, 1996, *Waste Shipment Engineering Radionuclide Characterization Program Plan*, Revision 0, Westinghouse Hanford Company, Richland, Washington.

10.0 INITIAL TESTING, IN-SERVICE SURVEILLANCE, AND MAINTENANCE

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 15. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

This chapter is to contain sufficient information to delineate the plans and provisions for initial and in-service testing. With regard to maintenance, sufficient information is to be provided to demonstrate a commitment to comply with the requirements of DOE Order 4330.4A. The chapter is not intended to be the vehicle for review and approval of the initial testing, in-service surveillance, and maintenance program, but is to describe the essential features of the program that relate to facility safety.

Existing supporting documentation is to be referenced. Brief abstracts of referenced documentation are to be included in sufficient detail to provide an understanding of the referenced documentation.

NRC Requirements

There are no additional NRC requirements.

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

- The authorization basis for pre-operational testing will be presented in the FSAR.
- Reference numbers for the Project Training Implementation Matrix will be provided in the FSAR.
- Chapter 5.0 of the FSAR will explain how each TSR surveillance (test, calibration, or inspection of plant equipment) demonstrates operability or fulfills limiting conditions for operations or limiting control setting requirements.
- The analyses documented in Chapter 3 of the FSAR will define the numeric set points and values associated with each set point.

References

References for this chapter could include the following:

HNF-SD-SNF-SUP-003, 1997, *Fluor Daniel Hanford Radiation Protection Program, Implementation of Title 10, Code of Federal Regulations, Part 835*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.

WHC-SD-SNF-PLN-014, 1996, *SNF Project Maintenance Implementation Plan (MIP) Plan*, Revision 0, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

11.0 OPERATIONAL SAFETY

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 17. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

This chapter is to describe the bases for the Conduct of Operations program required by DOE Order 5480.19. The chapter is not intended to be the vehicle for review and approval of the operational safety program, but is to describe the essential features of the program that relate to facility safety.

Existing supporting documentation is to be referenced. Brief abstracts of referenced documentation are to be included in sufficient detail to provide an understanding of the referenced documentation.

NRC Requirements

Additional information that is to be added to the SAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 5 of HNF-SD-SNF-SP-012.

- The final design of the CVDF is to be evaluated to confirm that the requirements in DOE Orders 5480.7A and 6430.1A to provide adequate fire protection to achieve nuclear safety equivalence have been met.

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

- A reference for the Conduct of Operations Graded Approach Applicability Matrix will be provided in the FSAR.

References

References for this chapter could include the following:

HNF-SD-SNF-FHA-003, 1994, *Preliminary Fire Hazard Analysis for the Cold Vacuum Drying System Facility*, Revision 1, Draft, Fluor Daniel Hanford, Inc., Richland, Washington.

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

12.0 PROCEDURES AND TRAINING

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 13. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

This chapter is to describe the processes by which the technical content of procedures and training programs are developed, verified, and validated. A programmatic commitment to ongoing procedures and training programs is considered to be a necessary part of safety assurance. The chapter is not intended to be the vehicle for review and approval of the procedures and training program, but is to describe the essential features of the program as they relate to facility safety.

Existing supporting documentation is to be referenced. Brief abstracts of referenced documentation are to be included in sufficient detail to provide an understanding of the referenced documentation.

NRC Requirements

There are no additional NRC requirements.

Deferred Items

There are no items that are to be deferred and addressed in the FSAR.

References

References for this chapter could include the following:

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

13.0 HUMAN FACTORS

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 14. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

The results of incorporating human factors considerations in the design of CVDF equipment will be provided in this chapter. An overview of the SNF Project plans for incorporating human factors in work practices will be included.

NRC Requirements

Additional information that is to be added to the SAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 5 of HNF-SD-SNF-SP-012.

- Review the NRC guidance of NUREG-0700 and Standard Review Plan 18.1 against DOE Order 6430.1A, Section 1300-12.4, to identify appropriate additional NRC guidance for design of the facility.

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

- Discuss the results of the review of NUREG-0700 and Standard Review Plan 18.1 against DOE Order 6430.1A and the extent to which the requirements of these documents have been incorporated into the design of the CVDF.

References

References for this chapter could include the following:

HNF-SD-SNF-DRD-002, 1997, *Cold Vacuum Drying Facility Design Requirements*, Revision 2, Fluor Daniel Hanford, Inc., Richland, Washington.

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

14.0 QUALITY ASSURANCE**DOE Requirements**

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 18. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

This chapter is to contain sufficient information to demonstrate appropriate commitment to a quality assurance program that is required by DOE Order 5480.6C. The chapter is not intended to be the vehicle for review and approval of the quality assurance program, but is to describe the essential features of the program that relate to facility safety.

Existing supporting documentation is to be referenced. Brief abstracts of referenced documentation are to be included in sufficient detail to provide an understanding of the referenced documentation.

NRC Requirements

There are no additional NRC requirements.

Deferred Items

There are no items that are to be deferred and addressed in the FSAR.

References

References for this chapter could include the following:

DESH-1, Release 5, May 28, 1998, DE&S Hanford, Inc., Richland Washington.

HNF-MP-0599, 1997, *Project Hanford Quality Assurance Program Description*, Revision 1, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SP-1228, 1997, *Project Hanford Management Contract Quality Assurance Program Implementation Plan for Nuclear Facilities*, Revision 0, Fluor Daniel Hanford, Inc., Richland, Washington.

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

15.0 EMERGENCY PREPAREDNESS

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 19. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

This chapter is to contain sufficient information to demonstrate appropriate commitment to the emergency preparedness functions requirements of the 5500-series directives. The philosophy, objectives, and organization of the emergency preparedness functions are to be described for a spectrum of emergencies. The chapter is not intended to be the vehicle for review and approval of the emergency preparedness program, but is to describe the essential features of the program that relate to facility safety.

Existing supporting documentation is to be referenced. Brief abstracts of referenced documentation are to be included in sufficient detail to provide an understanding of the referenced documentation.

NRC Requirements

There are no additional NRC requirements.

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

- The reference for the emergency response procedures will be provided in the FSAR.

References

References for this chapter could include the following:

DOE/RL-94-02, 1997, *Hanford Site Emergency Response Plan*, U.S. Department of Energy, Richland Operations Office, Richland Washington.

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

16.0 PROVISIONS FOR DECONTAMINATION AND DECOMMISSIONING (D&D)

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 20. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

A description of the current decontamination and decommissioning (D & D) features incorporated in the CVDF systems design will be provided in this chapter. Operating considerations that will facilitate final decontamination and ultimate decommissioning and environmental restoration activities will also be addressed. It is expected that this chapter will be updated prior to the facility D & D life-cycle stage.

References

References for this chapter could include the following:

DOE Order 6430.1A, 1989, General Design Criteria, U.S. Department of Energy, Washington D.C.

17.0 MANAGEMENT, ORGANIZATION, AND INSTITUTIONAL SAFETY PROVISIONS

DOE Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, Topic 12. In addition, the format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

This chapter is to present information on management, technical, and other organizations that support safe operation. This chapter is to (1) enumerate the requirements used to develop the safety management programs, (2) include descriptions of responsibilities and relationships between the non-operating organizations having a safety function and the line operating organizations, and (3) present sufficient information on the safety management policies and programs to demonstrate that the facility operations are embedded in a safety-conscious environment. The chapter is not intended to be the vehicle for review and approval of the

management, organization, and institutional safety program, but is to describe the essential features of the program that relate to facility safety.

Existing supporting documentation is to be referenced. Brief abstracts of referenced documentation are to be included in sufficient detail to provide an understanding of the referenced documentation.

NRC Requirements

There are no additional NRC requirements.

Deferred Items

Items to be deferred and subsequently addressed in the FSAR include the following:

- Descriptions for the final processing organization will be provided in the FSAR.
- Topical plans will be finalized and presented in the FSAR.

References

References for this chapter could include the following:

WHC-SD-SNF-CM-003, 1995, *Spent Nuclear Fuel Project, Interface Control Plan*, Revision 0, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-SNF-PMP-011, 1995, *Spent Nuclear Fuel Project, Project Management Plan*, Revision 0, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-W441-PMP-001, *Project W-441: Cold Vacuum Drying Project Management Plan*, Revision 0, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-WM-SAR-062, 1997, *K Basins Safety Analysis Report*, Revision 3A, DE&S Hanford, Inc., Richland, Washington.

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