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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

BUILDING 707/707A DECOMMISSIONING BASIS FOR INTERIM OPERATION (DBIO)

REVISION 4

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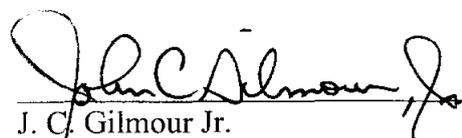
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

BUILDING 707 FACILITY COMPLEX DECOMMISSIONING BASIS FOR INTERIM OPERATION (DBIO)

REVISION 4

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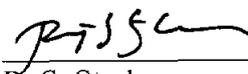
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**BUILDING 707/707A
DECOMMISSIONING
BASIS FOR INTERIM OPERATION
(DBIO)**

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This *Building 707/707A Decommissioning Basis For Interim Operations* (DBIO) documents the Authorization Basis (AB) for Building 707/707A at the Rocky Flats Environmental Technology Site (Site). The principal Department of Energy (DOE) Orders used as guidance in the development of this DBIO include 5480.23 (*Nuclear Safety Analysis Reports (SARs)*) and 5480.22 (*Technical Safety Requirements (TSRs)*). The principal guidance documents used in the development of this DBIO include the following DOE Standards: DOE-STD-1027-92 (*Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear SARs*), DOE-STD-3009-94 (*Preparation Guide for U.S. DOE Nonreactor Nuclear Facility SARs*), DOE-STD-3011-94 [*Guidance for Preparation of DOE 5480.22 (TSR) and DOE 5480.23 (SAR) Implementation Plans*]; and the RFETS *Safety Analysis and Risk Assessment Handbook (SARAH)*.

Consistent with the scope of the Site closure mission, disposition of Building 707/707A requires final recovery and processing (if necessary) of radioactive and chemical waste, deactivation and removal of facility systems, decontamination of rooms and equipment (as necessary to ensure worker safety and to support waste disposal), and decommissioning and demolition of the facility and its supporting structures. To achieve this goal, the future Building 707/707A Complex mission includes the following:

- those activities necessary to maintain the facility in a safe and habitable condition and to comply with government regulations,
- those activities necessary for system isolation and equipment removal, decontamination, waste disposal (e.g., size reduction, neutralization, packaging, shipping), decommissioning and demolition.

While safety is the responsibility of all employees at the Site, Building 707/707A implements integrated safety management through the systematic integration of safety considerations into management and work practices, at all levels of performance. Building 707/707A Complex Management is specifically committed to the 16 SMPs summarized in Chapter 3 of this DBIO, and detailed in the Site SAR. Management's commitment to safety is evidenced in the following key elements of the SMPs: line management responsibility for safety, clear assignment of roles and responsibilities, competence commensurate with responsibilities, balanced priorities, identification of safety standards and requirements, and hazard controls tailored to the work activity being performed. Currently there are no exemptions, to any of the SMPs, specific to the Building 707/707A Complex. Site-wide approved and outstanding open exemptions are discussed in the Site SAR.

Building 707/707A is a nonreactor nuclear facility, per DOE Order 5480.23, *Nuclear Safety Analysis Reports*. Based on the results of *Building 707/707A Preliminary Hazards Analysis* (PHA), and the guidance provided in DOE-STD-1027-92 (*Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear SARs*), Building 707/707A is categorized as a Hazard Category 2 Nonreactor Nuclear Facility. The basis for this categorization is presented in Chapter 5 of this DBIO.

For this DBIO, the Building 707/707A decommissioning activities were evaluated and encompass the following subcategories of activities as described in Chapter 4:

- Administrative Operations
- General Facility Operations
- Hazardous Material Handling
- Radioactive Waste Generation and Handling
- Decommissioning – Decontaminate, Dismantle, and Demolish

The starting point for the hazards and accident analyses documented in this DBIO was the Building 707/707A PHA. The PHA identified the chemical and radiological hazards within the facility and the potential for the occurrence of any of the seven major accident types (i.e., loss of confinement/containment (spill), fire, explosion, direct radiological exposure, inadvertent nuclear criticality, natural phenomena, and external events (EEs)). As documented in the PHA, updated scenarios were evaluated—without consideration for prevention or mitigation. Eight of the evaluated scenarios were identified as risk-dominant scenarios and were carried forward into the accident analysis.

These scenarios, in conjunction with a cursory review of all PHA scenarios bounded by the risk-dominant scenarios, were evaluated to determine the most effective preventive and mitigative controls to reduce the risk for each scenario (including those scenarios bounded by it). Controls were individually evaluated with respect to Public and the Worker risk to optimize control set selection and identify where additional defense-in-depth controls were appropriate. Where controls could be identified and credited for the prevention and/or mitigation of the estimated risk, such controls were incorporated into the control set and documented in the *TSRs* supporting this DBIO (included as Appendix A). Using the DOE guidelines from DOE-STD-3011-94 (*Guidance for Preparation of DOE 5480.22 (TSR) and DOE 5480.23 (SAR) Implementation Plans*), the resultant prevented/mitigated risk associated with each scenario was further evaluated to determine whether sufficient controls were in place to ensure an acceptable margin of safety.

The starting point for the accident analyses documented in Chapter 6 of this DBIO were the eight risk-dominant accident scenarios carried forward from the PHA. These eight scenarios were subdivided into the appropriate accident category and consolidated (as appropriate, based on type of accident, bounding risk in the subject accident type, material at risk (MAR), and accident progression), for further evaluation in the accident analyses, as documented in Chapter 5 of this DBIO. This division and consolidation resulted in four *FIRE* scenarios, one *EXPLOSION* scenario, one *SPILL* scenario, one *CRITICALITY* scenario, and one *NATURAL PHENOMENA HAZARD/EE* scenario. For all accidents evaluated (except those delineated below) preventive, mitigative, and/or defense-in-depth controls were identified for reducing risk to the Public and the Worker to achieve Risk Class *III*.

For each accident scenario, after the controls were applied, further evaluation was performed to ensure acceptable and effective risk management was achieved with the addition of the selected controls. These subsequent evaluations ascertained the availability of a combination of preventive/mitigative controls for all of the analyzed scenarios with the exception of: *CRITICALITY – OIL MODERATED METAL (707-D&D-13)*; *NATURAL PHENOMENA HAZARD (NPH) – EARTHQUAKE (707-6-54)* (Subsection 6.2.5.1) including a coincident fire or criticality, or an Aircraft Crash *EE – AIRCRAFT CRASH (707-6-51)*. Although the resultant *CLASS I* risk to the

Immediate Worker involved in a criticality accident and/or, the *CLASS II* risk for the Public and the *CLASS I* risk for the Worker from the earthquake is outside the DOE evaluation guidelines, there are no preventive or mitigative controls which can be credited to reduce the risk of these accident scenarios.

The only practical way to minimize the risk of these accidents is to remove the material-at-risk from the facility and dismantle the facility. Since this is the current mission of the facility, the risk of these scenarios should be accepted, and decommissioning and demolition of Building 707/707A should proceed.

**BUILDING 707/707A
DECOMMISSIONING
BASIS FOR INTERIM OPERATION
(DBIO)**

**CHAPTER 1
INTRODUCTION**

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1. INTRODUCTION

This *Building 707/707A Decommissioning Basis For Interim Operations (DBIO)* documents the Authorization Basis for Building 707/707A at the Rocky Flats Environmental Technology Site. Building 707/707A is a nonreactor nuclear facility [per DOE Order 5480.23 *Nuclear SARs* (Ref. 1-1)]. The principal DOE Orders used as guidance in the development of this DBIO includes 5480.23 - *Nuclear SARs* and 5480.22 - *TSRs* (Ref. 1-2). The principal guidance documents used in the development of this DBIO include the following DOE Standards: DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear SARs* (Ref. 1-3); DOE-STD-3009-94, *Preparation Guide for U.S. DOE Nonreactor Nuclear Facility SARs* (Ref. 1-4); DOE-STD-3011-94, *Guidance for Preparation of DOE 5480.22 (TSR) and DOE 5480.23 (SAR) Implementation Plans* (Ref. 1-5); the *Site SAR* (Site SAR, Ref. 1-6); and the *Site SARAH*, (Ref. 1-7).

The hazards that are present in Building 707/707A during the remaining building activities are documented in the *Building 707 Preliminary Hazard Analysis* (707 PHA, Ref. 1-8).

1.1 FACILITY HAZARD CLASSIFICATION

Building 707/707A is classified as a Hazard Category 2 Nonreactor Nuclear Facility in accordance with the inventory thresholds defined in DOE-STD-1027-92 (Ref. 1-3).

The hazards that will be present in Building 707/707A during the remaining decommissioning activities are documented in *Building 707/707A Preliminary Hazard Analysis (PHA)*. A review of the Revision 2 PHA to develop Revision 3 identified no significant changes in the types of hazards present. The building was built in the early 1970s and was formerly used for the processing, fabrication, and machining of plutonium components for nuclear weapons. Plutonium is the primary hazard of concern to be managed by the AB.

1.2 PURPOSE

This update to the AB incorporates the Closure activities that Building 707/707A plans to initiate in support of Site 2006 Closure Plans in a manner consistent with DOE's requirements and

expectations for safe and efficient operations. This DBIO provides the hazards and accident analyses associated with safely performing the decommissioning activities.

The hazards and accident analyses provide the technical bases from which the appropriate set of controls have been selected, assuring that operations can be conducted within DOE guidelines for safe operations. This DBIO also provides the baseline Authorization Basis by which future activities within Building 707/707A can be evaluated using the Unreviewed Safety Question (USQ) process as defined in DOE Order 5480.21 (Ref. 1-9) and implemented through approved Site procedures.

1.3 SCOPE

R4-02 | This DBIO encompasses all the Structures, Systems, and Components (SSCs) that comprise Building 707/707A Complex, which include the following: Buildings 707, 707A, and outside facilities (708, 711, 711A, 718, 731, 732, and 778) and components. Within the DBIO are descriptions of general elements necessary to accomplish the activities described in Chapter 4.

For the encompassed SSCs and activities, this DBIO documents the facility design, operational safety envelope, and control sets, which, through supporting safety analyses and evaluations, ensure the safety and protection of the Public, Worker, and the environment¹ during the conduct of the DBIO activities.

R4-02 | Justification for Continued Operations (JCOs) and positive USQs approved prior to September 10, 2002 have been incorporated into this DBIO.

1.4 ORGANIZATION AND CONTENT OF THE BUILDING 707/707A DBIO

This DBIO has been prepared with an Executive Summary, seven chapters, and one appendix. The organization and content of this DBIO are consistent with the format and content guidance

¹ *The safety analyses documented in this DBIO did not evaluate protection of the environment separate from worker and public safety since, typically, those controls necessary to protect the environment are commensurate with those identified for the safety and protection of the Workers and the Public.*

presented in DOE-STD-3011-94, *Guidance for Preparation of DOE 5480.22 (TSR) and DOE 5480.23 (SAR) Implementation Plans* (Ref. 1-5); DOE-STD-3009-94, *Preparation Guide for U.S. DOE Nonreactor Nuclear Facility SARs* (Ref. 1-4); DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear SARs* (Ref. 1-3); and DOE Order 5480.23 - *Nuclear SAR* (Ref. 1-1). The organization and content of the Building 707/707A DBIO is illustrated in Figure 1-1.

At the beginning of each chapter, a table of contents is provided as a point of reference. A list of references specific to the particular content follows each chapter. The content of each of the DBIO elements is summarized in the remainder of this subsection.

1.4.1 Executive Summary

This initial section of the Building 707/707A DBIO summarizes the significant conclusions from the analyses documented in the DBIO. The summary includes an overview of the facility safety basis supplemented by enough information to establish a top-level understanding of the facility and its operations (e.g., background and mission, location and boundaries, hazard category, and safety management). The significance of the conclusions from the analyses result in recommendations for the acceptability of the safety basis.

1.4.2 Chapter 1: Introduction

Chapter 1 provides an overview of the DBIO, as well as a summary description of the content for each of the DBIO chapters.

1.4.3 Chapter 2: Facility Description

An overview of the physical features and boundaries of Building 707/707A is presented in Chapter 2. Characteristics such as design basis, natural phenomena, major SSCs, other systems important to safety, and nearby facilities that are necessary for understanding the attributes important to the safety basis are discussed. The operational history of the facility is also summarized in terms of significant occurrences, USQDs, accidents, and changes that were significant contributors and considerations during the DBIO analyses.

1.4.4 Chapter 3: Safety Management Programs (SMPs)

Safety Management Programs that support the safe conduct of the facility activities are identified and summarized in Chapter 3. The top-level summary descriptions provide sufficient detail to establish the significance of the role of each program's key functional elements and attributes to the analysis of the hazards associated with DBIO activities. Detailed discussions of each SMP are contained in the Site SAR, to which the reader is directed for additional information not presented in this DBIO.

1.4.5 Chapter 4: Facility Activities

In Chapter 4, those Building 707/707A activities encompassed by the DBIO analyses are identified and described with correlation to the decommissioning activities. The descriptions are written with the appropriate level of detail required to understand the scope of the activities, associated hazards analyses, and postulated accidents as presented in Chapters 5 and 6.

1.4.6 Chapter 5: Hazard Identification and Analysis

The methodology used to identify hazards in the *Preliminary Hazards Analysis* (PHA) (Ref. 1-8) is summarized in Chapter 5. The hazards evaluation process is described and illustrates how the results of the analysis are carried forward into the Accident Analysis in Chapter 6. Hazard identification is presented in tabular format.

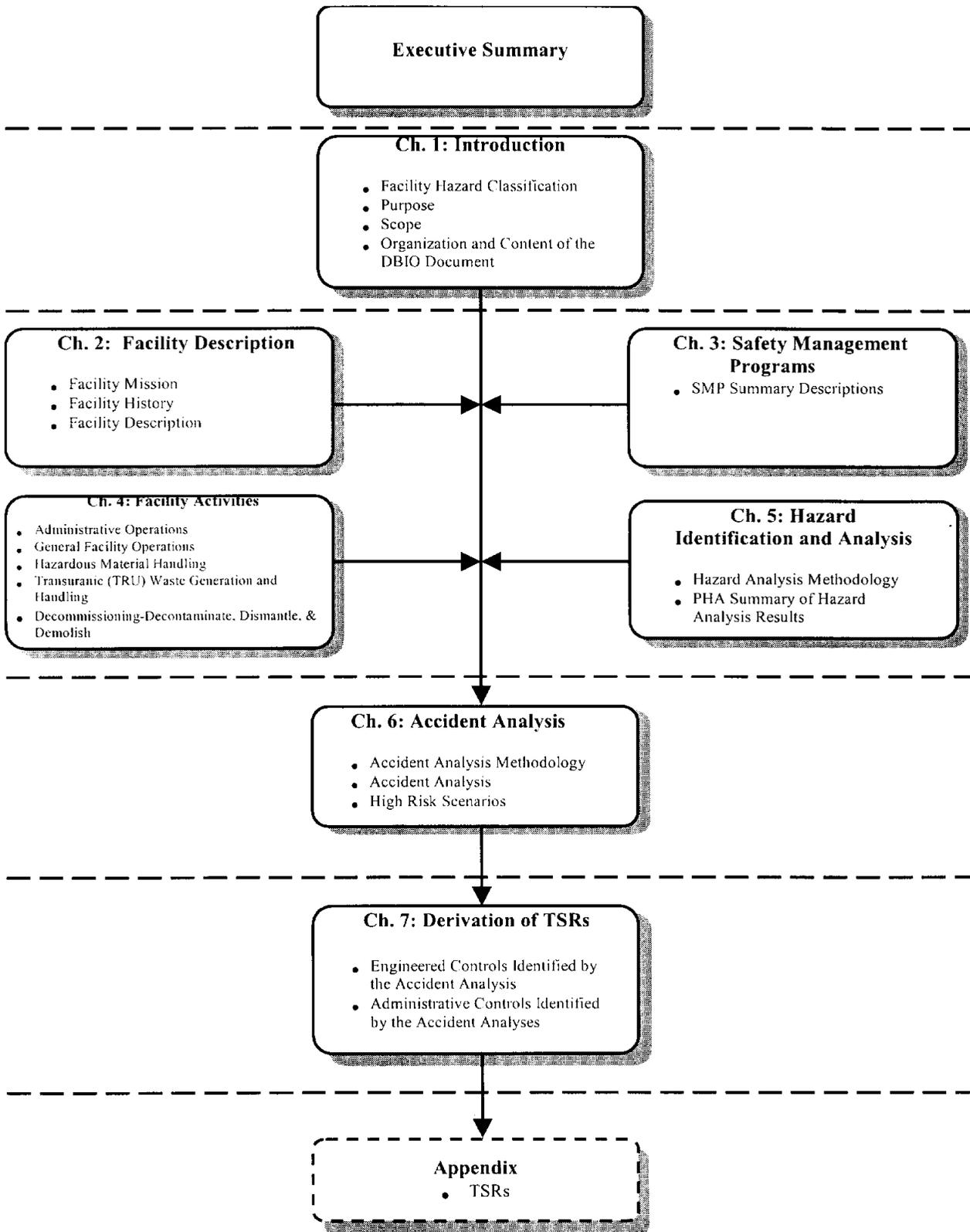


FIGURE 1-1. ORGANIZATION AND CONTENT OF THE BUILDING 707/707A DBIO

1.4.7 Chapter 6: Accident Analysis

The analyses that identified and assessed the hazards and postulated accidents associated with the facility activities described in Chapters 4 and 5 are documented in Chapter 6. This chapter discusses the methodology used for analyzing the activities. It summarizes the results of the completed accident analyses in terms of the accident types evaluated, selection of a set of risk-dominant accident scenarios within the accident types, and associated control sets to prevent/mitigate the accidents. The accident analysis encompasses not only facility activities but also natural phenomena hazards and external events.

1.4.8 Chapter 7: Derivation of Technical Safety Requirements (TSRs)

Technical Safety Requirements (TSRs) define acceptable conditions, safe boundaries, and management or administrative controls. Chapter 7 derives the TSRs [i.e., Limiting Conditions for Operations (LCOs), Administrative Controls (ACs), and passive Design Features] that are credited for maintaining the safety envelope for the Building 707/707A Complex. The discussion directly addresses the development of the TSRs, as derived from the hazards and accident analyses, in support of the TSRs specifically identified and described in Appendix A. Also in this chapter is a discussion of the identification and development of those defense-in-depth features recognized in the hazards and accident analyses for providing an additional layer of protection for the Public and the Worker, thereby further reducing the estimated risk of the selected accident scenarios.

1.4.9 Appendix A: Technical Safety Requirements

Appendix A contains the TSRs, their Bases, and compliance methodology. Compliance with the TSRs is facilitated with lists of terms, definitions, logical connectors, completion times, and frequency notations that provide a comprehensive understanding of the terminology and methodology used. The TSR Bases provide clarification and background of the need for the TSRs.

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