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Spent Nuclear Fuel Project – Criteria Document Spent Nuclear Fuel Final Safety Analysis Report

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Abstract: The criteria document provides the criteria and planning guidance for developing the Spent Nuclear Fuel (SNF) Final Safety Analysis Report (FSAR). This FSAR will support the U.S. Department of Energy, Richland Operations Office decision to authorize the procurement, installation, installation acceptance testing, startup, and operation of the SNF Project facilities (K Basins, Cold Vacuum Drying Facility, and Canister Storage Building).

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SPENT NUCLEAR FUEL PROJECT

CRITERIA DOCUMENT

SPENT NUCLEAR FUEL FINAL SAFETY ANALYSIS REPORT

PURPOSE

This document provides criteria and planning guidance for developing the Spent Nuclear Fuel (SNF) Final Safety Analysis Report (FSAR). The SNF FSAR will have a single document identification number but will be structured to allow staggered reviews for the SNF Project FSAR and each of the SNF Project facility FSARs. The facility FSARs will be the Canister Storage Building (CSB) FSAR, Cold Vacuum Drying Facility (CVDF) FSAR, and K Basins FSAR. The facility FSARs will be annexes to the Project FSAR. HNF-SD-SNF-SARR-005, *Multicanister Overpack Topical Report*, will contain safety documentation covering the design and related analysis of the multi-canister overpack (MCO). This information will be included in the facility FSARs by reference to the topical report. Submittal of the topical report is factored in the SNF FSAR preparation schedule. Information in HNF-SD-TP-SARP-017, *Safety Analysis Report for Packaging (Onsite) Multicanister Overpack Cask*, will also be included in the project FSAR by reference to the safety analysis report for packaging. The SNF FSAR will support the U.S. Department of Energy (DOE), Richland Operations Office (RL) decision to authorize the remaining procurement, construction, installation, installation-acceptance testing, and the startup and operation of all SNF Project facilities and their systems and equipment. This criteria document has been prepared in accordance with HNF-PRO-705, *Safety Basis Planning, Documentation, Review, and Approval*.

REQUIREMENTS

The SNF FSAR will be prepared in compliance with DOE Order 5480.23, *Nuclear Safety Analysis Reports*, including Attachment 1 of the order. 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 SNF FSAR format and chapter content.

Several SNF FSAR chapters will include information required for the CSB and CVDF that is in addition to the DOE requirements and is based on the DOE memo *Concurrence with the K Basins Spent Nuclear Fuel Project Policy on Nuclear Safety Requirements* (Grumbly 1995). The additional U.S. Nuclear Regulatory Commission equivalency information required for the SNF FSAR is specified in 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 for preparing the SNF FSAR are described in this document. A chapter-by-chapter description of SNF FSAR content is provided in the appendices:

- Appendix A details the SNF Project FSAR
- Appendix B details Annex A, the CSB FSAR

- Appendix C details Annex B, the CVDF FSAR
- Appendix D details Annex C, the K Basins FSAR.

Information applicable to all SNF Project facilities will be included in the SNF Project FSAR while information specific to individual facilities will be included in the facility FSARs. The facility FSARs will reference the SNF Project FSAR and the MCO Topical Report (HNF-SD-SNF-SARR-005) as appropriate.

IMPLEMENTATION

In accordance with HNF-PRO-705, Section 2.2, Item 1, this criteria document defines the basis for developing an acceptable and adequate SNF FSAR. Developing such a criteria document is a requirement of Fluor Daniel Hanford, Inc. Even though this document is not a DOE requirement, it is being provided to DOE to aid in the overall review process.

Final Safety Analysis Report Purpose and Scope

- The SNF FSAR will document the safety analyses of the SNF Project and will provide the safety basis for DOE authorization of the remaining SNF Project equipment procurement, construction, installation, installation-acceptance testing, and the SNF Project startup and operation.
- The SNF FSAR will replace the previously approved facility-specific, phased safety analysis reports and will update the existing safety analysis report information as appropriate to implement DOE safety evaluation report requirements and dispositioned review comments. Comments previously deferred to the facility-specific safety analysis reports will be addressed and appropriately incorporated in the SNF FSAR. Information submitted to RL, by letters utilizing the Key Driver Resolution Committee recommendations, for RL to authorize long-lead procurement release for specific equipment will be incorporated into the SNF FSAR. The SNF FSAR will also incorporate the evolutions of safety analysis methodology and assumptions and the completed system designs. The SNF FSAR will address the closure of all enabling assumptions associated with each SNF Project facility.
- The authorization basis for a facility will include the commitments specified in the SNF Project FSAR and the facility-specific commitments cited in the facility FSAR.

Final Safety Analysis Report Preparation

- The SNF FSAR will be prepared in accordance with applicable DOE requirements. In addition, report content detail and quality will be, as a minimum, consistent with DOE FSAR requirements and all closed enabling assumptions will be identified in the appropriate SNF FSAR chapters.

- The following Fluor Daniel Hanford, Inc. (FDH) nuclear safety procedures will be used to develop and maintain SNF Project safety basis documents.
 - HNF-PRO-430, *Safety Analysis Program*
 - HNF-PRO-517, *Safety Analysis Program Glossary*
 - HNF-PRO-700, *Safety Analysis and Technical Safety Requirements*
 - HNF-PRO-701, *Safety Analysis Process – Existing Facility*
 - HNF-PRO-702, *Safety Analysis Process – Facility Change or Modification*
 - HNF-PRO-703, *Safety Analysis Process – New Project*
 - HNF-PRO-704, *Hazard and Accident Analysis Process – Waiver 1*
 - HNF-PRO-705, *Safety Basis Planning, Documentation, Review, and Approval.*
- The SNF FSAR will address each facility's interfaces with other SNF Project and Hanford Site facilities to ensure that overall SNF Project and site safety is addressed. The interfaces include controls placed on specific facility processes for safety considerations of other SNF Projects and site facilities. The interfaces and role of the multi-canister overpack topical report (HNF-SD-SNF-SARR-005) will also be identified by the SNF FSAR.

Final Safety Analysis Report Basis Supporting Documentation

The SNF Project process basis has evolved significantly as the understanding of the fuel characteristics, reaction kinetics, process, and safety models have improved. This understanding has allowed a significant simplification of the process and facilities while assuring protection of the workers, public, and the environment. The simplification is based upon better understanding of the particulate inventory and the projected water inventory/envelope after cold vacuum drying. Characterization results, process validation testing, and change of MCO design pressure has allowed the project to conclude that the MCO and its contents are suitable for safe long-term storage after the cold vacuum drying process. The safety basis of the major process steps and facilities needed to achieve safe interim storage will be documented in the SNF Project Process and Safety Description.

The nuclear safety analyses contained in Chapter 3.0 of the facility FSARs rely on key inputs that will be documented in the SNF Project process and safety description. The technical basis for the inputs are documented in several reports. Included in these technical documents are the description of the methodology and results of analysis and calculations that support the derivation of these inputs. The SNF Project Process and Safety Description will discuss the contents of each of the technical reports and its relationship to the development of the safety basis needed to achieve safe interim storage of the spent fuel in the CSB. The SNF Project Process and Safety Description will be a controlled document and will describe the safety basis for analysis inputs. The SNF Project Process and Safety Description will be consistent with and will provide the basis for using the information contained in the project databook. The SNF Project FSAR and facility FSARs will maintain configuration control of input data for description and analyses by maintaining consistency with the SNF Project Process and Safety Description. As changes are incorporated into the SNF Project Process and Safety Description, the FSAR documentation that is being reviewed by DOE will be assessed using an unreviewed safety question-like process to determine whether updates to the respective FSARs are necessary.

The SNF Project Process and Safety Description, along with supporting technical documentation, will be submitted to DOE for review and approval prior to the submittal of the SNF Project FSAR and the facility FSARs. Early review and approval by DOE of the SNF Project Process and Safety Description and supporting technical documents will allow for identification and resolution of key technical issues prior to the submittal of the FSARs.

Final Safety Analysis Report Format and Content

This criteria document contains commitments to prepare the SNF FSAR in accordance with DOE Order 5480.23, including Attachment 1 of the order, and DOE-STD-3009-94 format and content guidance. Therefore, repetition of those DOE requirements and guidance in this document is minimized; pertinent details regarding FSAR chapter content and format are provided in the appendices. The information contained in the appendices represents planning guidance for authors and reviewers and will likely change as the documents are being prepared. DOE and FDH/Environmental, Safety, and Health will be consulted on significant changes.

Only key elements and summaries of programs will be presented in the SNF FSAR. Specific information regarding program implementation will be contained in separate, referenced supporting documentation. Specific requirements will be identified in the SNF FSAR, but compliance demonstration will be contained in separate, referenced supporting documents.

The SNF FSAR will use units (metric or English) consistent with those in the supporting documentation. If the analysis discussion uses metric units, then the discussion in the FSAR will use metric units. When an operator interfaces with the FSAR, the units that the operator sees in the plant will be those seen in the FSAR (i.e., if gauge reads psi, then psi will be in the FSAR).

The SNF FSAR will consist of four volumes. Described below are the general contents of each volume.

Volume 1 Volume 1 will be the SNF Project FSAR. This volume will contain the site description and the programmatic chapters (1.0 and 7.0 through 17.0). The remaining chapters (2.0 through 6.0) will contain information related to: analysis methodologies, acceptance criteria, required interfaces among subprojects and facilities, development of the technical basis for the sealing strategy, and a summary of the multi-canister overpack configuration from the time it enters the K Basins until it is ultimately placed in a CSB storage tube for interim storage. The specific criteria for Volume 1 are presented in Appendix A.

Volume 2 Volume 2 will be Annex A, the CSB FSAR. This volume will contain specific information relating to the facility design; hazard and accident analyses; identification of safety structures, systems, and components; facility-specific technical safety requirements; criticality evaluations; and identification and discussion of facility-specific programmatic implementation activities. Reference will be made to the appropriate chapters of the SNF Project FSAR. The specific criteria for Volume 2 are presented in Appendix B.

- Volume 3** Volume 3 will be Annex B, the CVDF FSAR. This volume will contain specific information relating to the facility design; hazard and accident analyses; identification of safety structures, systems, and components; facility-specific technical safety requirements; criticality evaluations; and identification and discussion of facility-specific programmatic implementation activities. Reference will be made to the appropriate chapters of the SNF Project FSAR. The specific criteria for Volume 3 are presented in Appendix C.
- Volume 4** Volume 4 will be Annex C, the K Basins FSAR. This volume will integrate the subproject safety analysis documents (fuel retrieval system, integrated water treatment system, and cask loadout system) into the appropriate chapters. This volume will contain specific information relating to the facility design; hazard and accident analyses; identification of safety structures, systems, and components; facility-specific technical safety requirements; criticality evaluations; and identification and discussion of facility-specific programmatic implementation activities. Reference will be made to the appropriate chapters of the SNF Project FSAR. The specific criteria for Volume 4 are presented in Appendix D.

Final Safety Analysis Report Design Basis

The SNF FSAR will clearly describe the facility and systems design used as the basis for the safety analysis. The maturity of the SNF Project facility systems design will be sufficient to support the DOE decision for the procurement, construction, installation, installation-acceptance testing; and startup testing and operation of the SNF Project facility systems. The safety analyses will be supported by the design requirements established for the equipment and structures.

Design baseline control for the SNF Project FSAR and the facility FSARs during DOE review will be implemented in accordance with the SNF Project Configuration Management Plan and the SNF Project Nuclear Safety Desktop Instruction. This desk top instruction provides an unreviewed safety question-like process for evaluating design changes to SNF Project facilities or equipment and major upgrades at K Basins that have preliminary safety basis documents (preliminary phased safety analysis reports, safety analysis documents, or topical reports). The desktop instruction will ensure that: (1) a consistent review of design changes and their impact to applicable SNF Project safety basis documents is conducted, (2) the appropriate level of approval authority is designated, and (3) changes to the safety basis documents are controlled.

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 Nonreactor Nuclear Facility Safety Analysis Reports*, U.S. Department of Energy, Washington, D.C.

Grumbly, T. P., 1995, *Concurrence with the K-Basins Spent Nuclear Fuel Project Policy on Nuclear Safety Requirements* (Memo EM-36-3.1.6.7 to Manager, U.S. Department of Energy, Richland Operations Office, July 20), U.S. Department of Energy, Richland, Washington.

HNF-PRO-430, 1997, *Safety Analysis Program*, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-PRO-517, 1997, *Safety Analysis Program Glossary*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-PRO-700, 1997, *Safety Analysis and Technical Safety Requirements*, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-PRO-701, 1997, *Safety Analysis Process - Existing Facility*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-PRO-702, 1997, *Safety Analysis Process - Facility Change or Modification*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-PRO-703, 1997, *Safety Analysis Process - New Project*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-PRO-704, 1997, *Hazard and Accident Analysis Process - Waiver 1*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-PRO-705, 1998, *Safety Basis Planning, Documentation, Review, and Approval*, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-SARR-005, 1998, *Multicanister Overpack Topical Report*, Rev. 1, 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*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-TP-SARP-017, 1998, *Safety Analysis Report for Packaging (Onsite) Multicanister Overpack Cask*, Rev. 1, Fluor Daniel Hanford, Incorporated, Richland, Washington.

APPENDIX A

SPENT NUCLEAR FUEL FINAL SAFETY ANALYSIS REPORT
FORMAT AND CONTENTVOLUME 1:
SPENT NUCLEAR FUEL PROJECT
FINAL SAFETY ANALYSIS REPORT

INTRODUCTION

This document provides criteria and planning guidance for developing the Spent Nuclear Fuel (SNF) Project Final Safety Analysis Report (FSAR), which is Volume 1 of the SNF FSAR. The SNF Project FSAR will consist of an Executive Summary and Chapters 1.0 through 17.0. The following programmatic chapters will contain the majority of information that the facility FSARs will reference:

- Chapter 1.0, "Site Characteristics"
- Chapter 7.0, "Radiation Protection"
- Chapter 8.0, "Hazardous Material Protection"
- Chapter 9.0, "Radioactive and Hazardous Waste Management"
- Chapter 10.0, "Initial Testing, In-Service Surveillance, and Maintenance"
- Chapter 11.0, "Operational Safety"
- Chapter 12.0, "Procedures and Training"
- Chapter 13.0, "Human Factors"
- Chapter 14.0, "Quality Assurance"
- Chapter 15.0, "Emergency Preparedness"
- Chapter 16.0, "Provisions for Decontamination and Decommissioning"
- Chapter 17.0, "Management, Organization, and Institutional Safety Provisions."

These programmatic chapters will describe the common programs that will be used by the SNF Project for all project facilities (i.e., Canister Storage Building [CSB], Cold Vacuum Drying Facility [CVDF], and K Basins). The remaining SNF Project FSAR chapters will contain programmatic and general overview information that will refer to the facility FSARs for specific information.

Because the SNF Project operating crews will be working at all SNF Project 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 multi-canister overpack (MCO) is moved throughout the project facilities. In addition, utilization of common programs for all SNF Project facilities will ensure consistency in the preparation of project training information, procedure development, and consistency of operations.

Discussion of facility-specific details associated with the common programs that are required by DOE Order 5480.23, *Nuclear Safety Analysis Reports*, or DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Safety Analysis Reports*, will be contained in the facility FSARs, Annexes A through C, in Volumes 2 through 4.

The development of the SNF Project FSAR will be based on the following:

- Requirements of DOE Order 5480.23
- Direction in Attachment 1 of DOE Order 5480.23, "Interim Guidance for DOE Order 5480.23"
- Format, content and hazard and accident analysis methodology guidance provided in DOE-STD-3009-94
- Guidance in HNF-SD-SNF-SP-012, Rev. 0, *Additional Guidance for Including Nuclear Safety Equivalency in the Canister Storage Building and Cold Vacuum Drying Facility Final Safety Analysis Reports*
- Instructions in the Project Hanford procedures.

Pertinent details regarding the format and content of the SNF Project FSAR chapters are provided; however, repetition of the requirements, guidance, and direction provided in the governing documents is minimized.

EXECUTIVE SUMMARY

The Executive Summary states the purpose of the SNF Project FSAR, which is to provide the authorization basis for the procurement, construction, installation, installation-acceptance testing, startup, and operation of the SNF Project subprojects and facilities and their systems and equipment. The activities and scope of the submittal that supports this purpose will be clearly identified and will be based on the safety analysis conclusions.

Tables containing information related to close-out of enabling assumptions associated with the development of the SNF Project safety basis will be included in the Executive Summary along with references to specific SNF Project FSAR chapters or facility FSAR chapters where the appropriate information is presented.

U.S. Department of Energy Requirements

The format of this section shall conform to the requirements of DOE-STD-3009-94. The SNF Project FSAR Executive Summary will contain only a general summary description. The facility FSAR Executive Summaries will meet the content requirements of DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)1, "Executive Summary."

U.S. Nuclear Regulatory Commission Requirements

Information that will be added to the SNF Project FSAR to address U.S. Nuclear Regulatory Commission (NRC) equivalency requirements is summarized below. This information is presented in detail in HNF-SD-SNF-SP-012.

- Discuss the need for the SNF Project subprojects and facilities.
- Briefly discuss the mode of storage; its functions and operation; the normal capacity of each subproject and facility; the types, forms, quantities, and potential sources of the spent fuel and high-level waste to be stored; and the waste products generated during its operation.
- Discuss the manner in which the SNF Project FSAR has been augmented to add that information from Regulatory Guide 3.48 and 10 CFR 72.24 that is unique to the storage of SNF.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-RD-001, 1998, *SNF K Basins and Cold Vacuum Drying Standard Requirements Identification Document*, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-RD-007, 1997, *Spent Nuclear Fuel Project, Canister Storage Building and Hot Conditioning System Standards/Requirements Identification Report*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

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

1.0 SITE CHARACTERISTICS

This chapter will provide a description of site characteristics necessary for understanding the facility environs important to the safety basis. Information will be provided to support and clarify assumptions used in the hazard and accident analyses to identify and analyze potential external and natural phenomena accident initiators and accident consequences to the facility.

This chapter need not be rewritten as part of the SNF Project FSAR development. When the DOE has reviewed and approved HNF-SD-SNF-SAR-002, *Safety Analysis Report for the Cold Vacuum Drying Facility, Phase 2, Supporting Installation of Processing Systems*, the regional and Hanford Site information will be transferred to the SNF Project FSAR.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)3, "Site Characteristics." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Information that will be added to the SNF Project FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in HNF-SD-SNF-SP-012.

- Clearly delineate the area to be considered as the controlled area boundary for access control and address the locations beyond the restricted area that are potentially impacted by radioactive material and effluents. Also discuss the probable future uses of Hanford Site land and how this has been considered in the design bases of each SNF Project facility.
- Specify the design parameters applicable to the design tornado and provide the specified parameters for the tornado-driven missiles. Also discuss the incorporation of a design basis tornado and tornado missiles for safety-class structures, systems, and components (SSCs) into the design of the SNF Project facilities.
- Identify the locations beyond the restricted area and beyond the controlled area that could be impacted by radioactive material and effluents.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-SAR-002, 1998, *Safety Analysis Report for the Cold Vacuum Drying Facility, Phase 2, Supporting Installation of Processing Systems*, Rev. 4, 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*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

2.0 FACILITY DESCRIPTION

This chapter will contain an overview discussion of the entire SNF Project, including coverage of each subproject and facility and its respective role in fulfillment of the SNF Project mission. Also included will be a summary of the MCO configuration from the time it enters the K Basins until it is ultimately placed in an MCO storage tube in the CSB for interim storage. Specific discussions of facility descriptions will be contained in the facility FSARs and will address the NRC equivalency requirements stated in HNF-SD-SNF-SP-012.

References

References for this chapter will, as a minimum, include the following:

HNF-2032, 1998, *SNF Fuel Retrieval Subproject Safety Assessment Document*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-2456, 1998, *Cask Loadout System Safety Analysis Document*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-RPT-004, 1997, *Canister Storage Building Safety Analysis Report -- Phase 3: Safety Analysis Documentation Supporting Canister Storage Building Construction*, Rev. 7B, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-SAD-002, 1998, *K West Basin Integrated Water Treatment System Subproject Safety Assessment Document*, Rev. 2, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-SAR-002, 1998, *Safety Analysis Report for the Cold Vacuum Drying Facility, Phase 2, Supporting Installation of Processing Systems*, Rev. 4, Fluor Daniel Hanford, Inc., Richland, Washington.

WHC-SD-WM-SAR-062, 1996, *K Basins Safety Analysis Report*, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

3.0 HAZARD AND ACCIDENT ANALYSES

This chapter will contain a description of the methodology, guidelines, and acceptance criteria used to develop the specific analyses performed for SNF Project facilities. In addition, the overall integrated safety basis for the SNF Project, along with identification and summaries of supporting documentation, will be presented. Specific interfaces among the facilities relied upon to demonstrate the safety basis will be identified. The specific analyses performed for each subproject or facility, along with analyses results and conclusions, will be presented in the facility FSARs and will address NRC equivalency requirements stated in HNF-SD-SNF-SP-012.

References

References for this chapter will, as a minimum, 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-SP-012, 1997, *Additional Guidance for Including Nuclear Safety Equivalency in the Canister Storage Building and Cold Vacuum Drying Facility Final Safety Analysis Reports*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

4.0 SAFETY STRUCTURES, SYSTEMS, AND COMPONENTS

This chapter will contain a discussion of the criteria and selection methodology used to identify safety-class and safety-significant SSCs. Specific information regarding specific SSCs for each SNF Project subproject or facility will be presented in the appropriate facility FSAR and will address NRC equivalency requirements as stated in HNF-SD-SNF-SP-012.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-RD-001, 1998, *SNF K Basins and Cold Vacuum Drying Standard Requirements Identification Document*, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-RD-007, 1997, *Spent Nuclear Fuel Project, Canister Storage Building and Hot Conditioning System Standards/Requirements Identification Report*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

5.0 TECHNICAL SAFETY REQUIREMENTS

This chapter will contain a discussion of the technical safety requirements development criteria and guidelines, along with a discussion of interface control for technical safety requirements at each SNF Project facility. Specific derivation of technical safety requirements for each facility will be presented in the appropriate facility FSAR. There are no NRC equivalency requirements.

References

References for this chapter will, as a minimum, include the following:

DOE 5480.22, 1992, *Technical Safety Requirements*, U.S. Department of Energy, Richland, Washington.

6.0 PREVENTION OF INADVERTENT CRITICALITY

This chapter will contain a discussion of criticality programs and analysis methodology. The criticality protection program will also be discussed. SNF Project facility- or subproject-specific criticality analyses results and controls that are in place to reduce the likelihood of inadvertent nuclear criticality excursions, along with any required instrumentation, will be discussed in the appropriate facility FSAR.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)8, "Inadvertent Criticality Protection." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Information that will be added to the SNF Project FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in HNF-SD-SNF-SP-012.

- Include a commitment to a criticality safety k_{eff} value of 0.95 for the appropriate SNF facility in accordance with the NRC equivalency requirement.
- Discuss how the requirements of ANSI/ANS-8.3-1986 have been incorporated into the design.

References

References for this chapter will, as a minimum, include the following:

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

7.0 RADIATION PROTECTION

This chapter will contain sufficient information to demonstrate compliance with the radiation protection requirements of 10 CFR 835, *Occupational Radiation Protection*. 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 will be referenced. Brief abstracts of referenced documentation will be included in sufficient detail to provide an understanding of the referenced documentation. A commitment to ALARA (as low as reasonably achievable) principles described in the radiation protection program will be established.

U.S. Department of Energy Requirements

The content shall address DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)9, "Radiation Protection." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Information that will be added to the SNF Project FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in HNF-SD-SNF-SP-012.

- State that each facility will incorporate control devices for access to high-radiation areas that conform to the requirements of 10 CFR 20.1601.
- Show that the design guidance of NRC Regulatory Guide 8.8 have been implemented.
- Document that the provisions for radiological monitoring will meet the requirements of 10 CFR 20, 10 CFR 70.59 and 10 CFR 835.
- Discuss the shielding provisions provided in the facility to limit radiological exposure.
- State that each facility design and safety analysis will apply the radiological exposure criteria of 10 CFR 72.104 to any real individual of the public during normal operations and anticipated occurrences.

Facility-specific details regarding incorporation of monitoring devices and facility design and analysis considerations will be presented in the appropriate facility FSAR.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-CN-026, 1997, *MCO Shield Plug Dose Rate Analysis*, Rev. 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*, Rev. 2, Fluor Daniel Hanford, Inc., Richland, Washington.

HSRCM-1, 1995, *Hanford Site Radiological Control Manual*, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

8.0 HAZARDOUS MATERIAL PROTECTION

This chapter will contain sufficient information to demonstrate compliance with applicable requirements for control and monitoring of hazardous materials. The provisions for hazardous material protection other than those provided for radiological protection will be summarized. Topic summaries will 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 will be referenced. Brief abstracts of referenced documentation will be included in sufficient detail to provide an understanding of the referenced documentation. A commitment to ALARA principles described in the hazardous material protection program will be established.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)10, "Hazardous Material Protection." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Information about the ingestion pathway will be added to the SNF Project FSAR to address NRC equivalency requirements. This information is presented in detail in HNF-SD-SNF-SP-012. Facility-specific details addressing the ingestion pathway will be presented in the appropriate facility FSAR.

References

References for this chapter will, as a minimum, include the following:

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

9.0 RADIOACTIVE AND HAZARDOUS WASTE MANAGEMENT

This chapter will 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 will 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 will be referenced. Brief abstracts of referenced documentation will be included in sufficient detail to provide an understanding of the referenced documentation. Facility-specific discussions regarding waste sources, characteristics, and anticipated volumes and waste handling or treatment systems will be discussed in the appropriate facility FSAR.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)7, "Radioactive and Hazardous Material Waste Management." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

References

References for this chapter will, as a minimum, include the following:

HSRCM-1, 1995, *Hanford Site Radiological Control Manual*, Rev. 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*, Rev. 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*, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

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

10.0 INITIAL TESTING, IN-SERVICE SURVEILLANCE, AND MAINTENANCE

This chapter will contain sufficient information to delineate the plans and provisions for initial and in-service testing. With regard to maintenance, sufficient information will 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 will be referenced. Brief abstracts of referenced documentation will be included in sufficient detail to provide an understanding of the referenced documentation. Any facility-specific information regarding unique test, surveillance, and maintenance procedures will be discussed in the appropriate facility FSAR.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)15, "Initial Testing, Inservice Surveillance, and Maintenance." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-SUP-003, 1998, *Spent Nuclear Fuel Startup and Test Plan Life Cycle Costs and Impacts Alternatives for Managing KE Basin Sludge*, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington.

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

11.0 OPERATIONAL SAFETY

This chapter will 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 will describe the essential features of the program that relate to facility safety.

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

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)17, "Operational Safety." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Information that will be added to the SNF Project FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in HNF-SD-SNF-SP-012.

- Facility-specific evaluations of the final design of each facility 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 will be discussed in the appropriate facility FSAR.

References

References for this chapter will, as a minimum, include the following:

WHC-SD-SNF-FHA-001, 1996, *Fire Hazard Analysis for the K Basins Facilities at 100 K Area*, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-SNF-FHA-002, 1996, *Phase 2 Fire Hazard Analysis for the Canister Storage Building*, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

WHC-SD-SNF-FHA-003, 1996, *Preliminary Fire Hazard Analysis for the Cold Vacuum Drying System Facility*, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

12.0 PROCEDURES AND TRAINING

This chapter will describe the processes by which the technical content of procedures and training programs are developed, verified, and validated. A programmatic commitment to 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 will describe the essential features of the program as they relate to facility safety.

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

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)13, "Procedures and Training." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

13.0 HUMAN FACTORS

This chapter will provide a general discussion on the human factors processes, the importance to facility safety, and the design of the facilities to optimize human performance. This chapter will demonstrate that human factors are considered in facility operations where humans are relied upon for preventive actions and for operator mitigative actions during abnormal and emergency operations. The emphasis will be on human-machine interfaces required for ensuring the safety function of safety SSCs that are important to safety and on the provisions made for optimizing the design of those human-machine interfaces to enhance reliable human performance. Facility-specific discussions regarding identification and optimization of specific human-machine interfaces will be discussed in the appropriate facility FSAR.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, and paragraph 4.f.(3)14, "Human Factors." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Information that will be added to the SNF Project FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in 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.

14.0 QUALITY ASSURANCE

This chapter will contain sufficient information to demonstrate appropriate commitment to a quality assurance program that is required by 10 CFR 820, "Procedural Rules for DOE Nuclear Activities." The chapter is not intended to be the vehicle for review and approval of the quality assurance program but will describe the essential features of the program that relate to facility safety.

Existing supporting documentation will be referenced. Brief abstracts of referenced documentation will be included in sufficient detail to provide an understanding of the referenced documentation. Specific commitments regarding implementation of the SNF Project Quality Assurance Program will be discussed in the appropriate facility FSAR.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)18, "Quality Assurance." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

References

References for this chapter will, as a minimum, include the following:

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

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

WHC-SD-SNF-QAPP-004, 1996, *Spent Nuclear Fuel Project Quality Assurance Program Plan*, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

15.0 EMERGENCY PREPAREDNESS

This chapter will contain sufficient information to demonstrate appropriate commitment to the emergency preparedness functions requirements of the DOE 5500-series directives. The

philosophy, objectives, and organization of the emergency preparedness functions will 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 will describe the essential features of the program that relate to facility safety.

Existing supporting documentation will be referenced. Brief abstracts of referenced documentation will be included in sufficient detail to provide an understanding of the referenced documentation. Specific facility discussions regarding facility emergency plans will be discussed in the appropriate facility FSAR.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)19, "Emergency Preparedness." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

References

References for this chapter will, as a minimum, include the following:

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

16.0 PROVISIONS FOR DECONTAMINATION AND DECOMMISSIONING (D&D)

This chapter will contain the description of the SNF Project program and policy regarding decontamination and decommissioning of the SNF Project subproject facilities. Confirmation that facility design has adequately incorporated decontamination consideration will be presented in the appropriate facility FSAR. Design and 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 before the facility decontamination and decommissioning lifecycle stage.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)20, "Provisions for Decontamination and Decommissioning." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

References

References for this chapter will, as a minimum, 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

This chapter will present information on management, technical, and other organizations that support safe operation. This chapter will: (1) identify the requirements used to develop the safety management programs, (2) include descriptions of responsibilities and relationships between the nonoperating 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 will describe the essential features of the program that relate to facility safety.

Existing supporting documentation will be referenced. Brief abstracts of referenced documentation will be included in sufficient detail to provide an understanding of the referenced documentation. Specific facility commitment to SNF Project safety policy and any unique organizational structure or requirements will be addressed in the appropriate facility FSAR.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)12, "Management, Organization, and the Institutional Safety Provisions." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

References

References for this chapter will, as a minimum, include the following:

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

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

APPENDIX B

**FINAL SAFETY ANALYSIS REPORT
SAFETY ANALYSIS REPORT FORMAT AND CONTENT****VOLUME 2:
ANNEX A
CANISTER STORAGE BUILDING
FINAL SAFETY ANALYSIS REPORT****INTRODUCTION**

This document provides criteria and planning guidance for developing Volume 2 of the Spent Nuclear Fuel (SNF) Final Safety Analysis Report (FSAR). Volume 2 will comprise Annex A of the SNF Project FSAR, the Canister Storage Building (CSB) FSAR. The CSB FSAR, in conjunction with the SNF Project FSAR, will support the U.S. Department of Energy (DOE), Richland Operations Office (RL) decision to authorize the procurement, construction, installation, installation-acceptance testing, and operation of the CSB and its systems. This criteria document has been prepared based on the guidance provided in HNF-PRO-705, *Safety Basis Planning, Documentation, Review, and Approval*.

Annex A, the CSB FSAR, will contain specific information relating to the CSB facility design; hazard and accident analyses; identification of safety structures, systems, and components (SSCs); identification of CSB-specific technical safety requirements; and discussion of CSB-specific programmatic implementation activities. Reference will be made to the appropriate chapters of the SNF Project FSAR for information that is applicable for all SNF Project facilities.

The development of the CSB FSAR will be based on the following:

- Format, content and hazard and accident analysis methodology guidance provided in DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports*
- Requirements of DOE Order 5480.23, *Nuclear Safety Analysis Reports*
- Direction in Attachment 1 of DOE Order 5480.23, "Interim Guidance for DOE Order 5480.23"
- Instructions in the Project Hanford procedures
- HNF-SD-SNF-SP-012, Rev. 0, *Additional Guidance for Including Nuclear Safety Equivalency in the Canister Storage Building and Cold Vacuum Drying Facility Final Safety Analysis Reports*.

Pertinent details regarding the format and content of the CSB FSAR chapters are provided; however, DOE content and format requirements, guidance, and direction that have been identified in the SNF Project FSAR programmatic chapters (see Appendix A) have not been repeated. The additional NRC requirements for the CSB have been included for applicable chapters.

EXECUTIVE SUMMARY

The Executive Summary will state the purpose of the CSB FSAR, which is to provide the authorization basis for the procurement, construction, installation, installation-acceptance testing, and operation of the CSB and its systems. The requested activities and scope of the CSB FSAR will be clearly identified and will be based on the safety analysis conclusions. The CSB design basis accident analysis results will be summarized.

Tables containing information related to the close-out of enabling assumptions associated with the development of the CSB safety basis will be included in the Executive Summary along with references to specific chapters where the appropriate information is presented.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)1, "Executive Summary." The format of this section shall conform to the requirements of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CSB FSAR to address U.S. Nuclear Regulatory Commission (NRC) equivalency requirements is summarized below. This information is presented in detail in Table 3 of HNF-SD-SNF-SP-012.

- Discuss the need for the CSB.
- Briefly discuss the mode of storage; its functions and operation; the normal capacity of the CSB; the types, forms, quantities, and potential sources of the spent fuel and high-level waste to be stored; and the waste products generated during CSB operation.
- Discuss the manner in which the CSB FSAR has been augmented to add that information required by Regulatory Guide 3.48 and 10 CFR 72.24 that is unique to the storage of SNF.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-RPT-004, 1997, *Canister Storage Building Safety Analysis Report – Phase 3: Safety Analysis Documentation Supporting Canister Storage Building Construction*, Rev. 7B, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-RD-007, 1997, *Spent Nuclear Fuel Project, Canister Storage Building and Hot Conditioning System Standards/Requirements Identification Report*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

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

A1.0 SITE CHARACTERISTICS

Chapter 1.0 of the SNF Project FSAR will provide a description of site characteristics necessary for understanding the CSB facility environs important to the safety basis. The regional and Hanford Site information will be incorporated into Chapter A1.0 of the CSB FSAR by reference to Chapter 1.0. CSB-specific site information will be provided in Chapter A1.0 to support and clarify assumptions used in the CSB hazard and accident analyses to identify and analyze potential external and natural phenomena accident initiators and accident consequences to the CSB.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CSB FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 3 of HNF-SD-SNF-SP-012.

- Clearly delineate the area to be considered as the controlled area boundary for access control and address the locations beyond the restricted area that are potentially impacted by radioactive material and effluents. Also discuss the probable uses of Hanford Site land in the future and how this has been considered in the design bases of the CSB.
- Specify the design parameters applicable to the design tornado and provide the specified parameters for the tornado-driven missiles. Also discuss the incorporation of a design basis tornado and tornado missiles for safety-class SSCs into the design of the CSB.
- Identify the locations beyond the restricted area and beyond the controlled area that could be impacted by radioactive material and effluents.

References

References for this chapter will, as a minimum, include the following:

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*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

A2.0 FACILITY DESCRIPTION

Chapter A2.0 will describe the CSB in sufficient detail to provide an overall understanding of the facility and will provide the basis for the assumptions used in the hazard and accident analyses. The information for individual structures and systems that will be described in Chapter A2.0 is as follows:

- Summary description
 - Description of the structure and system configuration and key components
 - Description of process functions performed by the system
 - Composite piping and instrumentation diagrams and flow drawings (for key systems)
- Major system hazards and safety considerations.

This will be a brief summary only and will not duplicate the detailed hazard assessment and descriptions of Chapter A3.0 or A4.0.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)4, "Facility Description and Operation, Including Design of Principal Structures, Components, Systems, Engineered Safety Features, and Processes." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CSB FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 3 of HNF-SD-SNF-SP-012.

- Address the compliance of the design and construction of the CSB to the general design criteria of 10 CFR 72. Also discuss the margins of safety during normal operations and expected operational occurrences during the life of the CSB.

- Describe the methods used to convert the tornado and wind loading discussed in Chapter A1.0 into forces on structures. Show that the failure of any structure not being designed for tornado loads will not affect the ability of other SSCs important to safety to perform their intended safety functions. Analyze the potential effect of tornado missiles on SSCs important to safety.
- Describe the ability of the facility to withstand the natural phenomena hazard hydrology design requirements; include a discussion of the static and dynamic consequences of all types of flooding. Discuss the consequences of exceeding the design basis for the snow and ice loading.
- If the CSB is located adjacent to another structure, provide assurance that any physical interaction between the structures would not impair the capability of either facility to perform its safety functions.
- Provide a detailed description of all operations, including systems, equipment, and instrumentation and their operation characteristics, including identification of potential hazards posed by operating systems. Designate the provisions made for operational safety features to ensure against a hazard. List each operational unit sequentially and discuss the performance objectives. Provide information related to the overall functioning of the installation as a storage operation. Describe the proposed spent fuel and high-level radioactive waste handling and passive storage and relate them to the equipment and associated controls.
- Describe the operations used for transfer of spent fuel assemblies or high-level waste containers to the storage positions, the storage surveillance program, and the operations used for removal from the storage position. Describe all features, systems, and special techniques included in the system that provide for the safety of the operation under both normal and off-normal conditions.

Deferred Items

A description of the design and operation of the MCO weld station will be deferred and subsequently addressed in Revision 1 of the CSB FSAR.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-RPT-004, 1997, *Canister Storage Building Safety Analysis Report -- Phase 3: Safety Analysis Documentation Supporting Canister Storage Building Construction*, Rev. 7B, Fluor Daniel Hanford, Inc., Richland, Washington.

A3.0 HAZARD AND ACCIDENT ANALYSES

Chapter 3.0 of the SNF Project FSAR will contain a description of the methodology, guidelines, and acceptance criteria used to develop the specific analyses performed for each SNF Project subproject or facility. In addition, the overall integrated safety basis for the sealing strategy concept, along with identification and summaries of supporting documentation, will be presented in Chapter 3.0. Chapter 3.0 information will be incorporated into Chapter A3.0 of the CSB FSAR by reference to Chapter 3.0.

Chapter A3.0 will describe how the process described in the SNF Project FSAR is applied to systematically identify and assess hazards to evaluate the potential internal, external, and natural phenomena events that can cause the identified hazards to develop into accidents. The chapter will also present the results of the hazard identification and assessment process. Hazard analysis will (1) consider the complete spectrum of accidents that may occur as the result of facility operations; (2) analyze potential accident consequences to the public and workers; (3) estimate likelihood of occurrence; (4) identify and assess associated preventive and mitigative features; (5) identify safety-significant SSCs; and (6) identify a selected subset of accidents, designated design basis accidents, that will be formally defined in the accident analysis. Subsequent accident analysis will evaluate the design basis accidents for comparison with Evaluation Guidelines to identify and assess the adequacy of safety-class SSCs.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)5, "Hazard Analysis and Classification of the Facility." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CSB FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 3 of HNF-SD-SNF-SP-012.

- Evaluate those nearby activities identified in Section A1.6, "External Human-Generated Threats," that may represent a threat to the facility.

References

References for this chapter will, as a minimum, 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-007, 1997, *Spent Nuclear Fuel Project, Canister Storage Building and Hot Conditioning System Standards/Requirements Identification Report*, Rev. 0, Flour Daniel Hanford, Inc., Richland, Washington.

A4.0 SAFETY STRUCTURES, SYSTEMS, AND COMPONENTS

Chapter 4.0 of the SNF Project FSAR will contain a discussion of the criteria and selection methodology used to identify safety-class and safety-significant SSCs. Chapter 4.0 information will be incorporated into Chapter A4.0 of the CSB FSAR by reference to Chapter 4.0. Chapter A4.0 will provide the details (safety functions, support systems, functional requirements, and performance criteria) for safety SSCs identified in Chapter A3.0.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)6, "Principal Health and Safety Criteria." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CSB FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 3 of HNF-SD-SNF-SP-012.

- Describe the functions and design bases for all systems and structures performing the following functions: receipt and inspection of loaded shipping casks, cask unloading, spent fuel or high-level radioactive waste transfer and examination, fuel assembly or disassembly, placement of spent fuel in a container, container sealing and testing, short-term storage of spent fuel or high-level waste container, decontamination of shipping cask, safety SSC and drywell loading and preparation for storage, safety SSC transfer to storage, removal of spent fuel or high-level radioactive waste container from storage site to shipping cask, and placement of a damaged fuel element in a container.
- Demonstrate that implementation of the NRC nuclear safety equivalency requirements is documented in WHC-SD-SNF-DB-003.
- State that the requirements of ANSI/ASME N509-1989 and ANSI/ASME N510-1989 have been incorporated into the design of safety-significant heating, ventilating, and air conditioning systems used to achieve onsite radiological limits or to implement the principles of ALARA (as low as reasonably achievable). State that the CSB design has incorporated the design requirements of ANSI/ANS-57.1-1992 and ANSI/ANS-57.2-1983.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-RD-007, 1997, *Spent Nuclear Fuel Project, Canister Storage Building and Hot Conditioning System Standards/Requirements Identification Report*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

A5.0 TECHNICAL SAFETY REQUIREMENTS

Chapter 5.0 of the SNF Project FSAR will contain a discussion of the technical safety requirement development criteria and guidelines, along with a discussion of interface control for technical safety requirements at each SNF Project subproject or facility. Chapter 5.0 information will be incorporated into Chapter A5.0 of the CSB FSAR by reference to Chapter 5.0.

Chapter A5.0 will build upon the control functions determined to be essential in Chapter A3.0, and Chapter A4.0 to derive technical safety requirements. Derivation of technical safety requirements consists of summaries and references to pertinent sections of the CSB FSAR in which design (i.e., SSCs) and administrative controls (i.e., non-SSCs) are needed to prevent or mitigate the consequences of accidents. Design and administrative features that will be addressed include ones that: (1) provide significant defense in depth in accordance with the screening criteria of DOE 5480.22; (2) provide for significant worker safety; or (3) maintain consequences of facility operations below Evaluation Guidelines.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)16, "Derivation of Technical Safety Requirements." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

References

References for this chapter will, as a minimum, include the following:

DOE 5480.22, 1992, *Technical Safety Requirements*, U.S. Department of Energy, Richland, Washington.

A6.0 PREVENTION OF INADVERTENT CRITICALITY

Chapter 6.0 of the SNF Project FSAR will contain a discussion of criticality programs and analysis methodology. The criticality protection program will also be discussed. Chapter 6.0 information will be incorporated into Chapter A6.0 of the CSB FSAR by reference to Chapter 6.0. CSB-specific criticality analysis results and controls that will be in place to reduce the likelihood of inadvertent nuclear criticality excursions along with any required instrumentation will be discussed in Chapter A6.0.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)8, "Inadvertent Criticality Protection." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 3 of HNF-SD-SNF-SP-012.

- Include a commitment to a criticality safety k_{eff} value of 0.95.
- Discuss the extent to which the requirements of ANSI/ANS-8.3-1986 have been incorporated into the design.

References

References for this chapter will, as a minimum, include the following:

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

A7.0 RADIATION PROTECTION

Chapter 7.0 of the SNF Project FSAR will contain sufficient information to demonstrate compliance with the radiation protection requirements of 10 CFR 835, *Occupational Radiation Protection*. Chapter 7.0 information will be incorporated into Chapter A7.0 of the CSB FSAR by reference to Chapter 7.0. The provisions for radiation protection based on CSB hazards will be summarized in Chapter A7.0 to provide a basic understanding of compliance with the radiation protection program.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CSB FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 3 of HNF-SD-SNF-SP-012.

- State that the CSB has incorporated control devices for access to high-radiation areas that conform to the requirements of 10 CFR 20.1601.
- Show that the design guidance of NRC Regulatory Guide 8.8 have been implemented.
- Document that the provisions for radiological monitoring will meet the requirements of 10 CFR 20, 10 CFR 70.59 and 10 CFR 835.
- Discuss the shielding provisions provided in the facility to limit radiological exposure.
- State that the CSB design and safety analysis apply the radiological exposure criteria of 10 CFR 72.104 to any real individual of the public during normal operations and anticipated occurrences.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-CN-026, 1997, *MCO Shield Plug Dose Rate Analysis*, Rev. 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*, Rev. 2, Fluor Daniel Hanford, Inc., Richland, Washington.

HSRCM-1, 1995, *Hanford Site Radiological Control Manual*, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

A8.0 HAZARDOUS MATERIAL PROTECTION

Chapter 8.0 of the SNF Project FSAR will 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 will be summarized. Chapter 8.0 information will be incorporated into Chapter A8.0 of the CSB FSAR by reference to Chapter 8.0. CSB-specific discussions will include topic summaries that focus on hazardous material protection based on CSB hazards to provide a basic understanding of compliance with the hazardous material protection program.

U.S. Nuclear Regulatory Commission Requirements

Additional information to address the ingestion pathway will be added to the CSB FSAR to address NRC equivalency requirements. This information is presented in detail in Table 3 of HNF-SD-SNF-SP-012.

A9.0 RADIOACTIVE AND HAZARDOUS WASTE MANAGEMENT

Chapter 9.0 of the SNF Project FSAR will 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 will be summarized. Chapter 9.0 information will be incorporated into Chapter A9.0 of the CSB FSAR by reference to Chapter 9.0. CSB-specific discussions regarding waste sources and characteristics and waste handling or treatment systems will be discussed in Chapter A9.0.

A10.0 INITIAL TESTING, IN-SERVICE SURVEILLANCE, AND MAINTENANCE

Chapter 10.0 of the SNF Project FSAR will contain sufficient information to delineate the plans and provisions for initial and in-service testing. With regard to maintenance, sufficient information will be provided to demonstrate a commitment to comply with the requirements of DOE Order 4330.4A. Chapter 10.0 information will be incorporated into Chapter A10.0 of the CSB FSAR by reference to Chapter 10.0. Any CSB-specific summaries regarding unique test, surveillance, and maintenance procedures will be discussed in Chapter A10.0.

A11.0 OPERATIONAL SAFETY

Chapter 11.0 of the SNF Project FSAR will describe the bases for the Conduct of Operations program required by DOE Order 5480.19. Chapter 11.0 information will be incorporated into Chapter A11.0 of the CSB FSAR by reference to Chapter 11.0. Any CSB-specific information regarding conduct of operations and fire protection programs will be discussed in Chapter A11.0.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CSB FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 3 of HNF-SD-SNF-SP-012.

- The final design of the CSB will 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.

A12.0 PROCEDURES AND TRAINING

Chapter 12.0 of the SNF Project FSAR will describe the processes by which the technical content of procedures and training programs are developed, verified, and validated. A programmatic commitment to procedures and training programs is considered to be a necessary part of safety assurance. Chapter 12.0 information will be incorporated into Chapter A12.0 of the CSB FSAR by reference to Chapter 12.0.

A13.0 HUMAN FACTORS

Chapter 13.0 of the SNF Project FSAR will focus on human factors engineering, its importance to facility safety, and the design of the facility to optimize human performance. This chapter information will demonstrate that human factors are considered in facility operations where humans are relied upon for preventive actions and for operator mitigative actions during abnormal and emergency operations. Chapter 13.0 information will be incorporated into Chapter A13.0 of the CSB FSAR by reference to Chapter 13.0. CSB-specific discussions regarding identification and optimization of human-machine interfaces will be discussed in Chapter A13.0.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CSB FSAR to address NRC equivalency requirements is summarized below. This information is presented in detail in Table 3 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 CSB.

A14.0 QUALITY ASSURANCE

Chapter 14.0 of the SNF Project FSAR will contain sufficient information to demonstrate appropriate commitment to a quality assurance program and will describe the essential features of the program that relate to facility safety. Chapter 14.0 information will be incorporated into Chapter A14.0 of the CSB FSAR by reference to Chapter 14.0.

A15.0 EMERGENCY PREPAREDNESS

Chapter 15.0 of the SNF Project FSAR will contain sufficient information to demonstrate appropriate commitment to the emergency preparedness functions requirements of the DOE 5500-series directives. The philosophy, objectives, and organization of the emergency preparedness functions will be described for a spectrum of emergencies. Chapter 15.0 information will be incorporated into Chapter A15.0 of the CSB FSAR by reference to Chapter 15.0. Specific CSB discussions regarding facility emergency plans will be discussed in Chapter A15.0.

A16.0 PROVISIONS FOR DECONTAMINATION AND DECOMMISSIONING (D&D)

Chapter 16.0 of the SNF Project FSAR will contain the description of the SNF Project program and policy regarding decontamination and decommissioning of the SNF Project subproject facilities. Chapter 16.0 information will be incorporated into Chapter A16.0 of the CSB FSAR by reference to Chapter 16.0.

Confirmation that facility or subproject design has adequately incorporated decontamination consideration will be presented in Chapter A16.0. Operating considerations that will facilitate final decontamination and ultimate decommissioning and environmental restoration activities will also be addressed. It is expected that Chapter A16.0 will be updated prior to the facility decontamination and decommissioning lifecycle stage.

A17.0 MANAGEMENT, ORGANIZATION, AND INSTITUTIONAL SAFETY PROVISIONS

Chapter 17.0 of the SNF Project FSAR will present information on management, technical, and other organizations that support safe operation. This chapter will: (1) enumerate the requirements used to develop the safety management programs, (2) include descriptions of responsibilities and relationships between the nonoperating 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. Chapter 17.0 information will be incorporated into Chapter A17.0 of the CSB FSAR by reference to Chapter 17.0. Specific CSB commitment to SNF Project safety policy and any unique organizational structure or requirements will be addressed in Chapter A17.0.

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APPENDIX C

**FINAL SAFETY ANALYSIS REPORT
SAFETY ANALYSIS REPORT FORMAT AND CONTENT****VOLUME 3:
ANNEX B
COLD VACUUM DRYING FACILITY
FINAL SAFETY ANALYSIS REPORT****INTRODUCTION**

This document provides criteria and planning guidance for developing Volume 3 of the Spent Nuclear Fuel (SNF) Final Safety Analysis Report (FSAR). Volume 3 will comprise Annex B of the SNF Project FSAR, the Cold Vacuum Drying Facility (CVDF) FSAR. The CVDF FSAR, in conjunction with the SNF Project FSAR, will support the U.S. Department of Energy (DOE), Richland Operations Office (RL) decision to authorize the procurement, construction, installation, installation-acceptance testing, and operation of the CVDF and its systems. This criteria document has been prepared based on the guidance provided in HNF-PRO-705, *Safety Basis Planning, Documentation, Review, and Approval*.

Annex B, the CVDF FSAR, will contain specific information relating to the CVDF facility design; hazard and accident analyses; identification of safety structures, systems and components (SSCs); identification of CVDF-specific technical safety requirements; and discussion of CVDF-specific programmatic implementation activities. Reference will be made to the appropriate chapters of the SNF Project FSAR for information that is applicable for all SNF Project facilities.

The development of the CVDF FSAR will be based on the following:

- Format, content and hazard and accident analysis methodology guidance provided in DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports*
- Requirements of DOE Order 5480.23, *Nuclear Safety Analysis Reports*
- Direction in Attachment 1 of DOE Order 5480.23, "Interim Guidance for DOE Order 5480.23"
- Instructions in the Project Hanford procedures

- HNF-SD-SNF-SP-012, Rev. 0, *Additional Guidance for Including Nuclear Safety Equivalency in the Canister Storage Building and Cold Vacuum Drying Facility Final Safety Analysis Reports*.

Pertinent details regarding the format and content of the CVDF FSAR chapters are provided; however, DOE content and format requirements, guidance, and direction that have been identified in the SNF Project FSAR programmatic chapters (see Appendix A) have not been repeated. The additional NRC requirements for the CVDF have been included for applicable chapters.

EXECUTIVE SUMMARY

The Executive Summary will state the purpose of the CVDF FSAR, which is to provide the authorization basis for the procurement, construction, installation, installation-acceptance testing, and operation of the CVDF and its systems. The requested activities and scope of the CVDF FSAR will be clearly identified and will be based on the safety analysis conclusions. The CVDF design basis accident analysis results will be summarized.

Tables containing information related to the close-out of enabling assumptions associated with the development of the CVDF safety basis will be included in the Executive Summary along with references to specific chapters where the appropriate information is presented.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)1, "Executive Summary." The format of this section shall conform to the requirements of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Additional information to describe the type and exposure of the fuel to be conditioned will be added to the CVDF FSAR to address U.S. Nuclear Regulatory Commission (NRC) equivalency requirements. This information is presented in detail in Table 5 of HNF-SD-SNF-SP-012.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-SAR-002, 1998, *Safety Analysis Report for the Cold Vacuum Drying Facility, Phase 2, Supporting Installation of Processing Systems*, Rev. 4, Fluor Daniel Hanford, Inc., Richland, Washington.

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

B1.0 SITE CHARACTERISTICS

Chapter 1.0 of the SNF Project FSAR will provide a description of site characteristics necessary for understanding the CVDF facility environs important to the safety basis. Chapter 1.0 information will be incorporated into Chapter B1.0 the CVDF FSAR by reference to Chapter 1.0 to support and clarify assumptions used in the CVDF hazard and accident analyses to identify and analyze potential external and natural phenomena accident initiators and accident consequences to the CVDF.

References

References for this chapter will, as a minimum, include the following:

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*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

B2.0 FACILITY DESCRIPTION

Chapter B2.0 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 information for individual structures and systems described in Chapter B2.0 is as follows:

- Summary description
 - Description of the structure and system configuration and key components
 - Description of process functions performed by the system
 - Composite piping and instrumentation diagrams and flow drawings (for key systems)
- Major system hazards and safety considerations.

This will be a brief summary only and will not duplicate the detailed hazard assessment and descriptions of Chapter B3.0 or B4.0.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)4, "Facility Description and Operation, Including Design of Principal Structures, Components, Systems, Engineered Safety Features, and Processes." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Additional information describing the type and exposure of the fuel to be conditioned, the processes, and other design considerations will be added to the CVDF FSAR to address NRC equivalency requirements. This information is presented in detail in Table 5 of HNF-SD-SNF-SP-012.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-RD-007, 1997, *Spent Nuclear Fuel Project, Canister Storage Building and Hot Conditioning System Standards/Requirements Identification Report*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

B3.0 HAZARD AND ACCIDENT ANALYSES

Chapter 3.0 of the SNF Project FSAR will contain a description of the methodology, guidelines and acceptance criteria used to develop the specific analyses performed for each subproject or facility. In addition, the overall integrated safety basis for the sealing strategy concept, along with identification and summaries of supporting documentation, will be presented in Chapter 3.0. Chapter 3.0 information will be incorporated into Chapter B3.0 of the CVDF FSAR by reference to Chapter 3.0.

Chapter B3.0 will describe how the process described in the SNF Project FSAR was applied to systematically identify and assess hazards to evaluate the potential internal, external, and natural phenomena events that can cause the identified hazards to develop into accidents. This chapter will also present the results of this hazard identification and assessment process. Hazard analysis will: consider the complete spectrum of accidents that may occur as the result of facility operations; analyze potential accident consequences to the public and workers; estimate likelihood of occurrence; identify and assess associated preventive and mitigative features; identify safety-significant SSCs; and identify a selected subset of accidents, designated design basis accidents, that will be formally defined in the accident analysis. Subsequent accident analysis will evaluate these design basis accidents for comparison with Evaluation Guidelines to identify and assess the adequacy of safety-class SSCs.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)5, "Hazard Analysis and Classification of the Facility." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

References

References for this chapter will, as a minimum, 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-007, 1997, *Spent Nuclear Fuel Project, Canister Storage Building and Hot Conditioning System Standards/Requirements Identification Report*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

B4.0 SAFETY STRUCTURES, SYSTEMS, AND COMPONENTS

Chapter 4.0 of the SNF Project FSAR will contain a discussion of the criteria and selection methodology used to identify safety-class and safety-significant SSCs. Chapter 4.0 information will be incorporated into Chapter B4.0 of the CVDF FSAR by reference to Chapter 4.0. Chapter B4.0 will provide the details (safety functions, support systems, functional requirements, and performance criteria) for safety SSCs identified in Chapter B3.0.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)6, ""Principal Health and Safety Criteria." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CVDF FSAR 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, ventilation, and air-conditioning systems used to achieve onsite radiological limits or to implement ALARA (as low as reasonably achievable) principles.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-RD-007, 1997, *Spent Nuclear Fuel Project, Canister Storage Building and Hot Conditioning System Standards/Requirements Identification Report*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

B5.0 TECHNICAL SAFETY REQUIREMENTS

Chapter 5.0 of the SNF Project FSAR will contain a discussion of the technical safety requirement development criteria and guidelines, along with a discussion of interface control for technical safety requirements at each SNF Project subproject or facility. Chapter 5.0 information will be incorporated into Chapter B5.0 of the CVDF FSAR by reference to Chapter 5.0.

Chapter B5.0 will build upon the control functions determined to be essential in Chapter B3.0 and Chapter B4.0 to derive technical safety requirements. Derivation of technical safety requirements consists of summaries and references to pertinent sections of the CVDF FSAR in which design (i.e., SSCs) and administrative controls (i.e., non-SSCs) are needed to prevent or mitigate the consequences of accidents. Design and administrative features that will be addressed include ones that: (1) provide significant defense in depth in accordance with the screening criteria of DOE 5480.22; (2) provide for significant worker safety; or (3) maintain consequences of facility operations below Evaluation Guidelines.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)16, "Derivation of Technical Safety Requirements." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

There are no additional NRC requirements.

References

References for this chapter will, as a minimum, include the following:

DOE 5480.22, 1992, *Technical Safety Requirements*, U.S. Department of Energy, Richland, Washington.

B6.0 PREVENTION OF INADVERTENT CRITICALITY

Chapter 6.0 of the SNF Project FSAR will contain a discussion of criticality programs and analysis methodology. The criticality protection program will also be discussed. Chapter 6.0 information will be incorporated into Chapter B6.0 of the CVDF FSAR by reference to Chapter 6.0. CVDF-specific criticality analysis results and controls that will be in place to reduce the likelihood of inadvertent nuclear criticality excursions, along with any required instrumentation, will be discussed in Chapter B6.0.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)8, "Inadvertent Criticality Protection." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

- Additional information that will include a commitment to a criticality safety k_{eff} value of 0.95 will be added to address NRC equivalency requirements. This information is presented in detail in Table 5 of HNF-SD-SNF-SP-012.

References

References for this chapter will, as a minimum, include the following:

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

B7.0 RADIATION PROTECTION

Chapter 7.0 of the SNF Project FSAR will contain sufficient information to demonstrate compliance with the radiation protection requirements in 10 CFR 835, *Occupational Radiation Protection*. Chapter 7.0 will be incorporated into Chapter B7.0 of the CVDF FSAR by reference to Chapter 7.0. The provisions for radiation protection based on CVDF hazards will be summarized in Chapter B7.0 to provide a basic understanding of compliance with the radiation protection program.

U.S. Nuclear Regulatory Commission Requirements

Additional information that will be added to the CVDF FSAR 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 guidance of Regulatory Guide 8.8 have been implemented.
- Document that the provisions for radiological monitoring meet the requirements of 10 CFR 20 and 10 CFR 835.
- Discuss the provisions provided in the facility to limit radiological exposure by shielding.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-CN-026, 1997, *MCO Shield Plug Dose Rate Analysis*, Rev. 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*, Rev. 2, Fluor Daniel Hanford, Inc., Richland, Washington.

HSRCM-1, 1995, *Hanford Site Radiological Control Manual*, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

B8.0 HAZARDOUS MATERIAL PROTECTION

Chapter 8.0 of the SNF Project FSAR will contain sufficient information to demonstrate compliance with applicable requirements for control and monitoring of hazardous materials. The provisions for hazardous material protection other than those provided for radiological protection will be summarized. Chapter 8.0 information will be incorporated into Chapter B8.0 of the

CVDF FSAR by reference to Chapter 8.0. CVDF-specific discussions will include topic summaries that focus on hazardous material protection based on CVDF hazards to provide a basic understanding of compliance with the hazardous material protection program.

B9.0 RADIOACTIVE AND HAZARDOUS WASTE MANAGEMENT

Chapter 9.0 of the SNF Project FSAR will 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 will be summarized. Chapter 9.0 information will be incorporated into Chapter B9.0 of the CVDF FSAR by reference to Chapter 9.0. CVDF-specific discussions regarding waste sources, characteristics, and anticipated volumes and waste handling or treatment systems will be discussed in Chapter B9.0.

B10.0 INITIAL TESTING, IN-SERVICE SURVEILLANCE, AND MAINTENANCE

Chapter 10.0 of the SNF Project FSAR will contain sufficient information to delineate the plans and provisions for initial and in-service testing. With regard to maintenance, sufficient information will be provided to demonstrate a commitment to comply with the requirements of DOE Order 4330.4A. Chapter 10.0 information will be incorporated into Chapter B10.0 of the CVDF FSAR by reference to Chapter 10.0. Any CVDF-specific summaries regarding unique test, surveillance, and maintenance procedures will be discussed in Chapter B10.0.

B11.0 OPERATIONAL SAFETY

Chapter 11.0 of the SNF Project FSAR will describe the bases for the Conduct of Operations program required by DOE Order 5480.19. Chapter 11.0 information will be incorporated into Chapter B11.0 of the CVDF FSAR by reference to Chapter 11.0. Any CVDF-specific information regarding conduct of operations and fire protection programs will be discussed in Chapter A11.0.

U.S. Nuclear Regulatory Commission Requirements

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

- According to WHC-SD-SNF-DB-002, Table 5.b, Section 50.48, and Appendix R, the final design of new SNF Project Path Forward facilities should be reevaluated to reconfirm that DOE Orders 5480.7A and 6430.1A provide adequate fire protection requirements to achieve nuclear safety equivalence. An aspect of the design to be reconfirmed is the lack of active safety-class prevention or mitigation systems. Address the review and the additional requirements in the FSAR if it is determined that the requirements of DOE Orders 5480.7A and 6430.1A need to be augmented by the NRC requirements.

B12.0 PROCEDURES AND TRAINING

Chapter 12.0 of the SNF Project FSAR will describe the processes by which the technical content of procedures and training programs are developed, verified, and validated. A programmatic commitment to procedures and training programs is considered to be a necessary part of safety assurance. Chapter 12.0 information will be incorporated into Chapter B12.0 of the CVDF FSAR by reference to Chapter 12.0.

B13.0 HUMAN FACTORS

Chapter 13.0 of the SNF Project FSAR will focus on human factors engineering, its importance to facility safety, and the design of the facility to optimize human performance. This chapter will demonstrate that human factors are considered in facility operations where humans are relied upon for preventive actions and for operator mitigative actions during abnormal and emergency operations. Chapter 13.0 information will be incorporated into Chapter B13.0 of the CVDF FSAR by reference to Chapter 13.0. CVDF-specific discussions regarding identification and optimization of human-machine interfaces will be discussed in Chapter B13.0.

U.S. Nuclear Regulatory Commission Requirements

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

- According to WHC-SD-SNF-DB-003, the CVDF project was to 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. The review was to consider the differences in complexity between a power reactor control room and that of the CVDF. In the FSAR, discuss the results of the review and the extent to which the requirements of NUREG-0700 and Standard Review Plan 18.1 have been incorporated into the design of the CVDF.

B14.0 QUALITY ASSURANCE

Chapter 14.0 of the SNF Project FSAR will contain sufficient information to demonstrate appropriate commitment to a quality assurance program and will describe the essential features of the program that relate to facility safety. Chapter 14.0 information will be incorporated into Chapter B14.0 of the CVDF FSAR by reference to Chapter 13.0.

B15.0 EMERGENCY PREPAREDNESS

Chapter 15.0 of the SNF Project FSAR will contain sufficient information to demonstrate appropriate commitment to the emergency preparedness functions requirements of the DOE 5500-series directives. The philosophy, objectives, and organization of the emergency

preparedness functions will be described for a spectrum of emergencies. Chapter 15.0 information will be incorporated into Chapter B15.0 of the CVDF FSAR by reference to Chapter 15.0. Specific CVDF discussions regarding facility emergency plans will be discussed in Chapter B15.0.

B16.0 PROVISIONS FOR DECONTAMINATION AND DECOMMISSIONING (D&D)

Chapter 16.0 of the SNF Project FSAR will contain the description of the SNF Project program and policy regarding decontamination and decommissioning of the SNF Project subproject facilities. Chapter 16.0 information will be incorporated into Chapter B16.0 of the CVDF FSAR by reference to Chapter 16.0.

Confirmation that facility design has adequately incorporated decontamination consideration will be presented in Chapter B16.0. 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 decontamination and decommissioning lifecycle stage.

B17.0 MANAGEMENT, ORGANIZATION, AND INSTITUTIONAL SAFETY PROVISIONS

Chapter 17.0 of the SNF Project FSAR will present information on management, technical, and other organizations that support safe operation. This chapter will: (1) enumerate the requirements used to develop the safety management programs, (2) include descriptions of responsibilities and relationships between the nonoperating 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. Chapter 17.0 information will be incorporated into Chapter B17.0 of the CVDF FSAR by reference to Chapter 17.0. Specific CVDF commitment to SNF Project safety policy and any unique organizational structure or requirements will be addressed in Chapter B17.0.

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APPENDIX D

**FINAL SAFETY ANALYSIS REPORT
SAFETY ANALYSIS REPORT FORMAT AND CONTENT****VOLUME 4:
ANNEX C
K BASINS FINAL SAFETY ANALYSIS REPORT****INTRODUCTION**

This document provides criteria and planning guidance for developing Volume 4 of the Spent Nuclear Fuel (SNF) Final Safety Analysis Report (FSAR). Volume 4 will comprise Annex C of the SNF Project FSAR, the K Basins FSAR. The K Basins FSAR will include integration of the subproject safety analysis documents (fuel retrieval system, integrated water treatment system, and cask loadout system). The K Basins FSAR, in conjunction with the SNF Project FSAR, will support the U.S. Department of Energy (DOE), Richland Operations Office (RL) decision to authorize the procurement, construction, installation, installation-acceptance testing, and operation of the K Basins and their systems. This criteria document has been prepared based on the guidance provided in HNF-PRO-705, *Safety Basis Planning, Documentation, Review, and Approval*.

Annex C, the K Basins FSAR, will contain specific information relating to the K Basins facility design; hazard and accident analyses; identification of safety structures, systems and components (SSCs); identification of K Basins-specific technical safety requirements; and discussion of K Basins-specific programmatic implementation activities. Reference will be made to the appropriate chapters of the SNF Project FSAR for information that is applicable for all SNF Project facilities.

Development of the K Basin FSAR will be based on the following:

- Format, content and hazard and 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*
- Requirements of DOE Order 5480.23, *Nuclear Safety Analysis Reports*
- Direction in Attachment 1 of DOE Order 5480.23, "Interim Guidance for DOE Order 5480.23"
- Instructions in the Project Hanford procedures.

Pertinent details regarding format and content of the K Basins FSAR chapters are provided; however, DOE content and format requirements, guidance, and direction that have been identified in the SNF Project FSAR programmatic chapters (see Appendix A) have not been repeated. The additional NRC requirements for the K Basins have been included for applicable chapters.

EXECUTIVE SUMMARY

The Executive Summary will state the purpose of the K Basins FSAR, which is to provide the authorization basis for the procurement, construction, installation, installation-acceptance testing, and operation of the K Basins and their systems. The requested activities and scope of the K Basins FSAR will be clearly identified and will be based on the safety analysis conclusions. The K Basins design basis accident analysis results will be summarized.

Tables containing information related to the close-out of enabling assumptions associated with the development of the K Basins safety basis will be included in the Executive Summary along with references to specific chapters where the appropriate information is presented.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)1, "Executive Summary." The format of this section shall conform to the requirements of DOE-STD-3009-94.

References

References for this chapter will, as a minimum, include the following:

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

WHC-SD-WM-SAR-062, 1996, *K Basins Safety Analysis Report*, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

C1.0 SITE CHARACTERISTICS

Chapter 1.0 of the SNF Project FSAR will provide a description of site characteristics necessary for understanding the K Basins facility environs important to the safety basis. Chapter 1.0 information will be incorporated into Chapter C1.0 of the K Basins FSAR by reference to Chapter 1.0. K Basins-specific site information will be provided to support and clarify assumptions used in the K Basins hazard and accident analyses to identify and analyze potential external and natural phenomena accident initiators and accident consequences to the K Basins.

References

References for this chapter will, as a minimum, include the following:

WHC-SD-WM-SAR-062, 1996, *K Basins Safety Analysis Report*, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

C2.0 FACILITY DESCRIPTION

Chapter C2.0 will describe the K Basins 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 analyses. The information for individual structures and systems described in Chapter C2.0 is as follows:

- Summary description
 - Description of the structure and system configuration and key components of the existing K Basin systems and the subproject chapters (fuel retrieval system, integrated water treatment system, and cask loadout system)
 - Description of process functions performed by the system
 - Composite piping and instrumentation diagram and flow drawings (for key systems)
- Major system hazards and safety considerations.

This will be a brief summary only and will not duplicate the detailed hazard assessment and descriptions of Chapter C3.0 or C4.0.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)4, "Facility Description and Operation, Including Design of Principal Structures, Components, Systems, Engineered Safety Features, and Processes." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

References

References for this chapter will, as a minimum, include the following:

HNF-2032, 1998, *SNF Fuel Retrieval Subproject Safety Assessment Document*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-2456, 1998, *Cask Loadout System Safety Analysis Document*, Rev. 0, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-SD-SNF-SAD-002, 1998, *K West Basin Integrated Water Treatment System Subproject Safety Assessment Document*, Rev. 2, Fluor Daniel Hanford, Inc., Richland, Washington.

WHC-SD-WM-SAR-062, 1996, *K Basins Safety Analysis Report*; Rev. 3, Westinghouse Hanford Company, Richland, Washington.

C3.0 HAZARD AND ACCIDENT ANALYSES

Chapter 3.0 of the SNF Project FSAR will contain a description of the methodology, guidelines and acceptance criteria used to develop the specific analyses performed for each subproject or facility. In addition, the overall integrated safety basis for the sealing strategy concept, along with identification and summaries of supporting documentation, will be presented in Chapter 3.0. Chapter 3.0 information will be incorporated into Chapter C3.0 of the K Basins FSAR by reference to Chapter 3.0. Chapter C3.0 will describe how the process described in the SNF Project FSAR was applied to systematically identify and assess hazards to evaluate the potential internal, external, and natural phenomena events that can cause the identified hazards to develop into accidents. This chapter will also present the results of this hazard identification and assessment process. Hazard analysis will: consider the complete spectrum of accidents that may occur due to facility operations; analyze potential accident consequences to the public and workers; estimate likelihood of occurrence; identify and assess associated preventive and mitigative features; identify safety-significant SSCs; and identify a selected subset of accidents, designated design basis accidents, that will be formally defined in the accident analysis. Subsequent accident analysis will evaluate these design basis accidents for comparison with Evaluation Guidelines to identify and assess the adequacy of safety-class SSCs.

The existing hazard analysis tables of WHC-SD-WM-SAR-062, *K Basins Safety Analysis Report*, will be reviewed and revised to delete hazards no longer present (e.g., chlorine). Hazard and accident analyses from the safety analysis documents (fuel retrieval system, integrated water treatment system, cask loadout system) will be integrated into the K Basins FSAR.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)5, "Hazard Analysis and Classification of the Facility." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

References

References for this chapter will, as a minimum, 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, 1998, *SNF K Basins and Cold Vacuum Drying Standard Requirements Identification Document*, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington.

C4.0 SAFETY STRUCTURES, SYSTEMS, AND COMPONENTS

Chapter 4.0 of the SNF Project FSAR will contain a discussion of the criteria and selection methodology used to identify safety-class and safety-significant SSCs. Chapter 4.0 information will be incorporated into Chapter C4.0 of the K Basins FSAR by reference to Chapter 4.0. Chapter C4.0 will provide the details (safety functions, support systems, functional requirements, and performance criteria) for safety SSCs identified in Chapter C3.0.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)6, "Principal Health and Safety Criteria." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

References

References for this chapter will, as a minimum, include the following:

WHC-SD-WM-SAR-062, 1996, *K Basins Safety Analysis Report*, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

C5.0 TECHNICAL SAFETY REQUIREMENTS

Chapter 5.0 of the SNF Project FSAR will contain a discussion of the technical safety requirement development criteria and guidelines, along with a discussion of interface control for technical safety requirements at each SNF Project subproject or facility. Chapter 5.0 information will be incorporated into Chapter C5.0 of the K Basins FSAR by reference to Chapter 5.0.

Chapter C5.0 will build upon the control functions determined to be essential in Chapter C3.0 and Chapter C4.0 to derive technical safety requirements. Derivation of technical safety requirements consists of summaries and references to pertinent sections of the K Basins FSAR in which design (i.e., SSCs) and administrative controls (i.e., non-SSCs) are needed to prevent or mitigate the consequences of accidents. Design and administrative features that will be addressed include ones that: (1) provide significant defense in depth in accordance with the screening criteria of DOE 5480.22; (2) provide for significant worker safety; or (3) maintain consequences of facility operations below Evaluation Guidelines.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)16, "Derivation of Technical Safety Requirements." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

References

References for this chapter will, as a minimum, include the following:

DOE 5480.22, 1992, *Technical Safety Requirements*, U.S. Department of Energy, Richland, Washington.

C6.0 PREVENTION OF INADVERTENT CRITICALITY

Chapter 6.0 of the SNF Project FSAR will contain a discussion of criticality programs and analysis methodology. The criticality protection program will also be discussed. Chapter 6.0 information will be incorporated into Chapter C6.0 of the K Basins FSAR by reference to Chapter 6.0. K Basins-specific criticality analysis results and controls that will be used to reduce the likelihood of inadvertent nuclear criticality excursions along with any required instrumentation, if any, will be discussed in Chapter C6.0.

U.S. Department of Energy Requirements

The content shall address the topics described in DOE Order 5480.23, Attachment 1, paragraph 4.f.(3)8, "Inadvertent Criticality Prevention." The format of this chapter shall conform to the guidelines of DOE-STD-3009-94.

U.S. Nuclear Regulatory Commission Requirements

Additional information to include a description regarding the application of a criticality safety k_{eff} value of 0.95 for the cask loading system in accordance with NRC equivalency requirements. This information is presented in detail in HNF-SD-SNF-SP-012.

References

References for this chapter will, as a minimum, include the following:

Current K Basins criticality safety evaluation reports

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

C7.0 RADIATION PROTECTION

Chapter 7.0 of the SNF Project FSAR will contain sufficient information to demonstrate compliance with the radiation protection requirements of DOE Order 5480.11, *Radiation Protection for Occupational Workers*. Chapter 7.0 information will be incorporated into Chapter C7.0 of the K Basins FSAR by reference to Chapter 7.0. The provisions for radiation protection based on K Basins hazards will be summarized in Chapter C7.0 to provide a basic understanding of compliance with the radiation protection program.

References

References for this chapter will, as a minimum, include the following:

HNF-SD-SNF-CN-026, 1997, *MCO Shield Plug Dose Rate Analysis*, Rev. 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*, Rev. 2, Fluor Daniel Hanford, Inc., Richland, Washington.

HSRCM-1, 1995, *Hanford Site Radiological Control Manual*, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

C8.0 HAZARDOUS MATERIAL PROTECTION

Chapter 8.0 of the SNF Project FSAR will 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 will be summarized. Chapter 8.0 information will be incorporated into Chapter C8.0 of the K Basins FSAR by reference to Chapter 8.0. K Basins-specific discussions will include topic summaries that focus on hazardous material protection based on K Basins hazards to provide a basic understanding of compliance with the hazardous material protection program.

C9.0 RADIOACTIVE AND HAZARDOUS WASTE MANAGEMENT

Chapter 9.0 of the SNF Project FSAR will 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 will be summarized. Chapter 9.0 information will be incorporated into Chapter C9.0 of the K Basins FSAR by reference to Chapter 9.0. K Basins-specific discussions regarding waste sources, characteristics, and anticipated volumes and waste handling or treatment systems will be discussed in Chapter C9.0.

C10.0 INITIAL TESTING, IN-SERVICE SURVEILLANCE, AND MAINTENANCE

Chapter 10.0 of the SNF Project FSAR will contain sufficient information to delineate the plans and provisions for initial and in-service testing. With regard to maintenance, sufficient information will be provided to demonstrate a commitment to comply with the requirements of DOE Order 4330.4A. Chapter 10.0 information will be incorporated into Chapter C10.0 of the K Basins FSAR by reference to Chapter 10.0. Any K Basins-specific information regarding unique test, surveillance, and maintenance procedures will be discussed in Chapter C10.0.

C11.0 OPERATIONAL SAFETY

Chapter 11.0 of the SNF Project FSAR will describe the bases for the Conduct of Operations program required by DOE Order 5480.19. Chapter 11.0 information will be incorporated into Chapter C11.0 of the K Basins FSAR by reference to Chapter 11.0. Any K Basins-specific information regarding conduct of operations and fire protection programs will be discussed in Chapter C11.0.

C12.0 PROCEDURES AND TRAINING

Chapter 12.0 of the SNF Project FSAR will describe the processes by which the technical content of procedures and training programs are developed, verified, and validated. A programmatic commitment to procedures and training programs is considered to be a necessary part of safety assurance. Chapter 12.0 information will be incorporated into Chapter C12.0 of the K Basins FSAR by reference to Chapter 12.0.

C13.0 HUMAN FACTORS

Chapter 13.0 of the SNF Project FSAR will focus on human factors engineering, its importance to facility safety, and the design of the facility to optimize human performance. This chapter will demonstrate that human factors are considered in facility operations where humans are relied upon for preventive actions and for operator mitigative actions during abnormal and emergency operations. Chapter 13.0 information will be incorporated into Chapter C13.0 of the K Basins FSAR by reference to Chapter 13.0. K Basins-specific discussions regarding identification and optimization of human-machine interfaces will be discussed in Chapter C13.0.

C14.0 QUALITY ASSURANCE

Chapter 14.0 of the SNF Project FSAR will contain sufficient information to demonstrate appropriate commitment to a quality assurance program and will describe the essential features of the program that relate to facility safety. Chapter 14.0 information will be incorporated into Chapter C14.0 of the K Basins FSAR by reference to Chapter 14.0.

C15.0 EMERGENCY PREPAREDNESS

Chapter 15.0 of the SNF Project FSAR will contain sufficient information to demonstrate appropriate commitment to the emergency preparedness functions requirements of the DOE 5500-series directives. The philosophy, objectives, and organization of the emergency preparedness functions will be described for a spectrum of emergencies. Chapter 15.0 information will be incorporated into Chapter C15.0 of the K Basins FSAR by reference to Chapter 15.0. Specific K Basins discussions regarding facility emergency plans will be discussed in Chapter C15.0.

C16.0 PROVISIONS FOR DECONTAMINATION AND DECOMMISSIONING (D&D)

Chapter C16.0 of the K Basins FSAR will contain the description of the SNF Project program and policy regarding decontamination and decommissioning of the SNF Project subproject facilities. SNF Project FSAR Chapter 16.0 information will be incorporated into Chapter C16.0 by reference to Chapter 16.0.

Confirmation that facility or subproject design has adequately incorporated decontamination consideration will be presented in Chapter C16.0. 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 decontamination and decommissioning lifecycle stage.

C17.0 MANAGEMENT, ORGANIZATION, AND INSTITUTIONAL SAFETY PROVISIONS

Chapter 17.0 of the SNF Project FSAR will present information on management, technical, and other organizations that support safe operation. This chapter will: (1) enumerate the requirements used to develop the safety management programs, (2) include descriptions of responsibilities and relationships between the nonoperating 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. Chapter 17.0 information will be incorporated into Chapter C17.0 of the K Basins FSAR by reference to Chapter 17.0. Specific K Basins commitment to SNF Project safety policy and any unique organizational structure or requirements will be addressed in Chapter C17.0.

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