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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
SYSTEM DESCRIPTION DOCUMENT VOLUME I COVER SHEET

1. QA: QA

2. SDD Title
Waste Handling Building System Description Document

3. Document Identifier (Including Rev. No. and Change No., if applicable)
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	Printed Name	Signature	Date
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7. Remarks:

The following TBDs and TBVs are used in this document:

TBD-190, TBD-241, TBD-347, TBD-348, TBD-395, TBD-405, TBD-406, TBD-409, TBD-3963

TBV-430, TBV-3706, TBV-3855

Revision 00 of this System Description Document consists of Volume I, only. This document supersedes BCB000000-01717-1705-00030, REV 00. Volume II will be presented in a future revision.

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
SYSTEM DESCRIPTION DOCUMENT REVISION HISTORY

1. SDD Title
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3. Revision	4. Description of Revision
00	Initial Issue This document was previously issued using document identifier BCB000000-01717-1705-00030. The document supersedes the previous issuance. This document is a complete rewrite of the superseded document, driven largely by the use of an alternate source of regulatory requirements, the implementation of the License Application Design Selection effort, and the use of a new document development procedure.

DISCLAIMER

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SUMMARY

The Waste Handling Building System provides the space, layout, structures, and embedded subsystems that support waste handling operations. The Waste Handling Building (WHB) is located on the surface within the protected area of the Monitored Geologic Repository (MGR) site. The Waste Handling Building System provides space and layout to support waste handling operations, storage for aging and blending of spent fuel assemblies, staging of waste packages, and storage of empty disposal containers. The Waste Handling Building System also helps maintain a suitable environment for personnel and equipment that supports the waste handling operations; protects the systems within the WHB from natural and induced environments; confines contaminants; provides radiological protection to personnel; and provides space and layout for industrial and radiological safety systems, operations control and monitoring, safeguards and security systems, fire protection systems, ventilation systems, and utilities systems. The WHB also provides the required space and layout for maintenance, tool storage, and administrative and support facilities.

The Waste Handling Building System integrates waste handling systems within its protective structure to support the throughput rates established for waste emplacement. The system also provides shielding, layout, and other design features to limit personnel radiation exposure to levels that are as low as reasonably achievable (ALARA).

The Waste Handling Building System requires interface with MGR systems that perform or support waste handling operations. This system interfaces with the following systems:

- Carrier/Cask Transport System
- Waste Emplacement/Retrieval System
- Site Communications System
- Site Water System
- Emergency Response System
- MGR Site Layout System
- Health Safety System
- Monitored Geologic Repository Operations Monitoring and Control System
- Safeguards and Security System
- Site Generated Radiological Waste Handling System
- Site Generated Hazardous, Nonhazardous, and Sanitary Waste Disposal System
- Pool Water Treatment and Cooling System
- Canister Transfer System
- Assembly Transfer System
- Disposal Container Handling System
- Waste Package Remediation System
- Waste Handling Building Ventilation System
- Waste Handling Building Radiological Monitoring System
- Waste Handling Building Electrical System
- Waste Handling Building Fire Protection System
- Carrier/Cask Handling System

QUALITY ASSURANCE

The quality assurance (QA) program applies to the development of this document. The "SDD Development/Maintenance (Q SDDs) (WP# 16012126M5)" activity evaluation has determined the development of this document to be subject to "Quality Assurance Requirements and Description" requirements. This document was developed in accordance with AP-3.11Q, "Technical Reports."

1. FUNCTIONS AND DESIGN CRITERIA

The functions and design criteria for the system are identified in the following sections. Throughout this document the term "building" or "system" shall be used to indicate the Waste Handling Building System. The system architecture and classification are provided in Appendix B.

1.1 SYSTEM FUNCTIONS

1.1.1 The system provides the required space, layout, and structures to support and optimize the waste handling operations for expected waste throughputs.

1.1.2 The system protects the WHB structures, systems, and components (SSCs) from the external environments.

1.1.3 The system helps maintain worker and public radiation doses ALARA.

1.1.4 The system helps limit the spread of contamination within the facility.

1.1.5 The system provides safe work areas with a suitable environment for personnel and equipment to support operations, maintenance, and other activities.

1.1.6 The system provides the required space and layout in support of emergency plans.

1.1.7 The system provides the required space and layout in support of access control requirements.

1.1.8 The system provides the required space and layout for equipment storage.

1.1.9 The system limits the probability and consequences of off-normal conditions and design basis events.

1.1.10 The system provides features that facilitate decontamination and decommissioning at repository closure.

1.1.11 The system provides space and layout to support inspection, testing, calibration, and maintenance activities.

1.1.12 The system provides chilled water, hot water, potable water, industrial air, and instrument air as required to support waste handling operations.

1.1.13 The system interfaces with the MGR systems as required to support all waste handling and related operations.

1.1.14 The system facilitates decommissioning of the WHB.

1.2 SYSTEM DESIGN CRITERIA

This section presents the design criteria for the system. Each criterion in this section has a corresponding Criterion Basis Statement in Appendix A of Volume I that describes the need for the criterion as well as a basis for the performance parameters imposed by the criterion. Each criterion in this section also contains bracketed traces indicating traceability, as applicable, to the functions (F) in Section 1.1, the "Monitored Geologic Repository Requirements Document" (MGR RD) (as modified by input transmittal "Preliminary Draft Requirements from the Monitored Geologic Repository Requirements Document" [TBV-3855]), and "Revised Interim Guidance Pending Issuance of New U.S. Nuclear Regulatory Commission (NRC) Regulations (Revision 01, July 22, 1999), for Yucca Mountain, Nevada." In anticipation of the interim guidance being promulgated as a Code of Federal Regulations, it will be referred to as "10 CFR 63" in this system description document. For the applicable version of the codes, standards, and regulatory documents imposed on the design of this system, refer to Appendix E.

1.2.1 System Performance Criteria

1.2.1.1 The system shall provide space, layout, and structures as required to support and optimize dry handling of high-level radioactive waste in the WHB for expected waste throughputs.

[F 1.1.1][MGR RD 3.2.C, 3.2.E]

1.2.1.2 The system shall provide space, layout, and structures as required to support and optimize wet handling of high-level radioactive waste (i.e., pool structure and systems) in the WHB for expected waste throughputs.

[F 1.1.1][MGR RD 3.2.C, 3.2.E]

1.2.1.3 The system shall provide space, layout, and structures as required for staging, laydown, and storage of equipment and tools within specific areas of the WHB.

[F 1.1.1, 1.1.8][MGR RD 3.2.C]

1.2.1.4 The system shall provide space and layout as required to support maintenance activities of the systems that support waste handling operations.

[F 1.1.1, 1.1.11][MGR RD 3.1.G, 3.2.C]

1.2.1.5 The system shall provide space, layout, and structures as required for preparation and staging of canisters, waste packages, and empty disposal containers in the WHB.

[F 1.1.1][MGR RD 3.1.G, 3.2.C]

1.2.1.6 The system shall provide space, layout, and administrative support facilities for personnel performing operations, maintenance, and other activities in the WHB.

[F 1.1.1, 1.1.5, 1.1.6, 1.1.7][MGR RD 3.1.G, 3.2.C]

1.2.1.7 The system shall be designed to facilitate collection and transfer of solid and liquid low-level waste (with no mixing with non-contaminated systems) for processing in the Waste Treatment Building.

[F 1.1.1, 1.1.4, 1.1.13][MGR RD 3.1.G, 3.2.C, 3.3.E]

1.2.1.8 The system shall provide space, layout, and structures as required for installation of systems that support the waste handling operations (e.g., Waste Handling Building Ventilation System, Waste Handling Building Electrical System).

[F 1.1.13][MGR RD 3.2.C]

1.2.1.9 The system shall provide utilities (e.g., chilled water, hot water, potable water, industrial and instrument air) as required for personnel and equipment that support waste handling operations and maintenance activities.

[F 1.1.12][MGR RD 3.2.C]

1.2.1.10 The system design shall include provisions for decommissioning and decontamination, including the removal of potentially contaminated SSCs in accordance with the Decommissioning Plan (TBD-3963).

[F 1.1.10, 1.1.14][MGR RD 3.1.C, 3.1.G, 3.3.A][10 CFR 63.21(c)(17)]

1.2.1.11 The system shall have an operational life of 40 years.

[F 1.1.1][MGR RD 3.2.C]

1.2.2 Safety Criteria

1.2.2.1 Nuclear Safety Criteria

1.2.2.1.1 The building SSCs important to safety shall be designed to withstand a design basis earthquake of Frequency Category 1 or Frequency Category 2, as appropriate to the seismic frequency classification assigned to a specific structure, system, and component (TBD-190, TBD-241).

[F 1.1.9][MGR RD 3.1.C, 3.1.G][10 CFR 63.111(a)(2), 63.111(b)(2), 63.112(e)(8)]

1.2.2.1.2 The building SSCs important to safety shall be designed to withstand dynamic effects from internal (TBD-347) and external missile impacts (TBD-348).

[F 1.1.9][MGR RD 3.1.C, 3.1.G][10 CFR 63.111(a)(2), 63.111(b)(2), 63.112(e)(8)]

1.2.2.1.3 The system shall be designed to protect the SSCs that are important to confinement against the adverse effects of operation of the fire protection system.

[F 1.1.9][MGR RD 3.1.G]

1.2.2.1.4 The system shall provide suitable barriers to impede the spread of fires to systems and equipment that are important to confinement.

[F 1.1.9][MGR RD 3.1.G]

1.2.2.1.5 The system shall be designed such that during and after design basis events and off-normal environmental conditions, operation of SSCs important to safety is not affected by failure of other SSCs.

[F 1.1.9][MGR RD 3.1.C, 3.1.G][10 CFR 63.111(a)(2), 63.111(b)(2), 63.112(e)(8)]

1.2.2.1.6 The building shall be designed to maintain control of radioactive waste and radioactive effluents.

[F 1.1.4][MGR RD 3.1.C, 3.1.G][10 CFR 63.112(e)(10)]

1.2.2.1.7 The system design shall limit the spread of radioactive contamination by creating confinement zones in the WHB based on isolating activities that have a potential for releases.

[F 1.1.3, 1.1.4, 1.1.5][MGR RD 3.1.C, 3.1.G][10 CFR 63.112(e)(1), 63.112(e)(4)]

1.2.2.1.8 The system shall be designed in accordance with the project ALARA program goals (TBD-406) and the applicable guidelines in "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable" (Regulatory Guide 8.8).

[F 1.1.3][MGR RD 3.1.B, 3.1.C, 3.1.G][10 CFR 63.111(a)(1), 63.112(e)(2), 63.112(e)(3)]

1.2.2.1.9 The system shall be designed for the design basis flood in accordance with the guidelines in Regulatory Guide 1.102, "Flood Protection for Nuclear Power Plants."

[MGR RD 3.1.G]

1.2.2.1.10 The system shall be designed to perform its safety functions as required during and after applicable design basis events.

[F 1.1.9][MGR RD 3.1.C, 3.1.G][10 CFR 63.111(a)(2), 63.111(b)(2), 63.112(e)(8)]

1.2.2.1.11 Reinforced concrete structures and other SSCs with a structural role that are important to safety shall have sufficient capability for every section to withstand the worst-case loads under normal and off-normal conditions (as defined in "Standard Review Plan for Spent Fuel Dry Storage Facilities" (NUREG-1567)) without permanent deformation and with no degradation of capability to withstand any future loadings.

[MGR RD 3.1.G, 3.3.A]

1.2.2.1.12 The system shall be designed to limit the accumulation of radioactive contamination and facilitate decontamination of building components and surfaces.

[F 1.1.3, 1.1.5][MGR RD 3.1.G, 3.3.A]

1.2.2.1.13 The system shall be designed to provide means to control access to high radiation areas and airborne radioactivity areas.

[MGR RD 3.1.C, 3.1.G][10 CFR 63.112(e)(5)]

1.2.2.1.14 The QL-1 portions of the system shall withstand the maximum Tornado wind speed of 189 mph with a corresponding pressure drop of 0.81 psi and rate of pressure drop of 0.3 psi/sec.

[MGR RD 3.1.C][10 CFR 63.112(e)(8)]

1.2.2.1.15 The Tornado-generated missiles that must be considered for the system are either the Spectrum I or Spectrum II missiles as identified in "MGR Design Basis Extreme Wind/Tornado Analysis," Section 6.3.

[MGR RD 3.1.C][10 CFR 63.112(e)(8)]

1.2.2.2 Non-nuclear Safety Criteria

1.2.2.2.1 The system shall be designed such that floor surfaces upon which transportation casks are loaded and unloaded are flat and at the same level as the top of any railroad track rails.

[F 1.1.5][MGR RD 3.3.A]

1.2.2.2.2 The system shall be designed to permit prompt termination of operations and evacuation of personnel during an emergency.

[MGR RD 3.1.C, 3.1.G, 3.3.A][10 CFR 63.112(e)(10)]

1.2.3 System Environment Criteria

1.2.3.1 The system components shall be designed for the internal normal temperature environment of 65 degrees F to 104 degrees F and off-normal temperature environment of (TBD-395).

[F 1.1.5][MGR RD 3.3.A]

1.2.3.2 The system components shall be designed for the internal normal humidity environment of (TBD-409).

[F 1.1.5][MGR RD 3.3.A]

1.2.3.3 The system shall be designed such that components susceptible to radiation can operate in and withstand the radiation environment (TBD-405) in which the component is located.

[F 1.1.5][MGR RD 3.3.A]

1.2.3.4 The system shall be designed for a maximum wind speed of 121 miles per hour.

[F 1.1.2][MGR RD 3.1.G, 3.3.A]

1.2.3.5 The system shall be designed for an outside temperature environment of 5 degrees F to 117 degrees F (TBV-430).

[F 1.1.2]

1.2.3.6 The system shall be designed for an environment with a maximum daily snowfall of 10 in. and maximum snowfall accumulation of 17 in. (TBV-430 and TBV-3706).

[F 1.1.2][MGR RD 3.1.G, 3.3.A]

1.2.3.7 The system shall be designed for the ambient relative humidity environment (TBV-430) defined in Table I-1.

Table I-1. Ambient Relative Humidity Environment

Parameter	Value
Annual mean value	28%
Minimum summer mean value	13%
Maximum winter mean value	46%

[F 1.1.2]

1.2.3.8 The system shall be designed for an environment with a maximum annual precipitation of 10 in. and maximum daily precipitation of 5 in. (TBV-430).

[F 1.1.2][MGR RD 3.3.A]

1.2.3.9 The system shall be designed to withstand a frost line depth of 15 in. below the undisturbed ground surface.

[MGR RD 3.3.A]

1.2.4 System Interfacing Criteria

1.2.4.1 The system shall interface with the Carrier/Cask Transport System for size, weight, and operating envelopes of casks and carriers.

[F 1.1.13]

1.2.4.2 The system shall interface with the Waste Emplacement/Retrieval System for size, weight, and operating envelopes of the waste package transporter.

[F 1.1.13]

1.2.4.3 The system shall interface with the Site Communications System for equipment installation and routing of communication lines requirements.

[F 1.1.13]

1.2.4.4 The system shall interface with the Site Water System for water storage and piping distribution requirements for fire protection; utility; heating, ventilation, and air conditioning; pool; and other requirements within the WHB.

[F 1.1.13]

1.2.4.5 The system shall interface with the Emergency Response System for space and layout, and equipment installation and cable routing requirements.

[F 1.1.13]

1.2.4.6 The system shall interface with the MGR Site Layout system for location and integration requirements of the WHB with other MGR facilities.

[F 1.1.13]

1.2.4.7 The system shall interface with the Health Safety System for space and layout and equipment installation requirements.

[F 1.1.13]

1.2.4.8 The system shall interface with the MGR Operations Monitoring and Control System for space and layout and equipment installation and cable routing requirements.

[F 1.1.13]

1.2.4.9 The system shall interface with the Safeguards and Security System for control of physical access into and within the WHB; and installation of barriers, equipment, cable, and other requirements.

[F 1.1.13]

1.2.4.10 The system shall interface with the Site Generated Radiological Waste Handling System for storage and transfer requirements of the radiological waste.

[F 1.1.13]

1.2.4.11 The system shall interface with the Site Generated Hazardous, Nonhazardous, and Sanitary Waste Disposal System for equipment and piping installation requirements.

[F 1.1.13]

1.2.4.12 The system shall interface with the Pool Water Treatment and Cooling System for space, layout, shielding, structural requirements, and sizing of the pool and equipment installation and piping routing requirements.

[F 1.1.13]

1.2.4.13 The system shall interface with the Canister Transfer System for operating envelope and structural support requirements.

[F 1.1.13]

1.2.4.14 The system shall interface with the Assembly Transfer System for operating envelope, structural support, and pool sizing requirements.

[F 1.1.13]

1.2.4.15 The system shall interface with the Disposal Container Handling System for space and layout, and operating envelope and structural support requirements.

[F 1.1.13]

1.2.4.16 The system shall interface with the Waste Package Remediation System for space and layout, and operating envelope and structural support requirements.

[F 1.1.13]

1.2.4.17 The system shall interface with the Waste Handling Building Ventilation System for space and layout requirements, equipment and ductwork installation requirements, chilled water piping distribution requirements, WHB zone locations and pressures, and temperature and humidity requirements.

[F 1.1.13][MGR RD 3.1.G]

1.2.4.18 The system shall interface with the Site Radiological Monitoring System for space and layout and equipment installation and cable routing requirements.

[F 1.1.13]

1.2.4.19 The system shall interface with the Waste Handling Building Electrical System for space and layout requirements, equipment installation and conduit routing requirements, and power distribution requirements for the systems in the WHB.

[F 1.1.13]

1.2.4.20 The system shall interface with the Waste Handling Building Fire Protection System for space and layout requirements, equipment installation and piping routing requirements, wall and door fire rating requirements, fire exit requirements, and drainage requirements.

[F 1.1.13][MGR RD 3.1.G]

1.2.4.21 The system shall interface with the Carrier/Cask Handling System for operating envelope and structural support requirements.

[F 1.1.13]

1.2.5 Operational Criteria

1.2.5.1 The system SSCs affecting waste throughput shall have a minimum inherent availability of 0.9941.

[F 1.1.1][MGR RD 3.3.A]

1.2.5.2 The system SSCs that are important to safety shall be designed to permit periodic inspection, testing, and maintenance as necessary to ensure their continued functioning and readiness.

[F 1.1.11][MGR RD 3.1.C, 3.1.G][10 CFR 63.112(e)(13)]

1.2.6 Codes and Standards Criteria

1.2.6.1 The system design shall comply with the applicable sections of "Occupational Safety and Health Standards" (29 CFR 1910).

[MGR RD 3.1.E]

1.2.6.2 The system design shall comply with the applicable sections of "Safety and Health Regulations for Construction" (29 CFR 1926).

[MGR RD 3.1.F]

1.2.6.3 The system design shall comply with the applicable sections of "Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type)" (ANSI/ANS-57.7-1988) and "Design of an Independent Spent Fuel Storage Installation (Water-Basin Type)" (Regulatory Guide 3.49).

[MGR RD 3.1.G, 3.3.A]

1.2.6.4 The system design shall comply with the applicable sections of "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-

1992) and "Design of an Independent Spent Fuel Storage Installation (Dry Storage)" (Regulatory Guide 3.60).

[MGR RD 3.1.G, 3.3.A]

1.2.6.5 The system design shall comply with the applicable sections of "Standard Guide for Design of Equipment for Processing Nuclear and Radioactive Materials" (ASTM C1217-92).

[MGR RD 3.3.A]

1.2.6.6 The system design shall comply with the applicable sections of "Specification for Radiation Shielding Materials" (ANSI/ANS-6.4.2-1985).

[MGR RD 3.3.A]

1.2.6.7 The system design shall comply with the applicable sections of the "Uniform Building Code, Volume 1, Administrative, Fire- and Life-Safety, and Field Inspection Provisions."

[MGR RD 3.3.A]

1.2.6.8 The system design shall comply with the applicable sections of the "Uniform Building Code, Volume 2, Structural Engineering Design Provisions."

[MGR RD 3.3.A]

1.2.6.9 The system design shall comply with the applicable sections of the "Uniform Building Code, Volume 3, Material, Testing and Installation Standards."

[MGR RD 3.3.A]

1.2.6.10 The system design shall comply with the applicable sections of "Life Safety Code" (NFPA 101).

[MGR RD 3.3.A]

1.2.6.11 The system design shall comply with the applicable sections of "Addenda to Energy Conservation in New Building Design" (ANSI/ASHRAE/IES 90A-a-1987).

[MGR RD 3.3.A]

1.2.6.12 The system design shall comply with the applicable sections of "IEEE Recommended Practice for Energy Management in Industrial and Commercial Facilities" (IEEE Std 739-1995).

[MGR RD 3.3.A]

1.2.6.13 The system design shall comply with the applicable sections of "Minimum Design Loads for Buildings and Other Structures" (ANSI/ASCE 7-95).

[MGR RD 3.1.G, 3.3.A]

1.2.6.14 The system design shall comply with the applicable sections of "Physical Protection of Plants and Materials" (10 CFR 73).

[MGR RD 3.1.D]

1.2.6.15 The system shall comply with the applicable provisions of "Standards for Protection Against Radiation" (10 CFR 20).

[MGR RD 3.1.B, 3.1.C][10 CFR 63.111(a)(1)]

1.2.6.16 The system design shall comply with the applicable sections of the "Uniform Plumbing Code."

[MGR RD 3.3.A]

1.2.6.17 The system design shall comply with the applicable sections of "National Electrical Code" (NFPA 70).

[MGR RD 3.3.A]

1.2.6.18 The system design shall comply with the applicable sections of "Electrical Safety Requirements for Employee Workplaces" (NFPA 70E).

[MGR RD 3.3.A]

1.2.6.19 The system design shall comply with the applicable sections of "National Electrical Safety Code" (C2-1997).

[MGR RD 3.3.A]

1.2.6.20 The system design shall comply with the applicable sections of "Code Requirements for Nuclear Safety Related Concrete Structures (ACI 349-97) and Commentary-ACI 349R-97."

[MGR RD 3.3.A]

1.2.6.21 The system design shall comply with the applicable sections of "Standard Specification for Structural Concrete" (ANSI/ACI 301-1996).

[MGR RD 3.3.A]

1.2.6.22 The system design shall comply with the applicable sections of "Structural Welding Code - Steel" (ANSI/AWS D1.1-98).

[MGR RD 3.3.A]

1.2.6.23 The system design shall comply with the applicable sections of "Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities" (ANSI/AISC N690-1984).

[MGR RD 3.3.A]

1.2.6.24 The system design shall comply with the applicable sections of "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)" (ASME NOG-1-1995).

[MGR RD 3.3.A]

1.2.6.25 The system design shall comply with the applicable sections of "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (NUREG-0800).

[MGR RD 3.1.G, 3.3.A]

1.2.6.26 The system shall be designed in accordance with the applicable sections of Department of Defense Design Criteria Standard "Human Engineering" (MIL-STD-1472E).

[MGR RD 3.3.A]

1.2.6.27 The system shall be designed in accordance with the applicable sections of "Human Factors Design Guidelines for Maintainability of Department of Energy Nuclear Facilities" (UCRL-15673).

[MGR RD 3.3.A]

1.2.6.28 The system shall be designed in accordance with the applicable sections of "Human-System Interface Design Review Guideline " (NUREG-0700).

[MGR RD 3.1.G, 3.3.A]

1.2.6.29 The system shall be designed in accordance with the applicable sections of "Safety Color Code" (ANSI Z535.1-1998), "Environmental and Facility Safety Signs" (ANSI Z535.2-1998), "Criteria for Safety Symbols" (ANSI Z535.3-1998), "Product Safety Signs and Labels" (ANSI Z535.4-1998), and "Accident Prevention Tags (for Temporary Hazards)" (ANSI Z535.5-1998).

[MGR RD 3.3.A]

1.2.6.30 The system shall be designed in accordance with the applicable sections of "Accessible and Usable Buildings and Facilities" (CABO/ANSI A117.1-1992) and "Americans With Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities" (36 CFR 1191, Appendix A).

[MGR RD 3.3.A]

1.2.6.31 The system shall be designed in accordance with the applicable sections of "Human Factors Engineering of Visual Display Terminal Workstations" (ANSI/HFS 100-1988), "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 3: Visual Display Requirements" (ISO 9241-3), and "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 8: Requirements for Displayed Colours" (ISO 9241-8).

[MGR RD 3.3.A]

1.2.6.32 The system shall be designed in accordance with the applicable sections of "Guidelines for Designing User Interface Software" (ESD-TR-86-278), "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 10: Dialogue Principles" (ISO 9241-10), "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 14: Menu Dialogues" (ISO 9241-14), and "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 15: Command Dialogues" (ISO 9241-15).

[MGR RD 3.3.A]

1.2.6.33 The system shall comply with the applicable assumptions contained in the "Monitored Geologic Repository Project Description Document."

1.2.6.34 The system design shall comply with the applicable requirements of "Spent Fuel Storage Facility Design Basis" (Regulatory Guide 1.13).

[MGR RD 3.1.G]

1.2.6.35 The design of concrete shielding structures shall comply with the applicable sections of "American National Standard for Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants" (ANSI/ANS-6.4-1997).

[MGR RD 3.1.G, 3.3.A]

1.2.6.36 The SSCs shall be coated in accordance with applicable requirements in "Standard Guide for Use of Protective Coating Standards in Nuclear Power Plants" (ASTM D5144).

[MGR RD 3.3.A]

1.2.6.37 The system design shall comply with the applicable requirements in "Standard for Fire Protection for Facilities Handling Radioactive Materials" (NFPA 801).

[MGR RD 3.3.A]

1.3 SUBSYSTEM DESIGN CRITERIA

There are no subsystem design criteria for this system.

1.4 CONFORMANCE VERIFICATION

This Section outlines the methods to be used to verify the conformance of the system with its design criteria.

1.4.1 The methods of conformance verification to be used are:

Analysis. Analysis is the process of accumulating results and conclusions intended to verify that a requirement has been satisfied. Analytical verification of compliance may include compilation and interpretation of results of tests, demonstrations, and examinations of lower-level components of the system. Analysis may also include logical arguments, modeling, calculations, tradeoff studies, reports (design and/or tradeoff), and other relevant information to verify compliance with a requirement, when physical testing of a system is impracticable.

Examination. Examination is the process of conducting careful observation and inspection, without use of special laboratory appliances and procedures, to verify compliance with specified requirements. Examination is a relatively direct method, involving, at most, simple physical manipulation or measurement. It is generally non-destructive and does not necessarily involve operation of the system being evaluated.

Demonstration. Demonstration is the qualitative process of displaying or operating a system or item in or near its operational environment to verify compliance with requirements. It differs from testing in that it is generally a qualitative and direct determination of the performance of a function and is performed without special instrumentation or other special equipment.

Test. Test is the quantitative process whereby data are collected, under controlled conditions, to document the performance of a product with respect to a standard. Manipulation and analysis of data derived from testing is an integral part of the method. Special instrumentation and scientific procedures are commonly employed. A test may be conducted in a laboratory or in the field (in situ).

1.4.2 Table I-2 correlates the criteria with the method to be used to verify compliance with the criteria. In the following table, items marked "N/A" (not applicable) have no verification required. These items are titles or contain explanatory materials. The other columns "Analysis," "Demo," "Exam," and "Test" refer to the verification methods identified in Section 1.4.1.

Table I-2. Conformance Verification

Criterion		Verification Method Code				
Number	Title	N/A	Analysis	Exam	Demo	Test
1.2	SYSTEM DESIGN CRITERIA	X				
1.2.1	System Performance Criteria	X				
1.2.1.1			X			
1.2.1.2			X			
1.2.1.3			X			
1.2.1.4			X			
1.2.1.5			X			
1.2.1.6			X			
1.2.1.7			X			
1.2.1.8			X			
1.2.1.9			X			
1.2.1.10			X			
1.2.1.11			X			
1.2.2	Safety Criteria	X				
1.2.2.1	Nuclear Safety Criteria	X				
1.2.2.1.1			X			
1.2.2.1.2			X			
1.2.2.1.3			X		X	X
1.2.2.1.4			X			
1.2.2.1.5			X			
1.2.2.1.6			X			
1.2.2.1.7			X			
1.2.2.1.8			X			
1.2.2.1.9			X			
1.2.2.1.10			X			
1.2.2.1.11			X			
1.2.2.1.12			X			
1.2.2.1.13			X			
1.2.2.1.14			X			
1.2.2.1.15			X			
1.2.2.2	Non-nuclear Safety Criteria	X				
1.2.2.2.1				X		
1.2.2.2.2			X			
1.2.3	System Environment Criteria	X				
1.2.3.1			X			
1.2.3.2			X			
1.2.3.3			X			
1.2.3.4			X			
1.2.3.5			X			
1.2.3.6			X			
1.2.3.7			X			
1.2.3.8			X			
1.2.3.9			X			
1.2.4	System Interfacing Criteria	X				
1.2.4.1			X			
1.2.4.2			X			
1.2.4.3			X			
1.2.4.4			X			
1.2.4.5			X			
1.2.4.6			X			
1.2.4.7			X			

Table I-2. Conformance Verification (Continued)

Criterion		Verification Method Code				
Number	Title	N/A	Analysis	Exam	Demo	Test
1.2.4.8			X			
1.2.4.9			X			
1.2.4.10			X			
1.2.4.11			X			
1.2.4.12			X			
1.2.4.13			X			
1.2.4.14			X			
1.2.4.15			X			
1.2.4.16			X			
1.2.4.17			X			
1.2.4.18			X			
1.2.4.19			X			
1.2.4.20			X			
1.2.4.21			X			
1.2.5	Operational Criteria	X				
1.2.5.1			X			
1.2.5.2			X	X		
1.2.6	Codes and Standards Criteria	X				
1.2.6.1			X			
1.2.6.2			X			
1.2.6.3			X			
1.2.6.4			X			
1.2.6.5			X			
1.2.6.6			X			
1.2.6.7			X			
1.2.6.8			X			
1.2.6.9			X			
1.2.6.10			X			
1.2.6.11			X			
1.2.6.12			X			
1.2.6.13			X			
1.2.6.14			X			
1.2.6.15			X			
1.2.6.16			X			
1.2.6.17			X			
1.2.6.18			X			
1.2.6.19			X			
1.2.6.20			X			
1.2.6.21			X			
1.2.6.22			X			
1.2.6.23			X			
1.2.6.24			X			
1.2.6.25			X			
1.2.6.26			X			
1.2.6.27			X			
1.2.6.28			X			
1.2.6.29			X			
1.2.6.30			X			
1.2.6.31			X			
1.2.6.32			X			
1.2.6.33			X			
1.2.6.34			X			
1.2.6.35			X			
1.2.6.36			X			
1.2.6.37			X			

APPENDIX A CRITERION BASIS STATEMENTS

This section presents the criterion basis statements for criteria in Section 1.2 of Volume I. Descriptions of the traces to "Monitored Geologic Repository Requirements Document" (MGR RD) (as modified by input transmittal "Preliminary Draft Requirements from the Monitored Geologic Repository Requirements Document" [TBV-3855]) and "Revised Interim Guidance Pending Issuance of New U.S. Nuclear Regulatory Commission (NRC) Regulations (Revision 01, July 22, 1999), for Yucca Mountain, Nevada" are shown as applicable. In anticipation of the interim guidance being promulgated as a Code of Federal Regulations, it will be referred to as "10 CFR 63" in this system description document.

1.2.1.1 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing a facility that can support and optimize the high-level radioactive waste (dry) handling operations for expected waste throughputs. This criterion is needed to support MGR RD 3.2.C which requires the MGR be capable of receiving, packaging, emplacing, and isolating nuclear waste; and MGR RD 3.2.E which requires system capability to include design capacity, equipment availability, and process efficiency (i.e., optimization).

II. Criterion Performance Parameter Basis

N/A

1.2.1.2 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing a facility that can support the high-level radioactive waste (wet) handling operations for expected waste throughputs. This criterion is needed to support MGR RD 3.2.C which requires the MGR to be capable of receiving, packaging, emplacing, and isolating nuclear waste; and MGR RD 3.2.E which requires system capability to include design capacity, equipment availability, and process efficiency (i.e., optimization).

II. Criterion Performance Parameter Basis

N/A

1.2.1.3 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for providing space, layout, and structures in the WHB for laydown and storage of equipment in support of the waste handling

operations. This criterion is needed to support MGR RD 3.2.C which requires the MGR be capable of receiving, packaging, emplacing, and isolating nuclear waste.

II. Criterion Performance Parameter Basis

N/A

1.2.1.4 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for providing space and layout in the WHB to support maintenance activities of the systems that support waste handling operations. This criterion is needed to support MGR RD 3.2.C which requires the MGR to be capable of receiving, packaging, emplacing, and isolating nuclear waste.

This criterion supports MGR RD 3.1.G and Guidance Statement 6.8g2 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.1.5 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for providing space, layout, and structures in the WHB for preparation and staging canisters, empty disposal containers, and waste packages (loaded and welded disposal containers) in support of the throughput rates. This criterion is needed to support MGR RD 3.2.C which requires the MGR to be capable of receiving, packaging, emplacing, and isolating nuclear waste at specified rates.

This criterion supports MGR RD 3.1.G.

II. Criterion Performance Parameter Basis

N/A

1.2.1.6 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for providing space, layout, and administrative support facilities in the WHB for personnel performing operations, maintenance, and other activities in support of the waste handling operations. This criterion is needed to support MGR RD 3.2.C which requires the MGR to be capable of receiving, packaging, emplacing, and isolating nuclear waste.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statement 6.8g2 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.1.7 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for facilitating collection and transfer of solid and liquid low-level waste generated in the WHB during waste handling operations. There shall be no mixing of contaminated waste with non-contaminated systems (e.g., sewer system, water systems, building drain system). This criterion directly supports MGR RD 3.3.E, which requires the MGR to be capable of managing site-generated waste, and indirectly supports MGR RD 3.2.C, which requires the MGR to be capable of receiving, packaging, emplacing, and isolating nuclear waste.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.6.g10, 6.6g13, 6.6.g14, 6.6.g15, 6.7.g9, 6.7g13, 6.7g14, 6.13g17, and 6.13g18 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.1.8 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for providing space, layout, and structures in the WHB for installation of systems that support waste handling operations. This criterion is needed to support MGR RD 3.2.C which requires the MGR to be capable of receiving, packaging, emplacing, and isolating nuclear waste.

II. Criterion Performance Parameter Basis

N/A

1.2.1.9 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for providing utilities (e.g., chilled water, hot water, potable water, industrial and instrument air) as required for personnel and

equipment that support waste handling operations and maintenance activities. This criterion is needed to support MGR RD 3.2.C which requires the MGR to be capable of receiving, packaging, emplacing, and isolating nuclear waste.

II. Criterion Performance Parameter Basis

N/A

1.2.1.10 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for the system to incorporate features that facilitate decontamination and decommissioning. This criterion is based on 10 CFR 63.21(c)(17) which requires the content of the license application to include a safety analysis report with "A description of design considerations that are intended to facilitate permanent closure and decontamination or dismantlement of surface facilities."

This criterion is based on the requirement in "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992), Section 6.14, which requires incorporating features to facilitate decommissioning. According to this standard, "Provisions shall be made to facilitate decontamination of structures and equipment, minimize the quantity of radioactive wastes and contaminated equipment, and facilitate the removal of radioactive wastes and contaminated materials" when the facility is permanently decommissioned. The plan for decommissioning will identify specific provisions to assist decommissioning and is TBD.

MGR RD 3.3.A requires compliance with the applicable industry codes and standards.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.6g9 and 6.6g10 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.1.11 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the operational life of the system. This criterion is required because this system supports the waste handling operations at the repository as required by MGR RD 3.2.C. Additional system operating life that may be needed to support performance confirmation or retrieval operations conducted after cessation of waste emplacement operations is not covered by this criterion. To meet the operational life

requirement, system components may require replacement in addition to any required preventive maintenance program.

II. Criterion Performance Parameter Basis

Performance requirement 3.2.C of the MGR RD requires the MGR be capable of receiving, packaging, emplacing, and isolating nuclear waste at the annual rates specified in Table 3-2 of the MGR RD. Table 3-2 of MGR RD indicates that waste receipt will commence in the year 2010 and is expected to be completed by the year 2041, spanning a total of 32 years. To account for future potential schedule fluctuations caused by uncertainties in waste remediation, early receipt, and plant life extensions, a 25 percent margin is added, resulting in an operational life of 40 years.

1.2.2.1.1 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for the system to withstand a design basis earthquake. This criterion is based on 10 CFR 63.112(e)(8), which requires the performance analysis of SSCs that are important to safety to include consideration of the "Ability of structures, systems, and components to perform their intended safety functions, assuming the occurrence of design basis events."

This requirement is also intended to help meet the overall geologic operations area performance objectives in 10 CFR 63.111(a)(2) and 10 CFR 63.111(b)(2), which state, respectively: "During normal operations, and for Category 1 design basis events, the annual dose to any real member of the public, located beyond the boundary of the preclosure controlled area shall not exceed a total effective dose equivalent (TEDE) of 0.25 mSv (25 mrem)," and, "The geologic repository operations area shall be designed so that taking into consideration Category 2 design basis events and until permanent closure has been completed, no individual located on, or beyond, any point on the boundary of the preclosure controlled area, will receive the more limiting of a TEDE of 0.05 Sv (5 rem), or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue (other than the lens of the eye) of 0.5 Sv (50 rem). The lens dose equivalent shall not exceed 0.15 Sv (15 rem), and the shallow dose equivalent to skin shall not exceed 0.5 Sv (50 rem)."

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.6g4 and 6.14g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

Specific seismic criteria for this system are to be determined (TBD).

1.2.2.1.2 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for the system to withstand the dynamic effects from internal and external missiles. This criterion is based on 10 CFR 63.112(e)(8) which requires the performance analysis of SSCs important to safety to include consideration of the "Ability of structures, systems, and components to perform their intended safety functions, assuming the occurrence of design basis events."

This requirement is also intended to help meet the overall geologic operations area performance objectives in 10 CFR 63.111(a)(2) and 10 CFR 63.111(b)(2), which state, respectively: "During normal operations, and for Category 1 design basis events, the annual dose to any real member of the public, located beyond the boundary of the preclosure controlled area shall not exceed a TEDE of 0.25 mSv (25 mrem)," and "The geologic repository operations area shall be designed so that taking into consideration Category 2 design basis events and until permanent closure has been completed, no individual located on, or beyond, any point on the boundary of the preclosure controlled area, will receive the more limiting of a TEDE of 0.05 Sv (5 rem), or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue (other than the lens of the eye) of 0.5 Sv (50 rem). The lens dose equivalent shall not exceed 0.15 Sv (15 rem), and the shallow dose equivalent to skin shall not exceed 0.5 Sv (50 rem)."

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.6g2, 6.13g5, 6.13g10, 6.13g15, and 6.14g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

Internal and external missile parameters (size, mass, speed, etc.) are TBD.

1.2.2.1.3 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.G requires compliance with applicable codes, standards, and regulations.

This criterion is based on the requirement in "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992), Section 5.9.3, which requires protection of the SSCs important to confinement against the adverse effects of operation of the fire protection system.

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.4 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.G requires compliance with applicable codes, standards, and regulations.

This criterion is based on the requirement in "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992), Section 5.9.4, which requires providing suitable barriers to impede the spread of fires to systems and equipment that are important to confinement.

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.5 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for the system SSCs important to safety not to be affected by the failure of other SSCs during a design basis event. This criterion is based on 10 CFR 63.112(e)(8) which requires the performance analysis of the SSCs that are important to safety to include consideration of the "Ability of structures, systems, and components to perform their intended safety functions, assuming the occurrence of design basis events."

This requirement is also intended to help meet the overall geologic operations area performance objectives in 10 CFR 63.111(a)(2) and 10 CFR 63.111(b)(2), which state, respectively: "During normal operations, and for Category 1 design basis events, the annual dose to any real member of the public, located beyond the boundary of the preclosure controlled area shall not exceed a TEDE of 0.25 mSv (25 mrem)," and "The geologic repository operations area shall be designed so that taking into consideration Category 2 design basis events and until permanent closure has been completed, no individual located on, or beyond, any point on the boundary of the preclosure controlled area, will receive the more limiting of a TEDE of 0.05 Sv (5 rem), or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue (other than the lens of the eye) of 0.5 Sv (50 rem). The lens dose equivalent shall not exceed 0.15 Sv (15 rem), and the shallow dose equivalent to skin shall not exceed 0.5 Sv (50 rem)."

This criterion supports the requirement of MGR RD 3.1.G and Guidance Statement 6.6g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.6 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for the system to help maintain control of radioactive waste and radioactive effluents. This criterion is based on 10 CFR 63.112(e)(10), which requires the performance analysis of SSCs that are important to safety to include consideration of "Means to control radioactive waste and radioactive effluents..."

MGR RD 3.1.G requires compliance with applicable codes, standards, and regulations.

This criterion is also based on the requirement in "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992), Section 6.6.1.2, which requires design of sumps and drains to prevent unmonitored or uncontrolled release of radioactive liquid waste.

This criterion supports the requirements of Guidance Statements 6.6g6, 6.6g13, 6.6g15, and 6.13g17 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.7 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for the WHB to incorporate design features that limit the impact of waste handling operations on contamination control. This criterion is based on 10 CFR 63.112(e)(1) and (e)(4) which require the performance analysis of SSCs that are important to safety to include consideration of "Means to limit concentration of radioactive material in air," and "Means to monitor and control the dispersal of radioactive contamination."

MGR RD 3.1.G requires compliance with applicable codes, standards, and regulations.

This criterion is also based on the requirement in "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992), Section 6.13.6, which requires zoning radiation and contamination areas according to anticipated levels of radiation or contamination in each area. Access to these areas will be controlled and ventilation pressure zones created (through interface with the WHB Ventilation System) to prevent the spread of contamination.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.6g6 and 6.6g12 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.8 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. MGR RD 3.1.B and 10 CFR 63.111(a)(1) require compliance with "Standards for Protection Against Radiation" (10 CFR 20). Section 1101(b) of 10 CFR 20 states: "The licensee shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to the members of the public that are as low as is reasonably achievable (ALARA)."

The requirement for compliance with the ALARA principles is also based on 10 CFR 63.112(e)(2) and (e)(3), which require the performance analysis of SSCs that are important to safety to include consideration of the "Means to limit the time required to perform work in the vicinity of radioactive materials," and "Suitable shielding."

MGR RD 3.1.G requires compliance with applicable codes, standards, and regulations. Compliance with "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable" (Regulatory Guide 8.8) is invoked because this regulatory guide is one of the primary regulatory documents that addresses ALARA and is acceptable to the Nuclear Regulatory Commission. This regulatory guide provides guidelines on achieving occupational ALARA goals during the planning, design, and operations phases of a nuclear facility. According to Section B of this guide, "Effective design of facilities and selection of equipment for systems that contain, collect, store, process, or transport radioactive material in any form will contribute to the effort to maintain radiation doses to station personnel ALARA." Section C.2 addresses facility and equipment design features. The design process of each system must include an evaluation of the applicable requirements in Section C.2 of Regulatory Guide 8.8.

In addition to compliance with the applicable guidelines in Regulatory Guide 8.8, the design of the system must meet the project ALARA program goals. The project ALARA program will include both qualitative and quantitative goals. Regarding the ALARA program of a licensee, Section C.1.a.(2) of Regulatory Guide 8.8 states: "The policy and commitment should be reflected in written administrative procedures and instructions for operations involving potential exposures of personnel to radiation and should be reflected in station design features. Instructions to designers, constructors, vendors, and station personnel specifying or reviewing station features, systems, or equipment should reflect the goals and objectives to maintain occupational radiation exposures ALARA."

This criterion supports the requirements of Guidance Statements 6.6g7, 6.6g12, 6.10g1, and 6.11g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

The project ALARA program goals are TBD.

1.2.2.1.9 Criterion Basis Statement

I. Criterion Need Basis

This criterion invokes the requirement for designing the WHB to withstand a design basis flood in accordance with "Flood Protection for Nuclear Power Plants" (Regulatory Guide 1.102).

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.3g1, 6.3g2, 6.3g3, 6.5g1, 6.6g3, 6.13g6, 6.13g7, 6.13g9, and 6.14g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.10 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for the system to have the capability to perform its important to safety functions during and after design basis events, as required. This criterion is based on 10 CFR 63.112(e)(8) which requires the performance analysis of SSCs that are important to safety to include consideration of the "Ability of structures, systems, and components to perform their intended safety functions, assuming the occurrence of design basis events."

This requirement is also intended to help meet the overall geologic operations area performance objectives in 10 CFR 63.111(a)(2) and 10 CFR 63.111(b)(2) which state, respectively: "During normal operations, and for Category 1 design basis events, the annual dose to any real member of the public, located beyond the boundary of the preclosure controlled area shall not exceed a TEDE of 0.25 mSv (25 mrem)," and "The geologic repository operations area shall be designed so that taking into consideration Category 2 design basis events and until permanent closure has been completed, no individual located on, or beyond, any point on the boundary of the preclosure controlled area, will receive the more limiting of a TEDE of 0.05 Sv (5 rem), or the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue (other than the lens of the eye) of 0.5 Sv (50 rem). The lens dose equivalent shall not exceed 0.15 Sv (15 rem), and the shallow dose equivalent to skin shall not exceed 0.5 Sv (50 rem)."

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.6g8, 6.13g1, 6.13g9, 6.13g10, 6.13g11, 6.13g12, 6.13g13, and 6.14g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.11 Criterion Basis Statement

I. Criterion Need Basis

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statement 6.14g3 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System" which invokes structural design requirements of "Standard Review Plan for Spent Fuel Dry Storage Facilities" (NUREG-1567). It also supports MGR RD 3.3.A which requires compliance with applicable codes and standards.

As required by NUREG-1567, Sections 7.4.4.3 and 7.4.5.3, WHB reinforced concrete structures and other structures important to safety shall have sufficient capability for every structural section to withstand the worst case loads under normal and off-normal conditions (as defined in NUREG-1567). This capability must be provided without permanent structural deformation and with no degradation of capability to withstand any future loadings. As defined in NUREG-1567, Table 7-1, normal and off-normal loads include dead, live, lateral soil pressure, thermal, and wind. This criterion does not apply to structural capability under accident-level events and conditions (e.g., tornado missile loads).

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.12 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards.

This criterion establishes the requirement for reducing the accumulation of fixed radioactive contamination and decontamination of building components and surfaces. This is a personnel radiological safety requirement based on "Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type)" (ANSI/ANS-57.7-1988, Section 6.8.2.1), which requires minimizing personnel exposure through proper selection of materials that can be readily decontaminated, use of coatings and finishes, and minimizing crevices where radioactive materials may accumulate.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statement 6.6g14 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.13 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion is based on the requirement in 10 CFR 63.112(e)(5) which requires the performance analysis of SSCs that are important to safety to include consideration of the means to control access to high radiation areas or airborne radioactivity areas.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.6g7 and 6.6g17 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System.

II. Criterion Performance Parameter Basis

N/A

1.2.2.1.14 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for the system to have the capability to perform its important to safety functions during and after design basis events, as required. This criterion is based on 10 CFR 63.112(e)(8) which requires the performance analysis of SSCs that are important to safety to include consideration of the "Ability of structures, systems, and components to perform their intended safety functions, assuming the occurrence of design basis events." The specific Design Basis Event is the Tornado winds.

II. Criterion Performance Parameter Basis

The maximum Tornado wind speed, pressure drop, and pressure drop rate were obtained from "MGR Design Basis Extreme Wind/Tornado Analysis," Section 7.

1.2.2.1.15 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for the system to have the capability to perform its important to safety

functions during and after design basis events, as required. This criterion is based on 10 CFR 63.112(e)(8) which requires the performance analysis of SSCs that are important to safety to include consideration of the "Ability of structures, systems, and components to perform their intended safety functions, assuming the occurrence of design basis events." The specific Design Basis Event is the Tornado-generated missiles.

II. Criterion Performance Parameter Basis

N/A

1.2.2.2.1 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards.

This criterion establishes a personnel safety requirement based on "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992, Section 6.1.1.1.3), which states: "The floor space upon which highway vehicles are loaded and unloaded should be flat and level. Any surface between railroad tracks, except for flange grooves, should be at the same level as the rails and surrounding floor."

II. Criterion Performance Parameter Basis

N/A

1.2.2.2.2 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion is based on the requirement in 10 CFR 63.112(e)(10) which requires the performance analysis of SSCs that are important to safety to include consideration of the means to permit prompt termination of operations and evacuation of personnel during an emergency.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statement 6.6g17 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

This criterion supports MGR RD 3.3.A.

II. Criterion Performance Parameter Basis

N/A

1.2.3.1 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards.

This criterion establishes the requirement for equipment environmental compatibility. This criterion is based on the requirement in "Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type)" (ANSI/ANS-57.7-1988, Section 6.9.2), which states: "System components shall be designed and qualified to operate within environmental limits established for their location within the installation, including but not limited to temperature, humidity, and radiation levels for the applicable performance requirements."

Temperature is one of the primary environmental parameters that can affect performance or result in advanced degradation of a component. To ensure proper performance, many manufacturers specify the normal temperature environment in which the component must operate. Manufacturers may also specify the maximum off-normal temperature environment that the components can be exposed to or operate in for a limited time. The off-normal condition may be caused by loss of electric power or failure of the ventilation system.

II. Criterion Performance Parameter Basis

A temperature of 104 degrees F is the typical maximum design ambient temperature during normal operations for areas that are not occupied but house electrical equipment in facilities similar to the MGR, such as nuclear power plants. The minimum temperature of 65 degrees F is from Appendix E of ANSI/ANS-57.7-1988. This appendix provides the typical normal temperatures for summer and winter for spent fuel storage and handling facilities similar to the MGR.

The off-normal temperatures are TBD.

1.2.3.2 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards.

This criterion establishes the requirement for equipment environmental compatibility. This criterion is based on the requirement in "Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type)" (ANSI/ANS-57.7-1988, Section 6.9.2), which states: "System components shall be designed and qualified to operate within environmental limits established for their location within the installation, including but not limited to temperature, humidity, and radiation levels for the applicable performance requirements."

Humidity is considered to be one of the primary environmental parameters that can affect the performance of components or result in advanced degradation of materials. Low humidity may result in static discharge in electrical and electronic equipment. High humidity is not expected to be a major concern at the MGR due to the generally dry climate; however, depending on the nature of the operations, some areas may exhibit high humidity conditions. To ensure proper performance, many manufacturers specify the humidity environment in which the component must operate. This criterion establishes the indoor humidity environment in which SSCs are expected to operate.

Humidity is not controlled during off-normal conditions because of the generally mild humidity environment at the repository.

II. Criterion Performance Parameter Basis

The humidity environment is TBD.

1.2.3.3 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards.

This criterion establishes the requirement for equipment environmental compatibility. This criterion is based on the requirement in "Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type)" (ANSI/ANS-57.7-1988, Section 6.9.2), which states: "System components shall be designed and qualified to operate within environmental limits established for their location within the installation including but not limited to temperature, humidity, and radiation levels for the applicable performance requirements."

Radiation from fuel assemblies, high-level waste canisters, or other radioactive sources can affect electrical and electronic components. Accumulated doses of radiation (also referred to as Total Integrated Dose) can cause eventual degradation of components containing organic compounds, such as electrical insulation and lubricants. Accumulated doses can also cause damage to components containing polymers. In addition to the material degradation issue, real-time operation of an electronic device may be compromised by the type of radiation it receives, such as neutrons colliding with the lattice atoms of the semiconductor.

Most of the electronic and electrical components will be located in mild environments with small radiation doses. Components that will be installed in radiation environments should be evaluated for the radiation doses that they can receive, and, where applicable, susceptibility to the type of radiation (X-ray, Gamma, neutron) should also be considered.

Shielding, distance, and duration of exposure can significantly reduce the radiation dose and type of radiation that a component receives. Therefore, detailed analyses on a case by case basis will determine the economic feasibility and practicability of providing

shielding, distance from the source, exposure time minimization, frequent replacement of the affected component, or qualification of the component for the radiation environment.

It should be emphasized that this criterion addresses the radiation doses that can affect operability of the components during normal operations, and is not intended to invoke environmental qualification requirements for post-accident operability.

II. Criterion Performance Parameter Basis

The radiation environment is TBD.

1.2.3.4 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards.

This criterion establishes the wind environment for the buildings and structures at the repository. Proper consideration of wind is required to ensure that buildings and structures can withstand the wind forces and are adequately protected. This requirement is supported by "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992, Section 6.6.1.1), which requires consideration of all loads and load combinations in the design of structures whose failure can damage the fuel or equipment that is important to confinement.

According to Section 6.5 of the standard for "Minimum Design Loads for Buildings and Other Structures" (ANSI/ASCE 7-95), the basic wind speed is to be used in the determination of the design wind loads for all buildings and structures. The basic wind speed is defined in Section 6.2 as the three-second gust speeds at 10 m above ground with an annual probability of 0.02. In addition, based on the requirements in Section 3.3.1 of the "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (NUREG-0800), safety-related buildings or structures must also be evaluated for the maximum wind speed. Section 3.3.1.II.1 of NUREG-0800 states: "The wind used in the design shall be the most severe wind that has been historically reported for the site and surrounding area with sufficient margin for the limited accuracy, quantity, and period of time in which historical data has been accumulated."

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.13g2, 6.13g4, 6.13g5, and 6.13g9 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

The maximum wind speed is obtained from "MGR Design Basis Extreme Wind/Tornado Analysis," Section 7.

1.2.3.5 Criterion Basis Statement

I. Criterion Need Basis

Temperature is considered to be one of the primary environmental parameters that can affect component performance or result in advanced degradation. To ensure proper performance, many manufacturers specify the temperature environment in which the component must operate. This criterion establishes the outdoor temperature environment in which SSCs are expected to operate.

II. Criterion Performance Parameter Basis

The extreme outside temperature range of 5 degrees F to 117 degrees F is based on the annual extreme minimum and maximum temperatures for the nine meteorological monitoring sites located in the Yucca Mountain area. Locations of the nine sites are shown in Figure 2-1 of the "Engineering Design Climatology and Regional Meteorological Conditions Report." Extreme temperatures (and other data) are in Tables A-1 through A-9 of the report.

The collected temperature data in Tables A-1 through A-9 are based on 11 years of monitoring at Sites 1-5 and four years of monitoring at Sites 6-9. Site 1 data are typically more representative of the nine sites because Site 1 is closest to the repository. However, due to the limited number of years that data was collected, the lowest and highest recorded temperatures for all nine sites are used to bound the extreme temperature range. Site 5 has the lowest recorded temperature of -13.1 degrees C, and Site 9 has the highest of 45.1 degrees C. This temperature range was conservatively expanded to -15 degrees C (5 degrees F) to 47 degrees C (117 degrees F). Due to the use of potentially unqualified data, the performance parameters for this criterion are TBV.

1.2.3.6 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards.

Snowfall is one of the design parameters needed for exposed structures to ensure external loadings are considered. This requirement is supported by "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992, Section 6.6.1.1) which requires consideration of all loads and load combinations in the design of structures whose failure can damage the fuel or equipment that is important to confinement.

This criterion supports the requirement of MGR RD 3.1.G and Guidance Statement 6.6g5 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

The snowfall environment for the Yucca Mountain site was determined from the following information. The nine meteorological monitoring sites operated by the Radiological and Environmental Field Programs Department, as defined in "Meteorological Monitoring Program 1996 Summary Report," pp. 1-1 to 1-5, do not monitor snowfall because it is an infrequent occurrence. The "Engineering Design Climatology and Regional Meteorological Conditions Report" includes snowfall information for some other sites in the general area that were examined to bound the snowfall environment that could occur at the Yucca Mountain site. The closest of these sites is Desert Rock Airport south of Mercury, about 45 km east-southeast of Yucca Mountain. Snowfall data were also included for Tonopah, which is about 150 km north-northwest of the repository and at a higher elevation. Tables A-12 and A-14 of the "Engineering Design Climatology and Regional Meteorological Conditions Report" provide climatological summaries for those locations that include daily maximum, monthly maximum, and annual totals for snowfall. The snowfall data for Tonopah are considered to provide a conservative estimate of snowfall at the repository site for the following reasons: The elevation at Radiological and Environmental Field Programs Department Site 1 (which is closest to the proposed repository surface facilities) is 3,750 ft; Desert Rock is 3,300 ft; and Tonopah is 5,430 ft (altitudes are listed in Tables 2-1 and 2-2 of "Regional and Local Wind Patterns Near Yucca Mountain"). While Desert Rock is closer to Yucca Mountain, it is at a lower altitude. Average yearly total precipitation for Site 1, Desert Rock, and Tonopah are 4.97, 5.5, and 5.33, in., respectively, as shown in the "Engineering Design Climatology and Regional Meteorological Conditions Report," Tables A-1, A-12 and A-14. Annual average snowfall depths are 2.86 in. at Desert Rock and 13.53 in. at Tonopah. Tonopah is farther north, receives approximately the same total precipitation, and is at a higher altitude than Yucca Mountain. Therefore, use of snow data from Tonopah is considered to be the conservative bound for Yucca Mountain. The maximum daily snowfall for Tonopah is 10 in. (rounded up from 9.7 in.) and occurs in the month of February, as shown in Table A-14 of the referenced report.

The monthly snowfall is used to establish and bound the maximum snowfall accumulation. This is based on the conservative nature of the maximum monthly snowfall and the consideration that all of the monthly snowfall occurs in a short period of time with no reduction for melting. The maximum monthly snowfall for Tonopah is 17 in. and occurs in the month of December (from Table A-14).

The snowfall data for Tonopah were not collected under an approved QA program. The data were collected by the National Weather Service at its Tonopah station and are accepted by the scientific community as an accurate measurement of the actual snowfall at the station. The data are suitable for use in analyses, as discussed above, to provide conservative estimates of the possible maximum snowfall at the Yucca Mountain site for use as design criteria. Due to use of potentially non-qualified data, the parameters for this criterion are TBV.

1.2.3.7 Criterion Basis Statement

I. Criterion Need Basis

Humidity is a primary environmental parameter that can affect component performance and anticipated life expectancy. This criterion establishes the external humidity environment at the site.

II. Criterion Performance Parameter Basis

The humidity values are taken from the "Engineering Design Climatology and Regional Meteorological Conditions Report," Table A-1, Site 1 (NTS-60). Using Site 1 data is appropriate because the site is the closest and most representative of the North Portal, South Portal, and ventilation shafts. The annual mean humidity for Site 1 is 28 percent, which is the average of the yearly averages for each of the time periods (hour 0400, 1000, 1600, 2200) (from Table A-1). The minimum summer mean humidity for Site 1 is 13 percent, which occurred in the month of June at hour 1600 (from Table A-1). The maximum winter mean humidity for Site 1 is 46 percent (rounded up from 45.9), which occurred in the month of December at hour 0400 (from Table A-1). Due to the use of potentially unqualified data, the performance parameters for this criterion are TBV.

1.2.3.8 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards.

Precipitation is an environmental parameter that can affect site drainage and erosion, buried utilities, outdoor equipment seals, and roof drain system sizing. This criterion establishes the rainfall rates through which the WHB must be able to endure and function.

II. Criterion Performance Parameter Basis

The maximum annual precipitation is derived from the "Engineering Design Climatology and Regional Meteorological Conditions Report," p. 4-10 and Figure 4-3. The report identifies maximum annual precipitation that ranges from 1 to 10 in. for the period of 1949 to 1995. The bounding maximum annual precipitation of 10 in. is taken from the Amargosa Farms site. The Amargosa Farms site is deemed appropriate in the report based on its proximity to Yucca Mountain (p. 2-5, second paragraph).

The maximum daily precipitation is derived from the "Engineering Design Climatology and Regional Meteorological Conditions Report," p. 4-21, last paragraph. The reference paragraph states: "The conclusion from the statistical analyses of observed and estimated precipitation data performed for this report indicate that the maximum daily precipitation within 50 km of Yucca Mountain is not expected to exceed five inches." Due to the use of potentially unqualified data, the performance parameters for this criterion are TBV.

1.2.3.9 Criterion Basis Statement

I. Criterion Need Basis

This criterion supports conformance with MGR RD 3.3.A which requires compliance with applicable industry codes and standards. The "Uniform Building Code, Volume 2, Structural Engineering Design Provisions" requires footings and foundations to extend below the frost line. Frost line is one of the external environmental parameters that can affect the foundation and footing design for structures that must be embedded in the ground. The supporting surface for footings, foundations, and other buried items must lie below the frost line to prevent damage to structures from the effects of heaving caused by freezing and thawing of the soil.

II. Criterion Performance Parameter Basis

Section 1806 of the "Uniform Building Code, Volume 2, Structural Engineering Design Provisions," requires footings and foundations to extend below the frost line, but provides no values for frost line depth. However, Table 18-I-C of the above code requires a minimum depth of 12 in. for footings and foundations. Section 7.5.6 of "PRELIMINARY Geotechnical Investigation For Waste Handling Building, Yucca Mountain Site Characterization Project," recommends a depth of 15 in. for frost penetration for the WHB site. Section 1804.1.3 and Figure 1804.1 of the "Standard Building Code" provide a 10 in. depth for average annual frost penetration at the Yucca Mountain Site, and a 12 in. depth for the average annual frost penetration for the state of Nevada. In addition, Section 1804.1.3 of the "Standard Building Code" requires a minimum depth of 12 in. for foundations below finish grade. Therefore, a 15 in. frost line depth below the undisturbed ground surface is specified, which bounds the values identified in the various sources.

1.2.4.1 Criterion Basis Statement

I. Criterion Need Basis

The system provides the required space, layout, and structures to support receipt, loading, and unloading of the casks. Therefore, interface with the Carrier/Cask Transport System is required for size, weight, and operating envelopes of casks and carriers.

II. Criterion Performance Parameter Basis

N/A

1.2.4.2 Criterion Basis Statement

I. Criterion Need Basis

The system provides the required space, layout, and structures to support waste emplacement in the repository. Therefore, interface with the Waste Emplacement

System is required for size, weight, and operating envelopes of disposal containers and transporters.

II. Criterion Performance Parameter Basis

N/A

1.2.4.3 Criterion Basis Statement

I. Criterion Need Basis

The system provides the required space to support communication requirements for the WHB. Therefore, interface with the Site Communication System is required for equipment installation requirements and routing of communication lines.

II. Criterion Performance Parameter Basis

N/A

1.2.4.4 Criterion Basis Statement

I. Criterion Need Basis

WHB utilities; fire protection; heating, ventilation, and air-conditioning; pool; and other systems within the WHB have water supply requirements. Therefore, interface with the Site Water System is required for space, layout, and structures to support piping distribution and water storage requirements.

II. Criterion Performance Parameter Basis

N/A

1.2.4.5 Criterion Basis Statement

I. Criterion Need Basis

The system provides the required space and layout to support emergency response requirements for the WHB. Therefore, interface with the Emergency Response System is required for space and layout and equipment installation requirements and routing of cables.

II. Criterion Performance Parameter Basis

N/A

1.2.4.6 Criterion Basis Statement

I. Criterion Need Basis

The system interfaces with other structures at the MGR site to support waste receipt and emplacement. Therefore, interface with the MGR Site Layout system is required for location of the WHB and integration requirements with other MGR facilities.

II. Criterion Performance Parameter Basis

N/A

1.2.4.7 Criterion Basis Statement

I. Criterion Need Basis

Operations within the WHB require radiological control and maintaining a safe work environment for the personnel in the WHB. Therefore, interface with the Health Safety System is required for space, layout, and structures to support equipment installation and routing of conduits.

II. Criterion Performance Parameter Basis

N/A

1.2.4.8 Criterion Basis Statement

I. Criterion Need Basis

Operations, monitoring, and control of the systems located within the WHB and many systems located outside of the WHB will be performed in the WHB. Therefore, interface with the Monitored Geologic Repository Operations Monitoring and Control System is required for space, layout, and structures to support equipment installation requirements and routing of conduits.

II. Criterion Performance Parameter Basis

N/A

1.2.4.9 Criterion Basis Statement

I. Criterion Need Basis

Special security and access requirements will be imposed on personnel entering and exiting the WHB. Therefore, interface with the Safeguards and Security System is required for space, layout, and structures to support equipment installation and cable routing requirements, and control of access, installation of physical barriers, and other security system requirements.

II. Criterion Performance Parameter Basis

N/A

1.2.4.10 Criterion Basis Statement

I. Criterion Need Basis

Low-level waste will be generated as a result of waste handling operations in the WHB. Therefore, interface with the Site Generated Radiological Waste Handling System is required for storage and transfer requirements of the site-generated waste.

II. Criterion Performance Parameter Basis

N/A

1.2.4.11 Criterion Basis Statement

I. Criterion Need Basis

Hazardous, non-hazardous, and sanitary waste will be generated as a result of waste handling operations in the WHB. Therefore, interface with the Site Generated Hazardous, Nonhazardous, and Sanitary Waste Disposal System is required for storage, treatment, and transfer requirements of these types of wastes.

II. Criterion Performance Parameter Basis

N/A

1.2.4.12 Criterion Basis Statement

I. Criterion Need Basis

Waste handling operations in the WHB require handling of the spent nuclear fuel assemblies. Therefore, interface with the Pool Water Treatment and Cooling System is required for space, layout, shielding, and structural requirements for the pool, equipment installation, and pipe routing.

II. Criterion Performance Parameter Basis

N/A

1.2.4.13 Criterion Basis Statement

I. Criterion Need Basis

Receipt, handling, and disposal of spent nuclear fuel canisters will be performed in the WHB. The system provides the required space, layout, and structures to support canister-

handling operations. Therefore, interface with the Canister Transfer System is required for size, weight, and operating envelopes of canisters, cranes, and other components associated with the Canister Transfer System.

II. Criterion Performance Parameter Basis

N/A

1.2.4.14 Criterion Basis Statement

I. Criterion Need Basis

Receipt, handling, and disposal of spent nuclear fuel assemblies will be performed in the WHB. The system provides the required space, layout, and structures to support assembly-handling operations, including the pool for wet handling and storage of assemblies in the pool. Therefore, interface with the Assembly Transfer System is required for size, weight, and operating envelopes of the fuel assemblies, cranes, and other components associated with the Assembly Transfer System.

II. Criterion Performance Parameter Basis

N/A

1.2.4.15 Criterion Basis Statement

I. Criterion Need Basis

The system provides the required space, layout, and structures to handle the disposal containers. Therefore, interface with the Disposal Container Handling System is required for size, weight, and operating envelopes of disposal containers, cranes, and other equipment associated with the Disposal Container Handling System.

II. Criterion Performance Parameter Basis

N/A

1.2.4.16 Criterion Basis Statement

I. Criterion Need Basis

The system provides the required space, layout, and structures to support waste package remediation. Therefore, interface with the Waste Package Remediation System is required for size, weight, and operating envelopes of waste packages.

II. Criterion Performance Parameter Basis

N/A

1.2.4.17 Criterion Basis Statement

I. Criterion Need Basis

The system houses the Waste Handling Building Ventilation System which is designed to maintain a safe and comfortable environment for personnel, and a suitable environment to support waste handling operations. Therefore, the system interfaces with the Waste Handling Building Ventilation System for building zone locations and pressures, temperature and humidity requirements, chilled water piping distribution requirements, and the required space, layout, and structures for heating, ventilation, and air conditioning equipment and ductwork installation.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statement 6.14g4 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.4.18 Criterion Basis Statement

I. Criterion Need Basis

The system houses the radiation monitoring equipment in support of the waste handling operations. The system interfaces with the Waste Handling Building Radiological Monitoring System for space, layout, and structures for radiation monitoring equipment and cable routing requirements.

II. Criterion Performance Parameter Basis

N/A

1.2.4.19 Criterion Basis Statement

I. Criterion Need Basis

Systems located within the WHB require electric power to perform and support the waste handling operations. Therefore, interface with the Waste Handling Building Electrical System is required for equipment installation, cable routing, and power distribution requirements.

II. Criterion Performance Parameter Basis

N/A

1.2.4.20 Criterion Basis Statement

I. Criterion Need Basis

The Waste Handling Building Fire Protection System will be housed within the WHB. The system interfaces with the Waste Handling Building Fire Protection System for space, layout, and structures to support equipment installation and piping distribution requirements, wall and door fire rating requirements, fire exit installation, and drainage requirements following system discharge.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statement 6.14g4 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.4.21 Criterion Basis Statement

I. Criterion Need Basis

The system provides the required space, layout, and structures to support arrival and departure of the carriers and unloading, loading, and handling of the shipping casks. Therefore, interface with the Carrier/Cask Handling System is required for size, weight, and operating envelopes of carriers and casks.

II. Criterion Performance Parameter Basis

N/A

1.2.5.1 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires system design to address availability for systems that have the potential to affect throughput.

II. Criterion Performance Parameter Basis

The value for the system availability is from Table 7.2-1 of "Bounded Minimum Inherent Availability Requirements for the System Description Documents."

1.2.5.2 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. This criterion establishes the requirement for designing the SSCs important to safety to provide the "Means to inspect, test, and maintain structures, systems, and components important to safety, as necessary, to ensure their continued functioning and readiness" based on the requirement in 10 CFR 63.112(e)(13).

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statement 6.6g14 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.6.1 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.E requires compliance with applicable sections of "Occupational Safety and Health Standards" (29 CFR 1910).

II. Criterion Performance Parameter Basis

N/A

1.2.6.2 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.F requires compliance with applicable sections of "Safety and Health Regulations for Construction" (29 CFR 1926).

II. Criterion Performance Parameter Basis

N/A

1.2.6.3 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type)" (ANSI/ANS-57.7-1988) as applicable to the design of the system. "Design of an Independent Spent Fuel Storage Installation (Water-Basin Type)"

(Regulatory Guide 3.49) provides stipulations and exceptions endorsed by the U.S. Nuclear Regulatory Commission (NRC) for use of ANSI/ANS 57.7-1988.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.8g1 and 7.2g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.6.4 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992) as applicable to the design of the system. "Design of an Independent Spent Fuel Storage Installation (Dry Storage)" (Regulatory Guide 3.60) provides stipulations and exceptions endorsed by the NRC for use of ANSI/ANS 57.9-1992.

This criterion supports the requirements of MGR RD 3.1.G and Guidance Statements 6.9g1 and 7.3g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.6.5 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Standard Guide for Design of Equipment for Processing Nuclear and Radioactive Materials" (ASTM C1217-92) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.6 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Specification for Radiation Shielding Materials" (ANSI/ANS-6.4.2-1985) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.7 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies the "Uniform Building Code, Volume 1, Administrative, Fire- and Life-Safety, and Field Inspection Provisions" as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.8 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies the "Uniform Building Code, Volume 2, Structural Engineering Design Provisions" as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.9 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies the "Uniform Building Code, Volume 3, Material, Testing and Installation Standards" as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.10 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Life Safety Code" (NFPA 101) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.11 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Addenda to Energy Conservation in New Building Design" (ANSI/ASHRAE/IES 90A-a-1987) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.12 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "IEEE Recommended Practice for Energy Management in Industrial and Commercial Facilities" (IEEE Std 739-1995) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.13 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Minimum Design Loads for Buildings and Other Structures" (ANSI/ASCE 7-95) as applicable to the design of the system.

This criterion supports the requirement of MGR RD 3.1.G and Guidance Statement 7.4g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.6.14 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.D requires compliance with applicable sections of "Physical Protection of Plants and Materials" (10 CFR 73).

II. Criterion Performance Parameter Basis

N/A

1.2.6.15 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.C requires compliance with 10 CFR 63. MGR RD 3.1.B and 10 CFR 63.111(a)(1) require compliance with the requirements of "Standards for Protection Against Radiation" (10 CFR 20).

II. Criterion Performance Parameter Basis

N/A

1.2.6.16 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies the "Uniform Plumbing Code" as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.17 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "National Electrical Code" (NFPA 70) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.18 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Electrical Safety Requirements for Employee Workplaces" (NFPA 70E) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.19 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "National Electrical Safety Code" (C2-1997) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.20 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Code Requirements for Nuclear Safety Related Concrete Structures (ACI 349-97) and Commentary-ACI 349R-97" as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.21 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Standard Specification for Structural Concrete" (ANSI/ACI 301-1996) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.22 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Structural Welding Code - Steel" (ANSI/AWS D1.1-98) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.23 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities" (ANSI/AISC N690-1984) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.24 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder) (ASME NOG-1-1995) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.25 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.1.G requires compliance with applicable codes, standards, and regulations. This criterion identifies "Standard Review Plan for the Review of Safety Analysis

Reports for Nuclear Power Plants" (NUREG-0800) as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.26 Criterion Basis Statement

I. Criterion Need Basis

Design, selection, arrangement, configuration, and integration of SSCs involve many elements, including monitoring, operating, maintaining, and observing the facilities and systems. To accomplish an effective and safe work environment, the human-system interface must incorporate human factors engineering (HFE) criteria. Use of Department of Defense Design Criteria Standard "Human Engineering" (MIL-STD-1472E), in conjunction with the other HFE standards and guidelines cited in this system description document, will provide a human-system interface that maximizes performance and minimizes risk to personnel.

In support of MGR RD 3.3.A, this criterion ensures that the system will be designed to be safely and effectively used by all expected users. The U.S. Department of Energy (DOE) Good Practices Guide "Human Factors Engineering" (GPG-FM-027, paragraph 2.3.1), endorses the use of MIL-STD-1472E (GPG-FM-027 references an earlier version of MIL-STD-1472).

II. Criterion Performance Parameter Basis

N/A

1.2.6.27 Criterion Basis Statement

I. Criterion Need Basis

Maintainability of system equipment involves many factors, including the human-machine interface. This interface must address the design for maintainability through the incorporation of HFE criteria. In support of MGR RD 3.3.A, this criterion ensures that the system will be designed to be safely and effectively maintained through compliance with applicable industry standards. The DOE Good Practices Guide "Human Factors Engineering" (GPG-FM-027, paragraph 2.3.1) endorses the use of "Human Factors Design Guidelines for Maintainability of Department of Energy Nuclear Facilities" (UCRL-15673) for addressing HFE maintainability design criteria.

II. Criterion Performance Parameter Basis

N/A

1.2.6.28 Criterion Basis Statement

I. Criterion Need Basis

Design, selection, arrangement, configuration, and integration of control rooms, operating galleries, and related SSCs (e.g., controls, displays, labels, workspaces, human-computer interfaces) involves many factors, including the human-machine interface. Through compliance with "Human-System Interface Design Review Guideline" (NUREG-0700), in conjunction with other HFE standards and guidelines, this criterion ensures that control rooms, operating galleries, and related SSCs will be designed in a safe and effective manner.

This criterion supports MGR RD 3.3.A. The DOE Good Practices Guide "Human Factors Engineering" (GPG-FM-027, paragraph 2.3.1) supports the use of NUREG-0700. Sections 6.1 through 6.9 provide specific HFE design guidelines for control room elements.

This criterion supports the requirement of MGR RD 3.1.G and Guidance Statement 6.12g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.6.29 Criterion Basis Statement

I. Criterion Need Basis

Information being communicated by safety signs and tags must be quickly and easily read and uniformly understood. The ANSI Z535 series standards (I.e., "Safety Color Code" (ANSI Z535.1-1998), "Environmental and Facility Safety Signs" (ANSI Z535.2-1998), "Criteria for Safety Symbols" (ANSI Z535.3-1998), "Product Safety Signs and Labels" (ANSI Z535.4-1998), and "Accident Prevention Tags (for Temporary Hazards)" (ANSI Z535.5-1998)) are recognized in the nuclear industry for the design and use of safety signs and tags. In support of MGR RD 3.3.A, this criterion ensures that, when used in conjunction with other HFE standards and guidelines, the design of safety signs and tags will help provide a safer working environment.

II. Criterion Performance Parameter Basis

N/A

1.2.6.30 Criterion Basis Statement

I. Criterion Need Basis

In support of MGR RD 3.3.A, the "Americans With Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities" (36 CFR 1191, Appendix A) provides specific HFE design guidelines for providing personnel with physical disabilities access to and use of system resources. In addition, "Accessible and Usable Buildings and Facilities" (CABO/ANSI A117.1-1992) establishes configurations and design criteria for allowing accessibility to and usability of system components by persons with physical disabilities. When used in conjunction with other HFE standards and guidelines, these codes and standards will ensure a safe and efficient design.

This criterion is not applicable to facility workspaces and activities where physical disabilities endanger the individual or other personnel, preclude execution of tasks, or cannot be economically accommodated.

II. Criterion Performance Parameter Basis

N/A

1.2.6.31 Criterion Basis Statement

I. Criterion Need Basis

Design, selection, and integration of computer display terminals and workstations, equipment, and workspaces involve many factors, including the human-computer interface. "Human Factors Engineering of Visual Display Terminal Workstations" (ANSI/HFS 100-1988), "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 3: Visual Display Requirements" (ISO 9241-3), and "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 8: Requirements for Displayed Colours" (ISO 9241-8) support MGR RD 3.3.A by ensuring that HFE criteria will be incorporated into the selection and design of computer equipment and workspaces through compliance with applicable industry standards. The DOE Good Practices Guide "Human Factors Engineering" (GPG-FM-027, paragraph 2.3.1), endorses use of the ISO 9241 standard. When used in conjunction with other HFE standards and guidelines, these codes and standards will ensure a safe and efficient design.

II. Criterion Performance Parameter Basis

N/A

1.2.6.32 Criterion Basis Statement

I. Criterion Need Basis

Design, selection, and integration of software supporting the user interface in computer systems must consider the characteristics of the user population. In support of MGR RD 3.3.A, the application of "Guidelines for Designing User Interface Software" (ESD-TR-86-278), "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 10: Dialogue Principles" (ISO 9241-10), "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 14: Menu Dialogues" (ISO 9241-14), and "Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) - Part 15: Command Dialogues" (ISO 9241-15), ensures that HFE criteria will be incorporated into the selection, design, and integration of user interface software.

The DOE Good Practices Guide "Human Factors Engineering" (GPG-FM-027, paragraph 2.3.1), endorses the use of the ISO 9241 standard. When used in conjunction with other HFE standards and guidelines, these codes and standards will ensure a safe and efficient design.

II. Criterion Performance Parameter Basis

N/A

1.2.6.33 Criterion Basis Statement

I. Criterion Need Basis

The "Monitored Geologic Repository Project Description Document" allocates controlled project assumptions to systems. This criterion identifies the need to comply with the applicable assumptions identified in the subject document. The approved assumptions will provide a consistent basis for continuing the system design.

II. Criterion Performance Parameter Basis

N/A

1.2.6.34 Criterion Basis Statement

I. Criterion Need Basis

Compliance with "Spent Fuel Storage Facility Design Basis" (Regulatory Guide 1.13) supports the requirements of MGR RD 3.1.G and Guidance Statements 6.1g1, 6.1g2, 6.1g3, 6.1g4, 6.13g5, and 6.13g15 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.6.35 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. Compliance with "American National Standard for Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants" (ANSI/ANS-6.4-1997) supports the requirement of MGR RD 3.1.G and Guidance Statement 7.1g1 from the "MGR Compliance Program Guidance Package for the Waste Handling Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.6.36 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Standard Guide for Use of Protective Coating Standards in Nuclear Power Plants" (ASTM D5144) as applicable to the design of the system. This standard addresses special coating requirements for nuclear facilities, such as coatings that facilitate decontamination and coatings that are resistant to radiation.

II. Criterion Performance Parameter Basis

N/A

1.2.6.37 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Standard for Fire Protection for Facilities Handling Radioactive Materials" (NFPA 801) as applicable to the design of the system. This code invokes special fire protection system and building arrangement requirements for facilities that handle radioactive materials.

II. Criterion Performance Parameter Basis

N/A

APPENDIX B ARCHITECTURE AND CLASSIFICATION

The System architecture and QA classification are identified in Table I-3. The QA classifications are established in "Classification of the MGR Waste Handling Building System."

Table I-3. System Architecture and QA Classification

Waste Handling Building System Architecture	QL-1	QL-2	QL-3	CQ
Facility Decontamination		X		
Piped Utility Systems				X
Process Supply Systems				X
Safeguards and Security System				X
Solid Waste Collection				X
Waste Handling Building Structure	X			

APPENDIX C ACRONYMS, SYMBOLS, AND UNITS

C.1 ACRONYMS

This section provides a listing of acronyms used in Volume I.

ALARA	as low as is reasonably achievable
CQ	conventional quality
DOE	U.S. Department of Energy
F	Function
HFE	human factors engineering
MGR	Monitored Geologic Repository
MGR RD	Monitored Geologic Repository Requirements Document
NRC	Nuclear Regulatory Commission
QA	quality assurance
QL	quality level
SSCs	systems, structures, and components
TBD	to be determined
TBV	to be verified
TEDE	total effective dose equivalent
WHB	Waste Handling Building

C.2 SYMBOLS AND UNITS

This section provides a listing of symbols and units used in Volume I.

%	percent
C	Celsius
F	Fahrenheit
ft	feet
in.	inches
km	kilometers
m	meters
mSv	millisievert
Sv	sievert
mrem	millirem

APPENDIX D FUTURE REVISION RECOMMENDATIONS AND ISSUES

This appendix identifies issues and actions that require further evaluation. The disposition of these issues and actions could alter the functions and design criteria that are allocated to this system in future revisions to this document. However, the issues and actions identified in this appendix do not require TBDs or TBVs beyond those already identified.

Issue 1 – Resolve outstanding TBDs and TBVs.

Issue 2 – Develop more detailed criteria to address radiological protection/ALARA. The "detailed" criteria should address space allocation and layout criteria. The layout/general arrangement criteria should address locations relative to dose rates and considerations for contamination areas. The space allocation criteria should address the need for Radiological Materials Areas, Health Physics support, and decontamination areas.

Issue 3 – The term "confinement zones" mentioned in criteria 1.2.2.1.7 needs to be defined to prevent confusion in the future.

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