OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
SYSTEM DESCRIPTION DOCUMENT COVER SHEET

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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
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3. Revision	4. Description of Revision
00	Initial Issue (issued using document identifier BCB000000-01717-1705-00014).
01	Issued. This revision supersedes the previous revision with the document identifier of BCB000000-01717-1705-00014. This document is a complete rewrite of the superceded document, driven mainly by new design and regulatory requirements, and new document development procedures.
01 ICN01	This ICN adds Section 2 (Design Description) to the SDD, deletes the information in Section 1.4 per management direction, deletes TBV-459 from Appendix B, deletes TBV-3855, updates references in the SDD and Appendix E, and adds criterion 1.2.6.41. Changes are indicated by revision bars.

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SUMMARY

The Waste Treatment Building System provides the space, layout, structures, and embedded subsystems that support the processing of low-level liquid and solid radioactive waste generated within the Monitored Geologic Repository (MGR). The activities conducted in the Waste Treatment Building include sorting, volume reduction, and packaging of dry waste, and collecting, processing, solidification, and packaging of liquid waste. The Waste Treatment Building System is located on the surface within the protected area of the MGR. The Waste Treatment Building System helps maintain a suitable environment for the waste processing and protects the systems within the Waste Treatment Building (WTB) from most of the natural and induced environments. The WTB also confines contaminants and provides radiological protection to personnel. In addition to the waste processing operations, the Waste Treatment Building System provides space and layout for staging of packaged waste for shipment, industrial and radiological safety systems, control and monitoring of operations, safeguards and security systems, and fire protection, ventilation and utilities systems. The Waste Treatment Building System also provides the required space and layout for maintenance activities, tool storage, and administrative facilities.

The Waste Treatment Building System integrates waste processing systems within its protective structure to support the throughput rates established for the MGR. The Waste Treatment Building System also provides shielding, layout, and other design features to help limit personnel radiation exposures to levels which are as low as is reasonably achievable (ALARA).

The Waste Treatment Building System interfaces with the Site Generated Radiological Waste Handling System, and with other MGR systems that support the waste processing operations. The Waste Treatment Building System interfaces with the General Site Transportation System, Site Communications System, Site Water System, MGR Site Layout, Safeguards and Security System, Site Radiological Monitoring System, Site Electrical Power System, Site Compressed Air System, and Waste Treatment Building Ventilation 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. SYSTEM FUNCTIONS AND DESIGN CRITERIA

The functions and design criteria for the system are identified in the following sections. Throughout this document the term "system" shall be used to indicate the Waste Treatment Building System. The system architecture and classification are provided in Appendix B. Throughout this document, the term low-level waste or LLW is used to indicate site-generated low-level solid and liquid radiological waste.

1.1 SYSTEM FUNCTIONS

1.1.1 The system provides the required space, layout, and structures to support and optimize the LLW processing operations (including the control systems).

1.1.2 The system receives, handles, and stores packaging materials used in packaging of LLW for off-site disposal.

1.1.3 The system provides space, layout, and structural support for staging and shipping of packaged waste .

1.1.4 The system protects structures, systems, and components (SSC) within the WTB from the external environment.

1.1.5 The system provides fire protection for the WTB SSC.

1.1.6 The system receives, handles, and stores materials and chemicals used in LLW processing.

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

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

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

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

1.1.11 The system provides utilities as required to support LLW processing operations.

1.1.12 The system limits the probability and consequences of off-normal conditions.

1.1.13 The system limits the spread of low-level liquid waste within the facility.

1.1.14 The system limits the spread of contamination within the facility.

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

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

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 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) 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, refer to Appendix E.

1.2.1 System Performance Criteria

1.2.1.1 The system shall provide space, layout, and structures to support and optimize collection, processing (i.e., volume reduction, solidification), and packaging of LLW by the Site Generated Radiological Waste Handling System.

[F 1.1.1, 1.1.2][MGR RD 3.1.G, 3.3.E, 3.3.G]

1.2.1.2 The system shall provide space, layout, and structures to support staging and shipping of packaged LLW and mixed waste.

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

1.2.1.3 The system shall provide space, layout, and structures for receipt and storage of materials and chemicals that support waste processing operations.

[F 1.1.6][MGR RD 3.3.G]

1.2.1.4 The system shall provide space, layout, and structures for staging of unprocessed LLW.

[F 1.1.1][MGR RD 3.3.G]

1.2.1.5 The system shall provide space, layout, and structures as required for receipt, handling, and storage of packaging material, equipment, and tools needed to support the waste processing operations.

[F 1.1.1, 1.1.2][MGR RD 3.3.E, 3.3.G]

1.2.1.6 The system shall provide space and layout as required to support the inspection, testing, and maintenance activities of the systems that support the LLW processing operations.

[F 1.1.16][MGR RD 3.1.C, 3.3.E, 3.3.G][10 CFR 63.112(e)(13)]

1.2.1.7 The system shall provide space, layout, and administrative support facilities for personnel performing operations, maintenance, and other MGR related activities in the WTB.

[F 1.1.1, 1.1.8][MGR RD 3.3.E, 3.3.G]

1.2.1.8 The system shall provide space, layout, and structures as required for receipt and staging of packaged site generated mixed wastes for shipment off-site.

[F 1.1.1][MGR RD 3.3.E, 3.3.G]

1.2.1.9 The system shall be designed with an electrical subsystem that supplies normal electric power to the equipment in the WTB and provides interior and exterior lighting to support the LLW processing operations.

[F 1.1.1, 1.1.11][MGR RD 3.3.E, 3.3.G]

1.2.1.10 The system shall be designed with piped utility subsystems (e.g., chilled water, hot water, potable water, industrial and instrument air) as required for the personnel and equipment that support the LLW processing operations.

[F 1.1.1, 1.1.11][MGR RD 3.3.E, 3.3.G]

1.2.1.11 The system shall be designed with a fire protection subsystem for the WTB.

[F 1.1.5, 1.1.8][MGR RD 3.3.A, 3.3.E, 3.3.G]

1.2.1.12 The system shall include provisions for decontamination and decommissioning, including removal of potentially contaminated components.

[F 1.1.15][MGR RD 3.1.C][10 CFR 63.21(c)(17)]

1.2.1.13 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 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 1.1.7][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)]

1.2.2.1.2 The foundations and walls of structures that house the liquid radioactive waste system shall be designed to a height sufficient to contain the maximum liquid inventory in the building during and following a Frequency Category 1 (TBV-1246) design basis earthquake.

[F 1.1.12][MGR RD 3.1.C, 3.1.G][10 CFR 63.112(e)(8)]

1.2.2.2 Non-nuclear Safety Criteria

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

[F 1.1.10][MGR RD 3.1.C][10 CFR 63.112(e)(10)]

1.2.2.2.2 The system shall provide for retention of liquid radiological waste in the event of tank overflow, tank leak, and equipment failure.

[F 1.1.12, 1.1.13][MGR RD 3.1.C, 3.3.A][10 CFR 63.112(e)(10)]

1.2.2.2.3 The system shall limit the release of radioactive material and the spread of radioactive contamination by dividing the WTB into confinement zones based on radiation and contamination levels.

[F 1.1.8, 1.1.12, 1.1.14][MGR RD 3.1.B, 3.1.C][10 CFR 63.111(a)(1), 63.112(e)(1), 63.112(e)(10), 63.112(e)(4)]

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

[F 1.1.7][MGR RD 3.3.A]

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

[F 1.1.7, 1.1.9][MGR RD 3.1.C, 3.1.G][10 CFR 63.112(e)(5)]

1.2.3 System Environment Criteria

1.2.3.1 The system shall be designed such that components susceptible to radiation will not deteriorate excessively when exposed to the radiation environment (TBD-405) in which the component is located.

[MGR RD 3.3.A]

1.2.3.2 The system components affected by wind shall be designed for a basic wind speed of 121 miles per hour.

[F 1.1.4][MGR RD 3.1.G, 3.3.A]

1.2.3.3 The system shall be designed for an outside temperature environment of 5 degrees F to 117 degrees F.

[F 1.1.4]

1.2.3.4 The system shall be designed for a maximum daily snowfall of 10 inches and maximum snowfall accumulation of 17 inches.

[F 1.1.4][MGR RD 3.3.A]

1.2.3.5 The system shall be designed for the ambient relative humidity environment defined in Table 1.

Table 1. Ambient Relative Humidity Environment

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

[F 1.1.4]

1.2.3.6 The system shall be designed for an environment with a maximum annual precipitation of 10 inches and maximum daily precipitation of 5 inches.

[F 1.1.4][MGR RD 3.3.A]

1.2.3.7 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 General Site Transportation System for shipping and supply requirements.

1.2.4.2 The system shall interface with the Site Communications System for space and layout and equipment installation and routing of communication cables requirements.

1.2.4.3 The system shall interface with the Site Water System for the water supply requirements of the WTB subsystems.

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

1.2.4.5 The system shall interface with the MGR Operations Monitoring and Control System for space, layout, and equipment installation requirements.

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

1.2.4.7 The system shall interface with the Site Radiological Monitoring System for space, layout, and equipment installation requirements.

1.2.4.8 The system shall interface with the Site Electrical Power System for WTB power supply requirements.

1.2.4.9 The system shall interface with the Site Compressed Air System for industrial and instrument air requirements for the WTB.

1.2.4.10 The system shall interface with the Waste Treatment Building Ventilation System as required.

1.2.5 Operational Criteria

There are no operational criteria for this system.

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 provisions of "Standards for Protection Against Radiation" (10 CFR 20).

[MGR RD 3.1.B]

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), subject to the stipulations and exceptions provided in "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 "Specification for Radiation Shielding Materials" (ANSI/ANS 6.4.2-1985).

[MGR RD 3.3.A]

1.2.6.6 The system design shall comply with the applicable sections of the "1997 Uniform Building Code" (Volume 1, "Administrative, Fire- and Life-Safety, and Field Inspection Provisions").

[MGR RD 3.3.A]

1.2.6.7 The system design shall comply with the applicable sections of the "1997 Uniform Building Code" (Volume 2, "Structural Engineering Design Provisions").

[MGR RD 3.3.A]

1.2.6.8 The system design shall comply with the applicable sections of the "1997 Uniform Building Code" (Volume 3, "Material, Testing and Installation Standards").

[MGR RD 3.3.A]

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

[MGR RD 3.3.A]

1.2.6.10 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]

1.2.6.11 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]

1.2.6.12 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]

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

[MGR RD 3.1.D]

1.2.6.14 The design of the electrical subsystem shall comply with the applicable sections of "National Electrical Code" (NFPA-70).

[MGR RD 3.3.A]

1.2.6.15 The design of the electrical subsystem shall comply with the applicable sections of "National Electrical Safety Code" (IEEE C2-1997).

[MGR RD 3.3.A]

1.2.6.16 The system design shall comply with the applicable sections of "Standard Specification for Structural Concrete" (ACI 301–1996).

[MGR RD 3.3.A]

1.2.6.17 The system design shall comply with the applicable sections of "Structural Welding Code - Steel" (ANSI/AWS D1.1:1998).

[MGR RD 3.3.A]

1.2.6.18 The system design shall comply with the applicable sections of "Building Code Requirements for Structural Concrete and Commentary" (ACI 318-99).

[MGR RD 3.3.A]

1.2.6.19 The design of the electrical subsystem shall comply with the applicable sections of "IES Lighting Handbook: Application Volume."

[MGR RD 3.3.A]

1.2.6.20 The design of the electrical subsystem shall comply with the applicable sections of "IEEE Recommended Practice for Electrical Power Distribution for Industrial Plants" (IEEE Std 141-1993).

[MGR RD 3.3.A]

1.2.6.21 The design of the electrical subsystem shall comply with the applicable sections of "Standard for the Installation of Lightning Protection Systems" (NFPA 780).

[MGR RD 3.3.A]

1.2.6.22 The design of the electrical subsystem shall comply with the applicable sections of "IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis" (IEEE Std 399-1997).

[MGR RD 3.3.A]

1.2.6.23 The design of the electrical subsystem shall comply with the applicable sections of "IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems" (IEEE Std 142-1991).

[MGR RD 3.3.A]

1.2.6.24 The design of the electrical subsystem shall comply with the applicable sections of "IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems" (IEEE Std 242-1986).

[MGR RD 3.3.A]

1.2.6.25 The design of the electrical subsystem shall comply with the applicable sections of "American National Standard Practice for Office Lighting" (ANSI/IESNA RP-1-1993).

[MGR RD 3.3.A]

1.2.6.26 The design of the electrical subsystem shall comply with applicable sections of "American National Standard Practice for Industrial Lighting" (ANSI/IES-RP-7-1991).

[MGR RD 3.3.A]

1.2.6.27 The system design shall comply with the applicable sections of "Facility Safety" (DOE Order 420.1).

[MGR RD 3.3.A]

1.2.6.28 The system design shall comply with the applicable sections of "Manual of Steel Construction, Allowable Stress Design."

[MGR RD 3.3.A]

1.2.6.29 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]

1.2.6.30 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]

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

[MGR RD 3.3.A]

1.2.6.32 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]

1.2.6.33 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]

1.2.6.34 The system shall be designed in accordance with the applicable sections of "American National Standard For 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]

1.2.6.35 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]

1.2.6.36 The SSCs shall be coated in accordance with applicable requirements in "Standard Guide for Use of Protective Coating Standards in Nuclear Power Plants" (ASTM D5144-97).

[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]

1.2.6.38 The system design shall comply with applicable guidance in "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants" (Regulatory Guide 1.143).

[MGR RD 3.3.A]

1.2.6.39 The design of concrete radiation shielding structures shall comply with the applicable sections of "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]

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

1.2.6.41 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]

1.3 SUBSYSTEM DESIGN CRITERIA

There are no subsystem design criteria for this system.

1.4 CONFORMANCE VERIFICATION

This section will be provided in a future revision.

2. DESIGN DESCRIPTION

Section 2 of this SDD summarizes information contained in other references. By assembling system specific information contained elsewhere (i.e., analyses, technical reports, etc.), Section 2 provides insight into the current state of the design of this system. However, due to the nature of design development, the information contained in this section will continue to change as the design matures.

2.1 SYSTEM DESIGN SUMMARY

The system design summary provided below is based on Section 6.3.5 of "WHB/WTB Space Program Analysis for Site Recommendation."

The Waste Treatment Building (WTB) is sited on the existing Exploratory Studies Facility pad, adjacent to the Waste Handling Building (WHB) carrier bay. The WTB system provides SSCs that support the collection, segregation, and disposal of low-level radioactive waste generated within the MGR. The activities conducted within the WTB include sorting, volume reduction and packaging of liquid and dry waste, and collecting, processing, and solidification. The system is located within the surface facility's restricted area. The system provides space and controls for the internal building environment within which the Site-Generated Radiological Waste Handling System operates. The system protects Site-Generated Radiological Waste Handling System equipment and operations from natural and induced environmental conditions for the duration of the waste emplacement operation. The system's primary function is to control radiological contaminants and provide radiological protection to personnel.

The WTB System integrates LLW processing systems within its protective structure to support the throughput rates established for waste emplacement. The WTB System also provides shielding, layout, and other design features to help limit personnel radiation exposures to levels which are ALARA.

2.2 DESIGN ASSUMPTIONS

No assumptions were used to develop the design concept and features.

2.3 DETAILED DESIGN DESCRIPTION

The detailed design description provided below is based on Section 6.3 of the "WHB/WTB Space Program Analysis for Site Recommendation." Figures 1 and 2 in this SDD are based on Figures I-1 and I-4 of the referenced analysis.

The WTB is an open, high bay industrial structure without radiation shielding requirements. The main operating floor is a slab on grade. The superstructure is a structural steel, braced frame with insulated metal siding and metal deck roof with concrete containment walls to prevent any possible spills from entering the surrounding soil. Those slab portions and walls acting as containment will be designed for appropriate design basis events. Support personnel offices are

located on the ground floor. An elevated floor or mezzanine is located above the personnel offices for the building mechanical equipment. The WTB and the WHB are separated by a seismic joint to prevent structure interaction between the two different framing systems during an earthquake.

In the following sections, the design analysis for the WTB indicates the required minimum floor areas anticipated for all of the required functional spaces, including the supporting functional relationship housed in the WTB. The analysis indicates spaces within specific areas that include the Process Areas, Facility Support Areas, HVAC Equipment Areas, and the Miscellaneous Building Support Areas.

2.3.1 Process Areas

2.3.1.1 Low-Level Wastes

The process areas within the WTB provide space for the handling, processing, and packaging for disposal of site generated secondary LLW. The waste streams treated in the WTB are dry-solid LLW, recyclable liquid LLW, non-recyclable liquid LLW, and wet-solid LLW. The wet-solid LLW (spent ion exchange resins and filter cartridges) generated within the WTB are packaged for disposal within the WTB. A total floor area of 36,800 ft^2 is deemed sufficient for location and operation of LLW processing equipment.

2.3.1.2 Mixed and Hazardous Wastes

Mixed waste is not anticipated to be generated as a result of normal MGR operations; however, should the need arise, provision has been made to stage a small quantity of packaged mixed waste within the WTB. The area required is approximately 800 ft^2. This space is in addition to the 36,800 ft^2 identified for LLW processing.

As with mixed waste, it is not anticipated that significant quantities of hazardous wastes will be generated as a result of MGR operations. Hazardous waste, if generated, is to be packaged at its point of origin, and then staged in an area external to the WTB for proper shipment. Hazardous waste is excluded from entering the WTB to minimize the potential of generating mixed waste.

2.3.2 Facility Support Areas

The WTB contains functional areas within the facility required to support the treatment process. These areas include security, operations, and administration. Also included throughout the functional areas are the minimum required building circulation paths needed to connect operational personnel and equipment to essential facility functions.

2.3.2.1 Security

The functional requirements for security operations are intended to identify the required security functions to be housed inside the WTB. The requirements anticipate that only two security portals are needed, with one security portal and a small office located at the main entry of the facility and the second security portal at the shipping/receiving area.

2.3.2.1.1 Security Portals

The Security Portals are arranged to provide entry and exit control points into the WTB. Each portal, one located at the main entry and the other at the shipping/receiving area entrance into the facility, includes a security officer and a personnel radiation counter. The minimum space required for each portal is 150 ft^2 and the combined total not including the security office is 300 ft^2.

2.3.2.1.2 Office

The shift office provides space for one security person. This office is adjacent to the main security portal. The minimum space required for this area is 150 ft^2.

2.3.2.2 Operations

The Operations area provides functional support spaces for operational activities and associated personnel. This area includes a parts storage room, men and women's change rooms with shower facilities, restrooms for non-radiological coverall worker clothing, coverall storage, a lunchroom, janitor closet, forklift staging and charging area, and a shipping/receiving area.

2.3.2.2.1 Parts Storage

The parts storage room is a required functional space within the WTB. The minimum space required for this area is 120 ft^2.

2.3.2.2.2 Change Rooms

The change rooms including the associated showers are provided for both male and female operational to maintenance employees working within the WTB to change into worker coveralls. Restrooms are also provided in this area and are based on the anticipated male and female employees ratio planned for the WTB. The change rooms are located to provide direct access into the process areas of the facility. The combined minimum space required for both change rooms is 1,389 ft^2.

2.3.2.2.3 Coverall Storage

The coverall storage is provided for clean and dirty coverall clothing. The storage area is located adjacent to the change rooms. The minimum space required for this area is 85 ft^2.

2.3.2.2.4 Lunchroom

The lunchroom is provided for all operational personnel assigned to the WTB. The floor area includes space for minor food preparation, chairs and tables, and vending equipment. The food preparation area will support the heating of precooked foods and the storage area will accommodate minor refrigeration equipment. The minimum space required for this area is 980 ft^2.

2.3.2.2.5 Janitor Closet

There are two janitor closets incorporated into the WTB which provide janitorial supply storage. The combined minimum space required for both areas is 150 ft^2.

2.3.2.2.6 Forklift Staging

The staging area is anticipated to house several parked forklifts, including a battery charging station. The circulation or corridor access provides general equipment movement and is needed to connect the forklift staging area to the process area in the WTB. The ceiling height in the forklift staging area is open to the underside of the building structure. The minimum space required for the forklift staging area is 1,340 ft^2 and the minimum space provided for circulation is 1,755 ft^2.

2.3.2.2.7 Shipping/Receiving

The Shipping/Receiving area provides a loading dock with a staging area to receive routine supplies for the process, operations, and administration areas. The loading dock is also used for shipping waste materials produced by the WTB process area. The dock area is positioned for direct access from the mixed waste accumulation areas and to the exterior of the facility where site-shipping activities are handled. The ceiling in this area is open to the underside of the building structure. The minimum space required for this area is 1,450 ft^2.

2.3.2.3 Administration

The Administration area includes spaces that house various management and support functions for the WTB. These spaces include supervisor and plant operations offices, staff offices, health physics and QA offices, inventory control office, a calibration lab, and copy/supply storage. The administrative area is located adjacent to the main entry to the facility. The minimum total square footage for the administration area is 1,900 ft^2.

2.3.2.3.1 Plant/Process Maintenance Supervisor Offices

Two offices are provided to accommodate a plant maintenance supervisor and a process maintenance supervisor. The minimum space provided for each office is 100 ft^2. The combined minimum total space required for this area is 200 ft^2.

2.3.2.3.2 Plant Manager Office

One office is provided for the WTB Plant Manager. The minimum space required for this area is 225 ft^2.

2.3.2.3.3 Plant Management Supervisor Office

One office is provided for the Plant Management Supervisor. The minimum space required for this area is 150 ft^2.

2.3.2.3.4 Staff Support

The Staff Support Office is an open floor plan work area intended to provide space for six workstations. The minimum space required for this area is 600 ft^2.

2.3.2.3.5 Health Physics Office

The Health Physics Office provides space for two technicians and storage for radiation detection equipment and personnel dosimeter devices. The office is located adjacent to the instrument calibration shop and the entry point to the process area. The minimum space required for this area is 250 ft^2.

2.3.2.3.6 Quality Assurance Office

One office is provided for a QA Officer. The minimum space required for this area is 128 ft^2.

2.3.2.3.7 Inventory Control Office

The inventory control office is provided to accommodate inventory control of incoming and outgoing waste materials processed in the WTB. The minimum space required for this area is 128 ft^2.

2.3.2.3.8 Copy/Storage Room

The copy/storage room provides space for a copy machine, fax machine, and a storage area for general office supplies. The minimum space required for this area is 60 ft^2.

2.3.2.3.9 Instrument Calibration

The instrument calibration shop provides space for minor instrument calibration and storage space for radiological instruments used in the WTB (repairs to instruments are performed in the WHB). The shop is located adjacent to the health physics technicians' office. The minimum space required for this area is 250 ft^2.

2.3.2.4 Circulation

The functional space requirements for circulation of personnel was included in the floor area analysis for the operation and administration areas and excludes the forklift staging, forklift access corridor and the shipping and receiving. The circulation requirements for the forklift staging, forklift access corridor and the shipping/receiving area were figured separately along with the remainder of the unassigned/assigned circulation (e.g. stairways, elevator and facility support air equipment) and the vestibule. The adjacency requirements for functional areas are direct and do not require additional space. The combined minimum space required is 2,400 ft^2.

2.3.3 HVAC Equipment Areas

The size and configuration of the WTB HVAC equipment room for the WTB is designed to accommodate two separate equipment rooms for the normally clean outside air intake, and a separate room for the potentially contaminated recirculation or exhaust systems. The combined minimum space required is 5,375 ft^2.

2.3.4 Miscellaneous Building Support Areas

The WTB contain miscellaneous support utilities. These include fire protection, electrical, communication, and process systems supporting the WTB system operation. The building support spaces are sized to accommodate maintenance of equipment.

2.3.4.1 Fire Protection

The WTB is provided with sprinkler riser, fire suppression, and alarm systems. The fire riser rooms may be located either in a separate room or within a general area that does not detract from the functions of other spaces. Each fire riser assembly requires area for piping, valves, a backflow preventer unit, and associated alarms annunciation. The fire alarm annunciation panel is required to be located on the wall of the main entry vestibule and requires no additional floor area. The ceiling in the fire riser area may be open to the underside of the building structure. The minimum space required for each area is 100 ft^2 each per riser room, based on a 10-ft by 10-ft rooms. Total area for 2 riser room is 200 ft^2. The maximum allowable protected floor area that can be covered by each riser is 52,000 ft^2.

2.3.4.2 Electrical

The electrical power distribution room and the electrical switch-gear room provide the facility with the required electrical power and switching hardware needed to operate the entire WTB. The electrical service for the facility includes both normal and backup power. The backup power system is provided to assist critical safety systems and provide uninterruptible power supplies. Facility requirements for backup and uninterruptible power have not been determined. The allotted floor area used for the electrical rooms is based on assumed electrical power systems and associated equipment. The minimum combined space required for both electrical rooms is 1,950 ft^2.

2.3.4.3 Communications

The communication room provides space for telephone, radio, computer networking equipment, and building/site alarm system equipment. The specific communication system for the WTB has not been defined. The ceiling for this area may be open to the underside of the building structure. The minimum space required for this area is 50 ft^2.

2.4 COMPONENT DESCRIPTION

This information will be provided in a future revision.

2.5 CRITERIA COMPLIANCE

The surface facility is developed conceptually at this time without criteria compliance analyses. The criteria compliance for this system will be addressed in future issues of this SDD as the design and analysis of the system matures.

CRWMS SURFACE NUCLEAR FACILITIES
GENERAL ARRANGEMENT FIGURES

FIGURE LIST

FIGURE	TITLE
I-1	TITLE SHEET
WASTE HANDLING/WASTE TREATMENT BUILDING	
I-2	FLOOR PLAN AT EL. 50+0
I-3	FLOOR PLAN AT EL. 80+0
I-4	FLOOR PLAN AT EL. 100+0
I-5	FLOOR PLAN AT EL. 130+0
I-6	FLOOR PLAN AT EL. 142+0
I-7	FLOOR PLAN AT EL. 173+0
I-8	ROOF PLAN
I-9	BUILDING SECTIONS

ROOM LEGEND

WASTE HANDLING BUILDING

PRIMARY AREAS

CARRIER/CASK HANDLING SYSTEM (CCHS)

H-100A CARRIER BAY

ASSEMBLY TRANSFER SYSTEM (ATS)

H-040 VACUUM PUMP ROOM
H-101 (A,B) CASK AIRLOCK
H-102 (A,A2,B,B2) CASK PREP AND DECONTAMINATION
H-103 (A,B) CASK UNLOAD POOL AREA
H-103 (A1,B1) POOL, STAGING & CASK UNLOAD
H-104 (A,B) INCLINE TRANSFER CANAL
H-105 (A,B) DC LOAD CELL
H-106 (A,B) DC DECONTAMINATION CELL
H-183 FUEL STORAGE POOL AREA
H-183 (A,B,C,D) FUEL BASKET STORAGE POOL
H-183E NON-STANDARD FUEL POOL
H-183 (F,G) FUEL BASKET TRANSFER CANAL
H-183H NON-STANDARD FUEL BASKET TRANSFER CANAL
H-183J NON-STANDARD FUEL HANDLING AREA
H-205 (A,B) ASSEMBLY HANDLING CELL (AHC)
H-206 (A,B) AHC CRANE MAINTENANCE BAY
H-301 (A,B) POOL AREA CRANE MAINT BAY

CANISTER TRANSFER SYSTEM (CTS)

H-100B CASK TRANSFER CORRIDOR
H-103C CANISTER TRANSFER (CT) CELL, LOWER LEVEL
H-103D CANISTER STAGING
H-104C OFF-NORMAL CANISTER TRANSFER TUNNEL
H-107A CASK AIRLOCK
H-108A CASK PREP & DECONTAMINATION
H-205C CANISTER TRANSFER CELL UPPER LEVEL
H-205C1 OFF-NORMAL CANISTER HANDLING CELL
H-209A CT CELL CRANE MAINTENANCE BAY

DISPOSAL CONTAINER HANDLING SYSTEM (DCHS)

H-110 DC HANDLING CELL
H-111 WP TRANSPORTER LOADING CELL
H-112 WP TRANSPORTER AIRLOCK
H-113 LOADED DC STAGING AREA
H-115 EMPTY DC PREPARATION AIRLOCK
H-117 EMPTY DC PREPARATION
H-208 (A,B,C,D,E,F,G,H) WELDER #1-8
H-301 DC HANDLING CELL CRANE MAINTENANCE BAY

WASTE PACKAGE REMEDIATION SYSTEM (WPRS)

H-114 WP REMEDIATION CELL

PRIMARY SUPPORT AREAS

H-116 CONTAMINATED EQUIPMENT ROOM
H-118 (A,B,C,E,F,G,H) OPERATING GALLERY
H-119 WASTE HANDLING OPERATION CNTR
H-120 CONTAMINATED EQUIPMENT & DECONTAMINATION
H-120A STAGING AREA (HOT SUPPORT)
H-122 MAINTENANCE EQUIP STORAGE
H-123 TOOL STORAGE
H-124 MAINTENANCE SHOP
H-125 LLW COLLECTION & PACKAGING
H-126 FORKLIFT STAGING & SERVICING
H-203 WELDER MAINTENANCE BAY
H-207 (A,B,C,D,F,G,H,I,J) OPERATING GALLERY
H-211 WELDER MATERIALS STORAGE
H-213 WELDER MAINTENANCE HOT SHOP
H-402 ASSEMBLY & CANISTER TRANSFER CORRIDOR
H-403 DC HANDLING & WP REMEDIATION EQUIPMENT TRANSFER CORRIDOR

POOL SUPPORT AREAS

H-020 POOL TREATMENT EQUIP ROOM
H-083 POOL TREATMENT EQUIP ROOM
H-084 (A,B) POOL TREATMENT EQUIP ROOM
H-085 CORRIDOR

FACILITY SUPPORT AREAS

MAINTENANCE

H-019 EQUIPMENT MAINTENANCE SHOP
H-019B INSTRUMENT MAINTENANCE SHOP
H-121 SHIPPING & RECEIVING
H-159 TOOL STORAGE
H-160 MAINTENANCE MATERIAL STORAGE
H-161 (A,B) HEPA FILTER STORAGE
H-162 JANITOR CLOSET
H-163 SHIPPING/RECEIVING
H-164 WASTE STAGING
H-165 GAS BOTTLE STORAGE

OPERATIONS

H-016A MEN'S CHANGE ROOM
H-016B WOMEN'S CHANGE ROOM
H-017 (A,B) COVERALL STORAGE
H-133 (A,B) HEALTH PHYSICS LABORATORY
H-134 (A,B,C,D) LABORATORY TECHNICIANS OFFICE
H-135 LABORATORY MATERIAL STORAGE
H-136 FIRST AID ROOM & OFFICE
H-137 OPERATIONS LUNCHROOM
H-138 JANITOR CLOSET

ADMINISTRATION

H-018 (A,B) SUPERVISOR OFFICE
H-018B SUPERVISOR OFFICE
H-139 ENTRY LOBBY
H-140 (A,B) SUPERVISOR OFFICE
H-141 PLNT OPERATIONS MANAGER OFFICE
H-142 (A,B) QA/QC OPERATIONS OFFICE
H-143 (A,B,C,D) OPERATIONS STAFF OFFICE
H-144 STAFF SUPPORT-OPEN OFFICE
H-145 (A,B) SECRETARIAL OFFICE
H-146 (A,B) DOE MANAGER OFFICE
H-147 (A,B,C,D) DOE STAFF OFFICES
H-148 (A,B) DOE STAFF SUPPORT-SECRETARIAL
H-149 DOE STAFF SUPPORT-CLERICAL
H-150 CONFERENCE ROOM
H-151 OPERATIONS CLERK OFFICE
H-151A DOCUMENT CONTROL
H-152 COPY ROOM
H-153 STORAGE ROOM
H-154A RESTROOM, WOMEN
H-154B RESTROOM, MEN
H-155 LUNCHROOM
H-156 JANITOR CLOSET

RADIATION PROTECTION

H-010 REGULATED CHANGE ROOM
H-011 RADIATION PROTECTION PORTAL
H-012 PERSONNEL DECON ROOM
H-013 PERSONNEL RADIATION PROTECTION EQUIPMENT STORAGE
H-014 HEALTH PHYSICS OFFICE
H-015 (A,B) PROTECTIVE CLOTHING STORAGE
H-129 CALIBRATION SHOP
H-302 REGULATED CHANGE ROOM
H-305 REGULATED CHANGE ROOM
H-405 REGULATED CHANGE ROOM

SECURITY

H-130 (A,B) SECURITY PORTAL
H-131 SECURITY ALARM STATION
H-132 (A,B) OFFICE

HVAC EQUIPMENT AREAS

H-157 COLD SUPPORT HVAC
H-171 TERTIARY CONFINEMENT EXHAUST
H-171A ELECTRICAL DISTRIBUTION HVAC
H-171 (B,C) STACK MONITOR ROOM
H-200 TERTIARY CONFINEMENT SUPPLY
H-201 TERTIARY CONFINEMENT EXHAUST/RECIRCULATING
H-204 HYDRONIC EQUIPMENT ROOM
H-300 PRIMARY/SECONDARY CONFINEMENT SUPPLY
H-308 (A,B) PRIMARY CONFINEMENT EMERGENCY SUPPLY
H-383A FUEL STORAGE POOL TERTIARY CONFINEMENT SUPPLY
H-383B FUEL STORAGE POOL TERTIARY CONFINEMENT EXHAUST
H-400 SECONDARY CONFINEMENT EXHAUST
H-400A PRIMARY CONFINEMENT EXHAUST
H-400 (B,C) EMERGENCY CONFINEMENT EXHAUST

MISCELLANEOUS BUILDING SUPPORT AREAS

AIRLOCK AND VESTIBULE

H-086 VESTIBULE
H-100C ACCESS CORRIDOR
H-100 (D,E,F) VESTIBULE
H-101 (D,E,F,G,H) AIRLOCK
H-116A ACCESS CORRIDOR
H-183K VESTIBULE
H-217 AIRLOCK
H-220 AIRLOCK
H-223 VESTIBULE
H-228 VESTIBULE
H-303 AIRLOCK
H-304 VESTIBULE
H-307 AIRLOCK
H-309 ACCESS CORRIDOR
H-310 VESTIBULE
H-312 VESTIBULE
H-313 VESTIBULE
H-317 VESTIBULE
H-404 AIRLOCK
H-406 AIRLOCK
H-407 AIRLOCK

COMMUNICATIONS

H-170 COMMUNICATION ROOM

CORRIDORS & HALLWAYS

H-050 CORRIDOR
H-051 CORRIDOR
H-052 CORRIDOR
H-053 CORRIDOR
H-054 CORRIDOR
H-120B CORRIDOR
H-127 ACCESS CORRIDOR
H-128 ACCESS CORRIDOR
H-181 ACCESS CORRIDOR
H-182 ACCESS CORRIDOR
H-218 ACCESS CORRIDOR
H-219 ACCESS CORRIDOR
H-221 ACCESS CORRIDOR
H-224 ACCESS CORRIDOR
H-225 ACCESS CORRIDOR
H-226 ACCESS CORRIDOR
H-227 ACCESS CORRIDOR
H-306 ACCESS CORRIDOR
H-314 ACCESS CORRIDOR
H-315 ACCESS CORRIDOR
H-316 ACCESS CORRIDOR
H-401 (A,B,C,D,E,F) ACCESS CORRIDOR

ELECTRICAL

H-168 ELECTRICAL POWER DISTRIBUTION
H-169 (A,B) EMERGENCY GENERATOR
H-172 (A,B) SAFETY ELECTRICAL EQUIPMENT

FIRE PROTECTION

H-167 (A,B,C,D,E,F,G) FIRE RISER
H-267 (C,D,E,F) FIRE RISER
H-367G FIRE RISER

PIPE CHASE

H-075 PIPE CHASE

WASTE TREATMENT BUILDING

PROCESS AREA

T-101 SOLID LLW PROCESSING
T-102 CHEMICAL LIQUID LLW PROCESSING
T-103 RECYCLABLE LIQUID LLW PROCESSING
T-104 MIXED & HAZARDOUS WASTE STAGING

FACILITY SUPPORT AREA

SECURITY

T-105 SECURITY PORTAL
T-106 SECURITY PORTAL
T-107 OFFICE

OPERATIONS

T-108 PARTS STORAGE
T-109 MEN'S CHANGE ROOM
T-110 WOMEN'S CHANGE ROOM
T-111 COVERALL STORAGE
T-112 LUNCHROOM
T-113 (A,B) JANITOR CLOSET
T-114 FORKLIFT STAGING
T-115 SHIPPING/RECEIVING
T-129 FORKLIFT CORRIDOR

ADMINISTRATION

T-116 NOT USED
T-117 SUPERVISOR OFFICE
T-118 SUPERVISOR OFFICE
T-119 PLANT MANAGER OFFICE
T-120 PLANT MANAGEMENT SUPERVISOR OFFICE
T-121 STAFF SUPPORT-OPEN OFFICE
T-122 HEALTH PHYSICS OFFICE
T-123 QA OFFICE
T-124 INVENTORY CONTROL OFFICE
T-125 COPY/STORAGE ROOM
T-126 INSTRUMENT CALIBRATION
T-130 VESTIBULE

HVAC EQUIPMENT AREAS

T-200 FACILITY SUPPORT AREA HVAC
T-201 PROCESS AREA HVAC SUPPLY
T-202 PROCESS AREA HVAC EXHAUST

BUILDING SUPPORT AREAS

FIRE PROTECTION

T-127 (A,B) FIRE RISER ROOM

ELECTRICAL

T-203 ELECTRICAL POWER DISTRIBUTION
T-204 ELECTRICAL SWITCHGEAR

COMMUNICATIONS

T-128 COMMUNICATION ROOM

FIGURE 1
WASTE HANDLING/WASTE TREATMENT BLDG
TITLE SHEET

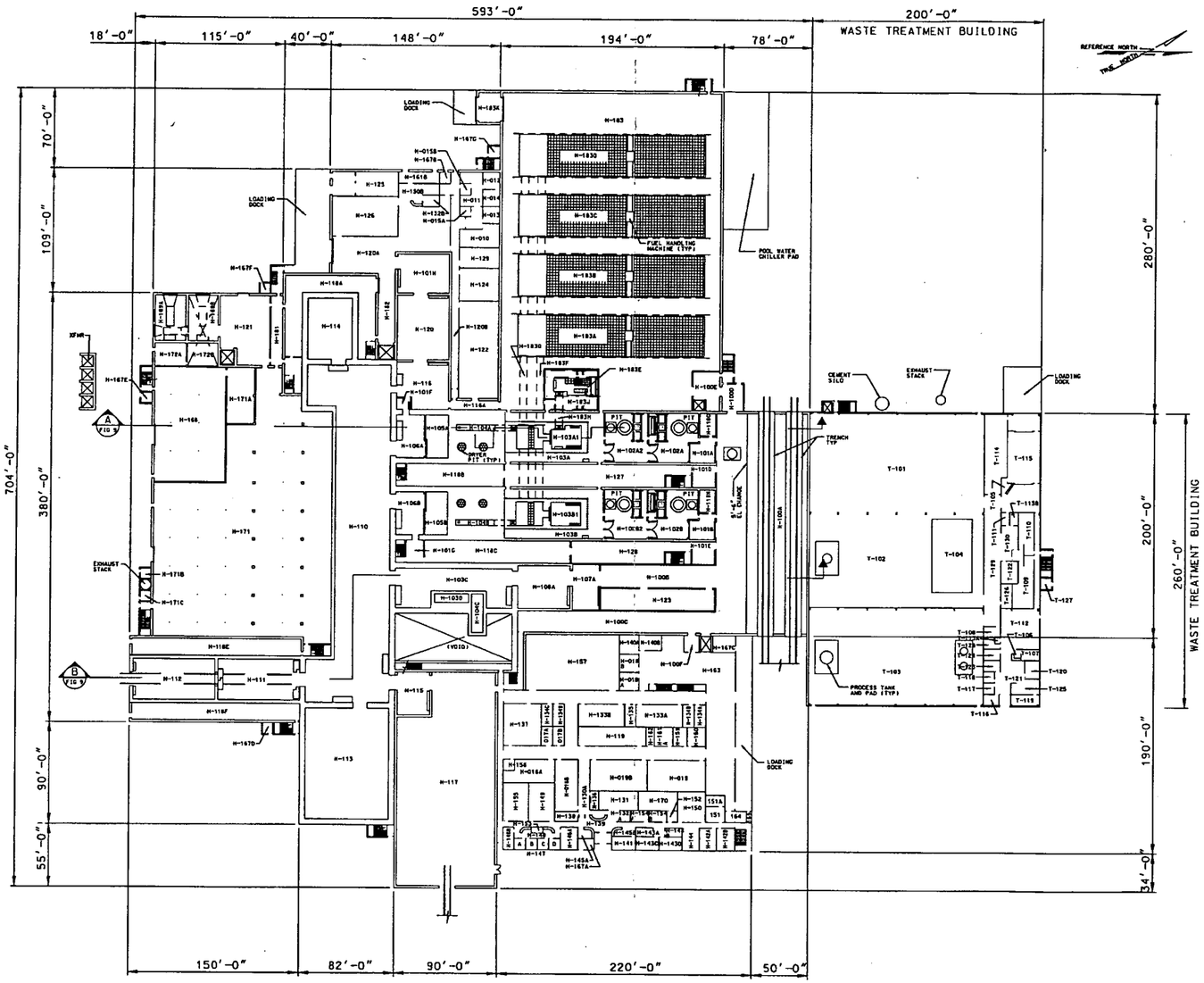

FIGURE 2
WASTE HANDLING/WASTE TREATMENT BLDG
FLOOR PLAN AT EL. 100+0

3. SYSTEM OPERATIONS

This section will be completed in a later revision.

4. SYSTEM MAINTENANCE

This section will be completed in a later revision.

APPENDIX A CRITERION BASIS STATEMENTS

This section presents the criterion basis statements for criteria in Section 1.2. Descriptions of the traces to "Monitored Geologic Repository Requirements Document" (MGR RD) 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 collection, processing, and packaging of site-generated low-level liquid and solid radiological waste (LLW). This criterion directly supports MGR RD 3.3.E and 3.3.G, which require the MGR to be capable of managing (i.e., collecting and packaging) site-generated waste for disposal off-site.

This criterion also supports MGR RD 3.1.G and requirements of guidance statement 6.6g8 from the "MGR Compliance Program Guidance Package for the Waste Treatment Building System."

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 staging of packaged LLW. This criterion supports 3.3.G, which requires the MGR to be capable of managing (i.e., collecting and packaging) site-generated, low-level, and mixed waste for disposal off-site.

This criterion also supports MGR RD 3.1.G and requirement of guidance statement 6.6g8 from the "MGR Compliance Program Guidance Package for the Waste Treatment Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.1.3 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing a facility that can support collection and processing of LLW. Specifically, this criterion addresses the requirement for the capability to receive and store the materials and chemicals required for processing waste. This criterion supports MGR RD 3.3.G, which requires the MGR to be capable of collecting and packaging site-generated waste for off-site disposal.

II. Criterion Performance Parameter Basis

N/A

1.2.1.4 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing a facility that can support collection and processing of LLW. Specifically, this criterion addresses the requirement for the capability for staging unprocessed site-generated waste awaiting processing (i.e., waste generated during operational peaks when processing and packaging for shipment cannot keep up with waste generation). This criterion supports MGR RD 3.3.G, which requires the MGR to be capable of collecting and packaging site-generated waste for disposal off-site.

II. Criterion Performance Parameter Basis

N/A

1.2.1.5 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing a facility that can support collection and processing of LLW. Specifically, this criterion addresses the requirement for laydown and storage space for materials, equipment, and tools required for processing site-generated waste. This criterion supports MGR RD 3.3.E and 3.3.G, which require the MGR to be capable of managing (i.e., collecting and packaging) site-generated waste for disposal off-site.

II. Criterion Performance Parameter Basis

N/A

1.2.1.6 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing a facility that can support collection and processing of LLW. Specifically, this criterion addresses the requirement for space and layout to support the inspection, testing, and maintenance activities associated with the processing of LLW. This criterion supports MGR RD 3.1.C and is based on 10 CFR 63.112(e)(13) which requires the performance analysis of the SSC that are important to safety to include consideration of the means to inspect, test, and maintain SSC important to safety to ensure their continued functioning and readiness.

This criterion also supports MGR RD 3.3.E and 3.3.G, which require the MGR to be capable of managing (i.e., collecting and packaging) site-generated waste for disposal off-site.

II. Criterion Performance Parameter Basis

N/A

1.2.1.7 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing a facility that can support collection and processing of LLW. Specifically, this criterion addresses the requirement for space, layout, and administrative support facilities (e.g., change rooms, rest rooms, offices) for personnel performing operations, maintenance, and other activities associated with the processing of LLW. This criterion supports MGR RD 3.3.E and 3.3.G, which require the MGR to be capable of managing (i.e., collecting and packaging) site-generated waste for disposal off-site.

II. Criterion Performance Parameter Basis

N/A

1.2.1.8 Criterion Basis Statement

I. Criterion Need Basis

This criterion addresses the requirement for the capability to receive and stage site-generated mixed waste. This criterion supports MGR RD 3.3.E and 3.3.G, which require the MGR to be capable of managing (i.e., collecting and packaging) site-generated waste for disposal off-site.

II. Criterion Performance Parameter Basis

N/A

1.2.1.9 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing a facility that can support collection and processing of LLW. Specifically, this criterion addresses the requirement for an electrical subsystem that is capable of providing electric power to the equipment installed in the WTB. This includes the equipment needed to perform the LLW processing operations, and the equipment that indirectly supports operations, such as the Waste Treatment Building Ventilation System. In addition, the electrical subsystem will provide interior and exterior lighting for the WTB. This criterion supports MGR RD 3.3.E and 3.3.G, which require the MGR to be capable of managing (i.e., collecting and packaging) site-generated waste for disposal off-site.

II. Criterion Performance Parameter Basis

N/A

1.2.1.10 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing a facility that can support collection and processing of LLW. Specifically, this criterion addresses the requirement for a piped utility subsystem, which supplies the required utilities to support the LLW processing operations. This criterion supports MGR RD 3.3.E and 3.3.G, which require the MGR to be capable of managing (i.e., collecting and packaging) site-generated waste for disposal off-site.

II. Criterion Performance Parameter Basis

N/A

1.2.1.11 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion addresses the requirement for a fire protection subsystem based on "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992). Sections 5.9 and 6.9 of this standard contain specific requirements for a fire protection system in a spent fuel storage facility with features similar to those in the WTB. This criterion indirectly supports MGR RD 3.3.E and 3.3.G, which require the MGR to be capable of managing (i.e., collecting and packaging) site-generated waste for disposal off-site.

II. Criterion Performance Parameter Basis

N/A

1.2.1.12 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for decommissioning of the WTB at the end of its service life. This criterion supports MGR RD 3.1.C, and it is based on the requirement in 10 CFR 63.21(c)(17), which requires the surface facilities to be designed to facilitate decommissioning.

II. Criterion Performance Parameter Basis

N/A

1.2.1.13 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, which 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 to 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

This criterion implements the requirements from MGR RD 3.1.B for the identification of "Standards for Protection Against Radiation" (10 CFR 20); MGR RD 3.1.C for the identification of 10 CFR 63.111(a)(1) and 10 CFR 63.112(e)(2) and (e)(3); and MGR RD 3.1.G for the need to address radiological health and safety.

The primary requirement for ALARA is contained in 10 CFR 20.1101(b), which 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)."

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 U.S. Nuclear Regulatory Commission. This regulatory guide provides guidelines on achieving the 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 following the 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 also supports the requirements of guidance statements 6.9g1 and 6.10g1 from the "MGR Compliance Program Guidance Package for the Waste Treatment Building System."

II. Criterion Performance Parameter Basis

The project ALARA program goals are TBD.

1.2.2.1.2 Criterion Basis Statement

I. Criterion Need Basis

This criterion supports MGR RD 3.1.C and 3.1.G. The criterion is based on the requirement in 10 CFR 63.112(e)(8) which requires the performance analysis of the SSC that are important to safety to include consideration of the ability of SSC to perform their intended safety functions, assuming the occurrence of design basis events. The frequency category of the earthquake applicable to this system is based on engineering judgment at this time and is therefore TBV.

The specific requirement for containing the liquid radioactive waste is consistent with the requirements in Section 11.2 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," and, Section 1.1.3 of Regulatory Guide 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants."

II. Criterion Performance Parameter Basis

N/A

1.2.2.2.1 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for designing the WTB to permit prompt termination of operations and evacuation of personnel during an emergency.

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

II. Criterion Performance Parameter Basis

N/A

1.2.2.2.2 Criterion Basis Statement

I. Criterion Need Basis

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

This criterion supports personnel safety based on the requirement in "Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)" (ANSI/ANS-57.9-1992), Section 6.7.1.5, which requires the system to "be designed to prevent the spread of radioactive materials to normally uncontaminated areas."

This criterion also supports MGR RD 3.1.C and is based on the requirement in 10 CFR 63.112(e)(10) which requires the performance analysis of the SSC that are important to safety to include consideration of the means to control radioactive waste and radioactive effluents.

II. Criterion Performance Parameter Basis

N/A

1.2.2.2.3 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for controlling and limiting the release of radioactive material and the spread of contamination. This criterion supports MGR RD 3.1.B and 3.1.C. This criterion is based on 10 CFR 63.111(a)(1), which requires meeting the requirements of 10 CFR 20, "Standards for Protection Against Radiation," and 10 CFR 63.112.(e)(1), (e)(4), and (e)(10), which require the performance analysis of the SSC that are important to safety to include consideration of the means to limit and control release and dispersal of radioactive material and contamination, and radioactive effluents.

II. Criterion Performance Parameter Basis

N/A

1.2.2.2.4 Criterion Basis Statement

I. Criterion Need Basis

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

This criterion establishes the requirement for reducing the accumulation of contamination and for facilitating decontamination of building components during normal operations. 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.

II. Criterion Performance Parameter Basis

N/A

1.2.2.2.5 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the requirement for controlling access to high radiation areas and areas with airborne radioactivity in order to protect personnel from radiation exposure and to keep radiation exposure ALARA.

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

This criterion also supports MGR RD 3.1.G and the requirements of guidance statement 6.6g6 from the "MGR Compliance Program Guidance Package for the Waste Treatment Building System."

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."

II. Criterion Performance Parameter Basis

The radiation environment is TBD.

1.2.3.2 Criterion Basis Statement

I. Criterion Need Basis

This criterion is needed to support MGR RD 3.3.A, which requires compliance with applicable codes and standards. Wind is one of the primary external environmental parameters that can affect buildings and structures located outside. Proper consideration of wind is required to ensure that buildings and structures can withstand the wind forces, and that system components are adequately protected from the wind.

According to Section 6.5.2 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. A similar discussion is provided in Sections 1615, 1616, and 1618 of the "1997 Uniform Building Code" (Volume 2, "Structural Engineering Design Provisions").

This criterion also supports MGR RD 3.1.G and the requirements of guidance statement 6.12g1 from the "MGR Compliance Program Guidance Package for the Waste Treatment Building System."

II. Criterion Performance Parameter Basis

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

1.2.3.3 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 SSC 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 were 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).

1.2.3.4 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.

II. Criterion Performance Parameter Basis

The "Engineering Design Climatology and Regional Meteorological Conditions Report" includes snowfall information for sites in the general area of the Yucca Mountain that are deemed adequate for bounding the snowfall environment for the Yucca Mountain site. The closest of these sites is Desert Rock Airport, south of Mercury. Snowfall data are also included for Tonopah. Although Desert Rock is closer to Yucca Mountain, the elevation of Tonopah is more representative of the elevation at the Yucca Mountain site (5,426 ft for Tonopah based on Table 1 of Chapter 24 of "Fundamentals," and 4,850 ft for Yucca Mountain based on Table 2-1 of the climatology report). Therefore, data for Tonopah is considered to be the conservative bound for Yucca Mountain.

Table A-14 of the "Engineering Design Climatology and Regional Meteorological Conditions Report" provides daily maximum and monthly maximum snowfall data. The maximum daily snowfall for Tonopah is 10 in. (rounded up from 9.7 in.). 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 inches (Table A-14).

1.2.3.5 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 (hours 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.

1.2.3.6 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 WTB must be able to withstand 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. This 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, fourth 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."

1.2.3.7 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 "1997 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 "1997 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 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 for the WTB (located near the Waste Handling Building), which bounds the values identified in the various sources. This value is consistent with Section 7.5.6 of "Preliminary Geotechnical Investigation For Waste Handling Building, Yucca Mountain Site Characterization Project," which recommends a depth of 15 in. for frost penetration for the Waste Handling Building site.

1.2.4.1 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for shipping and receiving LLW and receiving supplies via the shipping equipment (road, rail) of this system.

II. Criterion Performance Parameter Basis

N/A

1.2.4.2 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for providing space to support communication requirements for the WTB.

II. Criterion Performance Parameter Basis

N/A

1.2.4.3 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for the water supply requirements for the WTB.

II. Criterion Performance Parameter Basis

N/A

1.2.4.4 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for location and integration of the WTB with other MGR facilities by this system.

II. Criterion Performance Parameter Basis

N/A

1.2.4.5 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for providing space, layout, and structures to support equipment installation of the MGR Operations Monitoring and Control System.

II. Criterion Performance Parameter Basis

N/A

1.2.4.6 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for providing 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

1.2.4.7 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for providing space, layout, and structures for radiation-monitoring equipment.

II. Criterion Performance Parameter Basis

N/A

1.2.4.8 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for providing adequate electric power to the WTB electrical subsystem from this system.

II. Criterion Performance Parameter Basis

N/A

1.2.4.9 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for providing adequate supply (flow, pressure, cleanliness) of air to the WTB from this system.

II. Criterion Performance Parameter Basis

N/A

1.2.4.10 Criterion Basis Statement

I. Criterion Need Basis

This criterion establishes the need for this system to provide building zone locations and pressures, temperature and humidity requirements, chilled-water piping distribution requirements. Also, space and layout requirements for equipment and ductwork installation must be provided.

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 3.1.B requires compliance with applicable provisions of "Standards for Protection Against Radiation" (10 CFR 20).

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 also supports MGR RD 3.1.G and the requirements of guidance statements 6.8g1 and 7.2g1 from the "MGR Compliance Program Guidance Package for the Waste Treatment 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 "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

1.2.6.6 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "1997 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

1.2.6.7 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "1997 Uniform Building Code" (Volume 2, "Structural Engineering Design Provisions") as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.8 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "1997 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

1.2.6.9 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

1.2.6.10 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

1.2.6.11 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

1.2.6.12 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 also supports MGR RD 3.1.G and the requirement of guidance statement 7.3g1 from the "MGR Compliance Program Guidance Package for the Waste Treatment Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.6.13 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

1.2.6.14 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 electrical subsystem.

II. Criterion Performance Parameter Basis

N/A

1.2.6.15 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" (IEEE C2-1997) as applicable to the design of the electrical subsystem.

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 "Standard Specification for Structural Concrete" (ACI 301-1996) 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 "Structural Welding Code - Steel" (ANSI/AWS D1.1:1998) 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 "Building Code Requirements for Structural Concrete and Commentary" (ACI 318-99) 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 "IES Lighting Handbook: Application Volume" as applicable to the design of the electrical subsystem.

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 "IEEE Recommended Practice for Electrical Power Distribution for Industrial Plants" (IEEE Std 141-1993) as applicable to the design of the electrical subsystem.

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 for the Installation of Lightning Protection Systems" (NFPA 780) as applicable to the design of the electrical subsystem.

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 "IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis" (IEEE Std 399-1997) as applicable to the design of the electrical subsystem.

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 "IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems" (IEEE Std 142-1991) as applicable to the design of the electrical subsystem.

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 "IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems" (IEEE Std 242-1986) as applicable to the design of the electrical subsystem.

II. Criterion Performance Parameter Basis

N/A

1.2.6.25 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "American National Standard Practice for Office Lighting" (ANSI/IESNA RP-1-1993) as applicable to the design of the electrical subsystem.

II. Criterion Performance Parameter Basis

N/A

1.2.6.26 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "American National Standard Practice for Industrial Lighting" (ANSI/IES-RP-7-1991) as applicable to the design of the electrical subsystem.

II. Criterion Performance Parameter Basis

N/A

1.2.6.27 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies "Facility Safety" (DOE Order 420.1) as applicable to the design of this system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.28 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion identifies the "Manual of Steel Construction Allowable Stress Design" as applicable to the design of the system.

II. Criterion Performance Parameter Basis

N/A

1.2.6.29 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 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

1.2.6.30 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

1.2.6.31 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) involve 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.

II. Criterion Performance Parameter Basis

N/A

1.2.6.32 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

1.2.6.33 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) also 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

1.2.6.34 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. "American National Standard For 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

1.2.6.35 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

1.2.6.36 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 D5144-97) 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

1.2.6.38 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion requires compliance with the guidance in "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants" (Regulatory Guide 1.143) for WTB design. Regulatory Guide 1.143 includes design criteria that are generically applicable for radioactive waste treatment facility design.

II. Criterion Performance Parameter Basis

N/A

1.2.6.39 Criterion Basis Statement

I. Criterion Need Basis

MGR RD 3.3.A requires compliance with applicable industry codes and standards. This criterion requires concrete radiation shielding structures to be designed in accordance with the requirements of "Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants" (ANSI/ANS-6.4-1997).

This criterion also supports MGR RD 3.1.G and the requirement of guidance statement 7.1g1 from the "MGR Compliance Program Guidance Package for the Waste Treatment Building System."

II. Criterion Performance Parameter Basis

N/A

1.2.6.40 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

1.2.6.41 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

APPENDIX B ARCHITECTURE AND CLASSIFICATION

The system architecture and QA classification are identified in Table 2. The QA classifications are established in Table 1 of "Classification of the MGR Waste Treatment Building System."

Table 2. System Architecture and QA Classification

Waste Treatment Building System Architecture	Classification			
	QL-1	QL-2	QL-3	CQ
Electrical Systems				X
Fire Protection System				X
Piped Utility Systems				X
Process Supply Systems				X
Radiological Monitoring System			X	
Waste Treatment Building		X		

APPENDIX C ACRONYMS, SYMBOLS, AND UNITS

C.1 ACRONYMS

This section provides a listing of acronyms used in this document.

ALARA	as low as is reasonably achievable
DOE	U.S. Department of Energy
F	Function
HFE	human factors engineering
HVAC	heating, ventilating, and air-conditioning
LLW	site-generated low-level liquid and solid radiological waste
MGR	Monitored Geologic Repository
MGR RD	Monitored Geologic Repository Requirements Document
NRC	Nuclear Regulatory Commission
QA	quality assurance
SSCs	systems, structures, and components
TBD	to be determined
TBV	to be verified
WHB	Waste Handling Building
WTB	Waste Treatment Building

C.2 SYMBOLS AND UNITS

This section provides a listing of symbols and units used in this document.

%	percent
C	Celsius
F	Fahrenheit
ft	feet
in.	inches
km	kilometers
m	meters
ft^2	square feet

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: Existing system architecture (in Appendix B) includes a "Radiological Monitoring System" as part of the Waste Treatment Building design. It is however intended for the Site Radiological Monitoring System to provide radiological monitoring functions in the Waste Treatment Building. Therefore, for the next revision of the SDD, the architecture of the system will be revised to remove this subsystem.

Issue 2: This SDD will include the UBC seismic zone to be used for the non QL-1 SSCs when this information is available (requires decision by DOE/M&O).

APPENDIX E REFERENCES

This section provides a listing of references used in this SDD. References list the Accession number or Technical Information Catalog number at the end of the reference, where applicable.

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