QA: N/A

**Civilian Radioactive Waste Management System
Management and Operating Contractor**

Site Logistics and Administrative Systems Technical Report

BCB000000-01717-5705-00012, Revision 00

March 3, 1998

Prepared for:

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ACRONYMS AND ABBREVIATIONS

ACD	Advanced Conceptual Design Report
ALARA	As Low As Reasonably Achievable
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.
BOP	Balance of Plant
CCTV	Closed Circuit Television
DC	Disposal Container
DOE	U.S. Department of Energy
FAD	Functional Analysis Document
HVAC	Heating, Ventilating, and Air Conditioning
MGDS	Mined Geologic Disposal System
MWTF	Multi-Function Waste Tank Facility
NLP	Nevada Line Procedure
NRC	U. S. Nuclear Regulatory Commission
NTS	Nevada Test Site
OCRWM	Office of Civilian Radioactive Waste Management
OSHA	Occupational Safety and Health Administration
PC	Performance Confirmation
QA	Quality Assurance
QAP	Quality Assurance Procedure
QARD	Quality Assurance Requirements and Description
RCA	Radiologically Controlled Area
RDRD	Repository Design Requirements Document
SCPCDR	Site Characterization Plan Conceptual Design Report
SDD	System Description Document
UBC	Uniform Building Code
UPC	Uniform Plumbing Code
UPS	Uninterruptible Power Supply
VA	Viability Assessment
WHB	Waste Handling Building

1. PURPOSE

The purpose of this report is to evaluate space requirements and functional areas in support of the administration system, maintenance and supply system, and the site transportation support system located at the North Portal of the Yucca Mountain Repository. The report will also provide a basis for the Viability Assessment (VA) design. This report addresses the Administration Building, which includes the administration area, food service area, training auditorium and computer center; the Mockup Building; Visitors Center; Central Shops; Central Warehouse; and the Motor Pool and Facility Service Station.

The objective of this report is to develop a set of minimum square footage for each facility and to list the functions of the facilities.

This special program effort reflects a preliminary level of design and is anticipated to be revised as the design develops. Minimum special square footage identified in this document may increase or decrease as the design progresses. Building systems (i.e., HVAC, fire protection, electrical, communications) are defined for each facility in this report to identify type and scope of systems anticipated.

This study has been prepared to provide the initial conceptual design for those support systems and facilities which have not been addressed since the preparation of the Site Characterization Plan Conceptual Design Report (SCPCDR) (Reference 5.13). The appropriate level of detail was included to provide a credible design concept and to support the preparation of a cost estimate for VA.

2. QUALITY ASSURANCE

An activity evaluation, *Site-Wide Systems and Facilities Design (Work Package 12461016M1) Non-Q*, (Reference 5.12) has been performed in accordance with Quality Assurance Procedure (QAP) QAP-2-0, *Conduct of Activities*, and has determined that this report is not subject to the requirements of the *Quality Assurance Requirements and Description* (QARD) (Reference 5.2). In addition, review of the classification of permanent items described in *Classification of the Preliminary MGDS Repository Design* (Reference 5.1) prepared in accordance with QAP 2-3, *Classification of Permanent Items*, has been performed and indicates that System Description Documents number SU50, SU51, and SU54 items addressed in this report are "non-Q." Therefore, items addressed in this report are to be considered "non-Q" items and, as specified in NLP-3-18, this report is documented as not being subject to Quality Assurance (QA) controls. Table 2-1 presents the quality classification assignment for the administration system, maintenance and supply system, and general site transportation systems.

Table 2-1. Support Services Quality Classification Assignment

SDD Number	System	QA Classification
SU50	Administration System	
	Administration Building	Non-Q
	Mockup Building	Non-Q
	Visitors Center	Non-Q
	Engineering System	Non-Q
	Office Services and Records System	Non-Q
	Operations Management and Planning Computer System	Non-Q
	Training System	Non-Q
	Transportation Dispatch Computer System	Non-Q
SU51	Maintenance and Supply System	
	Central Shops	Non-Q
	Central Warehouse	Non-Q
	Equipment Storage and Retrieval System	Non-Q
	Inventory Planning and Management System	Non-Q
	Maintenance Planning and Management System	Non-Q
	Repair System	Non-Q
SU54	General Site Transportation System	
	Vehicle Repair System	Non-Q
	Motor Pool with Facility Service Station	Non-Q

3. METHOD

This report involved reviewing current functional requirements identified in the criteria documents and verifying if the functions and scope of functions appear reasonable for this type of program.

Functional areas that appear not to be reasonable, or are identified within the facility with no functional basis, are identified. Overall facility square footage was assessed (determined) in relation to the anticipated functional requirements.

It is intended that the functional requirements identified, along with possible need of functions unforeseen by this report, will be reviewed, assessed, and identified by corresponding user groups in a later design phase.

4. DESIGN INPUTS

4.1 DESIGN PARAMETERS

System functions (operations, equipment, and design configuration) identified for the MGDS facilities in this report are based on previously completed work documented in References 5.4 and 5.9. The information presented in these documents is preliminary and not qualified for use directly in procurement, fabrication, or construction.

Staffing levels used for the support areas within the Administration Building, Mockup Building, Visitors Center, Central Shops, Central Warehouse, and Facility Service Station and motor pool and a determination of the needed vehicle quantity are based on Enclosure 4 of the *Staffing Input Memo* (Reference 5.6). This is a non-Q (TBV) document, which represents the most current evaluation of anticipated Repository staffing levels.

Change rooms with shower facilities are provided in the Central Shops and Central Warehouse for personnel who perform manual work activities during a work day, based on Uniform Building Code (UBC) 1997 Appendix Chapter 29, Section 2905 - General, Table A-29-A requirements to provide showers in workshops and warehouses for personnel exposed to excessive heat or irritating materials.

4.2 CRITERIA

The following criteria are used for the facilities, support areas, and building systems of the Administration Building, Mockup Building, Visitors Center, Central Shops, Central Warehouse, and Facility Service Station and motor pool. The design criteria applicable to this report were developed to respond to requirements found in the *Repository Design Requirements Document* (RDRD) (Reference 5.3).

- 4.2.1** Office space within the facilities will be based on a minimum of 100 sq ft per office with a maximum square footage per 41 CFR 101.17.3, *Assignment and Utilization of Space*. (RDRD 3.7.4.4.E.1)
- 4.2.2** The facilities will include office space and equipment to support the licensing support system as described in 10 CFR 2.1011(b)(1). (RDRD 3.5.3.4)

- 4.2.3 The size and location of the corridors within the facilities will accommodate the movement of equipment, including initial installation, operation, and removal or replacement as applicable. (RDRD 3.2.5.2.2.A)
- 4.2.4 Warehouse space will be provided for the storage of all spare parts, consumable equipment, and replaceable equipment in an environment conducive to safe-keeping and protection. (RDRD 3.5.3.1)
- 4.2.5 Receiving and shipping space will be provided for receipt of maintenance and repair materials and tools, and shipment and return receipt of items shipped off site for repair. (RDRD 3.5.3.2.A)
- 4.2.6 Receiving and shipping space will be provided with door openings, halls, and aisles adequate for movement of items to be shipped into and out of the facility. (RDRD 3.5.3.2.B)
- 4.2.7 Training facilities will be provided for the training of personnel initially assigned to the Repository and the training of replacement personnel (due to attrition) throughout the system life cycle as required. Training will cover both operator and maintenance tasks. These requirements are for impacts on the physical systems (facilities and equipment) in the Repository. (RDRD 3.6.2)
- 4.2.8 Facilities will be provided to implement support functions, such as administration (security, visitor center, etc.) and logistics (maintenance, utilities, etc.) (RDRD 3.5.3.5)
- 4.2.9 The facilities will be provided with an electrical power system in accordance with U.S. Department of Energy (DOE) DOE 6430.1A, Division 16, *Electrical Power*. (RDRD 3.7.3.2.B)
- 4.2.10 Uninterruptible power will be provided to critical computer and communication equipment within the facilities in accordance with DOE 6430.1A, Division 16. (RDRD 3.7.3.2.C)
- 4.2.11 Standby electrical power will be provided to critical systems within the facilities in accordance with DOE 6430.1A, Division 16. (RDRD 3.7.3.2.D)
- 4.2.12 Potable water will be provided within the facilities in accordance with federal, state, and local requirements. (RDRD 3.7.3.3.B)
- 4.2.13 Communication systems will be provided within the facilities in accordance with the applicable sections of DOE 6430.1A, Divisions 1, 2, 10, 13, 15, and 16. (RDRD 3.7.3.4.A)
- 4.2.14 Facility lighting will be provided in accordance with DOE 6430.1A, Division 16. (RDRD 3.7.3.5.A)

- 4.2.15** Facility fire protection and detection systems will be provided in accordance with DOE 6430.1A, 0110-6, and DOE 5480.7. (RDRD 3.7.4.3.B and C)
- 4.2.16** A fire detection and alarm system will be installed in each facility to warn occupants of fire, to activate the automatic fire protection system, and to alert the fire station. (RDRD 3.7.4.3.I)
- 4.2.17** A training facility will provide for equipment, manuals, and training aids to support training programs including radiation protection and ALARA. (RDRD 3.7.4.4.C and 3.6.2.2)
- 4.2.18** Facilities and equipment will be provided to preserve and maintain records. (RDRD 3.7.4.4.F.2)
- 4.2.19** Maintenance facilities, equipment, and tools will be provided to support the maintenance concept of the Repository. (RDRD 3.7.4.4.G)
- 4.2.20** The Repository shall include facilities to test and maintain intrusion alarms, emergency alarms, communications equipment, physical barriers, and other security-related devices or equipment. (RDRD 3.7.4.4.H)
- 4.2.21** Food service restroom and personnel storage facilities will be provided to support the Repository working staff. (RDRD 3.7.4.4.K and 3.2.4.2.1)
- 4.2.22** Storage facilities for private and DOE equipment (including testing equipment and construction/drilling equipment) will be provided. (RDRD 3.7.4.4.M)
- 4.2.23** A Visitors Center with adequate space for displays and presentations will be provided to serve as an information center for visitors. An overlook area will be provided at the Visitors Center or elsewhere on the site to provide the visitors a view of the Repository surface area. (RDRD 3.7.4.4.O)
- 4.2.24** Heating, ventilating, and air conditioning (HVAC) equipment will be provided within the facilities in accordance with ASHRAE standards. (RDRD 3.2.4.2.2)
- 4.2.25** Ventilation will be provided to meet the standards of 29 CFR 1910.94 in areas where hazardous atmospheres are generated by maintenance operations. (RDRD 3.3.6.3.C)
- 4.2.26** Facilities for storing and handling hazardous gases and combustible and flammable liquids will be provided in accordance with the requirements of 29 CFR 1910, Subpart H. (RDRD 3.3.6.3.D)
- 4.2.27** The Repository computer systems will provide for the intercompatibility of resources, including hardware and software. (RDRD 3.3.10) (TBD)

- 4.2.28 QA records will be prepared, maintained, and stored in accordance with the requirements specified in the Office of Civilian Radioactive Waste Management (OCRWM) QARD, or an equivalent OCRWM-approved QA program. (RDRD 3.4.5)
- 4.2.29 A facility will be provided for maintenance of Repository construction records to ensure useability for future generations. (RDRD 3.4.6.B)
- 4.2.30 A facility will be provided for maintenance and replacement of shop-repairable equipment including required tools and parts. (RDRD 3.5.1.1.2.)
- 4.2.31 To support the waste package monitoring program required by 10 CFR 60.143(a) and (b), the Repository will be capable of supporting laboratory experiments that focus on the internal condition of the waste packages. (RDRD 3.7.6.E)
- 4.2.32 The emergency lighting system will be designed to automatically actuate and will be powered by batteries that are continuously charging. (RDRD 3.3.6.7.B)
- 4.2.33 Lighting in working areas and other enclosures shall conform to the applicable *Recommended Practice of the Illumination Engineering Society*. (RDRD 3.2.4.2.3 and 3.3.6.7.C)

4.3 ASSUMPTIONS

The following assumptions are made for the Administration Building, Mockup Building, Visitors Center, Central Shops, Central Warehouse, and Facility Service Station and motor pool. These assumptions are based on experience in similar facility spacial design, specifically, *Programming Report, W-236A Multi-Function Waste Tank Facility (MWTF) 200W Area*. (Reference 5.10)

4.3.1 General

The following assumptions are made throughout this report.

- 4.3.1.1 Circulation, mechanical/electrical, and other support area factors used in the determination of anticipated floor area are assumed to be 45% of gross floor area based on the current level of design and interpretation of factors defined in *Problem Seeking* (Reference 5.7).
- 4.3.1.2 Male/female percentages used for anticipated number of personnel using the restrooms are based on previous experience at DOE nuclear facilities. The percentages are greater than the minimum factors required in the Uniform Plumbing Code (UPC).
- 4.3.1.3 Staffing levels identified in this report are based on the *Staffing Input Memo* and assumed to be adequate for the intended functions identified. (Reference 5.6)

4.3.1.4 Specific facility-related functions and associated area required to perform these functions as defined in the *Mined Geologic Disposal System (MGDS), Advanced Conceptual Design Report (ACD)* (Reference 5.4) and the *Repository Surface Design Engineering Files Report* (Reference 5.9) were used as a basis for this report and are assumed to be accurate.

4.3.1.5 It is assumed that the QA levels shown Table 2-1 have been correctly assigned. This is based on the work performed in *Classification of the Preliminary MGDS Repository Design* (Reference 5.1) which carries a TBV for these classifications (TBV).

4.3.1.6 DOE Order 420.1 as it applies to fire protection is the applicable code superseding DOE Order 5480.7 and 6430.1A. This assumption is based on direction provided in Reference 5.16.

4.3.2 Administration Building

The following assumptions are made for the Administration Building as discussed in Section 7.2.2.1.

4.3.2.1 Kitchen service and lunchroom seating in the Administration Building (maximum Shift 1 per Reference 5.6) is sized to accommodate 340 people. The quantity to be served is determined from an assumption that a maximum of 80% of the Repository operations staff of 425 will be served. This assumption takes into consideration the availability of other lunchroom facilities throughout the Repository for personnel lunch use.

4.3.2.2 Kitchen service will be provided for visitors and off-site transportation personnel on a minimal basis and will be able to accommodate the anticipated 340 persons.

4.3.3 Mockup Building

The following assumptions are made for the Mockup Building as discussed in Section 7.2.2.2.

4.3.3.1 Waste handling system operations requiring mockup capabilities and the associated area needed are based on systems and areas required for those systems identified in the *Surface Nuclear Facilities Space Program Analysis*. (Reference 5.8)

4.3.4 Central Warehouse

The following assumptions are made for the Central Warehouse as discussed in Section 7.3.2.2.

4.3.4.1 The ratio of square footage per worker used for the change room/restroom analysis is assumed to be based on the square footage and the number of workers at the MWTF. (Reference 5.10) The number of MWTF workers identified is calculated from the number of lockers shown on MWTF plans.

4.3.4.2 It is assumed lunchrooms will be used for minor food preparation only. This assumption is based on previous design experience of similar DOE lunchroom facilities and analysis of the MWTF lunchroom (Reference 5.10).

4.3.4.3 Warehousing of equipment, materials and supplies required for Repository development operations at the South Portal will be provided at the South Portal operation area for efficiency and is not included in the scope of this report.

4.3.5 Central Shops

The following assumptions are made for the Central Shops as discussed in Section 7.3.2.1.

4.3.5.1 The ratio of square footage per worker used for the change room/restroom analysis is assumed to be based on the square footage and the number of workers at the MWTF. (Reference 5.10) The number of MWTF workers identified is calculated from the number of lockers shown on MWTF plans.

4.3.5.2 The change room and lunchroom facilities in the Central Shops will serve the staff of the Facility Service Station and motor pool for coverall change, showering, food preparation, and eating.

4.3.5.3 It is assumed lunchrooms will be used for minor food preparation only. This assumption is based on previous design experience of similar DOE lunchroom facilities and analysis of the MWTF lunchroom (Reference 5.10).

4.3.5.4 A first-aid room at the Central Shops is assumed not to be required based on staffing needs identified within the *Staffing Input Memo* (Reference 5.6).

4.3.5.5 Heavy vehicles (i.e., fire apparatus, well-logging equipment, maintenance and supply system operations equipment, etc.) located outside the RCA will be maintained at the Central Shop, not at the Facility Service Station. Heavy vehicles located within the RCA will be maintained at the Transporter Maintenance Building for radiological separation. Major maintenance and repairs will be performed at locations off-site. Specialty vehicle maintenance will be determined in further analysis.

4.3.5.6 Repository development operations equipment will be maintained at facilities located at the South Portal for efficiency of operations and is not included in the scope of this report.

4.3.5.7 For hazardous area ventilation and electrical systems, NFPA 88B will be imposed.

4.3.6 Motor Pool and Facility Service Station

The following assumptions are made for this Facility Service Station and vehicle parking as discussed in Sections 7.4.7.1 and 7.4.2.3.

- 4.3.6.1 Light vehicles (i.e., cars, pickup trucks, 4 wheel drive units) will be maintained in the Facility Service Station. Two vehicle maintenance bays with floor hoists will be adequate to provide service for minor repairs (tune-ups) and maintenance functions (oil changes). This assumption is based on a minimal service station identified in the *Time-Saver Standards for Building Types*. (Reference 5.5)
- 4.3.6.2 The change room and lunchroom facilities in the Central Shops will serve the staff of the Facility Service Station and motor pool for coverall change, showering, food preparation, and eating.
- 4.3.6.3 A break room will be provided for personnel and will include vending machine space. No food preparation equipment will be provided.
- 4.3.6.4 A 100-by-125-ft lot will be adequate for the fueling stations (island) and motor pool (vehicle) parking. This assumption is based on parking for 15 cars and the minimal area required for a service station operation identified in *Time-Saver Standards for Building Types* (Reference 5.5).
- 4.3.6.5 All major repairs of equipment and vehicles will be performed at other facilities and/or locations off-site. Hauling of this equipment and vehicles, if required, will be provided by these off-site operations.
- 4.3.6.6 Heavy vehicles (i.e., fire apparatus, well-logging equipment, maintenance and supply system operations equipment, etc.) will be maintained at the Central Shop, not at the Facility Service Station.
- 4.3.6.7 It is assumed one vehicle per 25 Repository workers (those not otherwise assigned to a specific operation vehicle pool) will be adequate to supply the motor pool. This assumption is needed to determine the lot size. Future verification of motor pool operations is required.
- 4.3.6.8 Transportation bussing for employees and visitors is provided by the NTS operations and facility for this function is not included in this report.
- 4.3.6.9 Repository development operations will provide fueling of vehicles and equipment at the South Portal for efficiency of operations and is not included in the scope of this report.
- 4.3.6.10 For service bay ventilation and electrical systems, NFPA 88B will be imposed.
- 4.3.6.11 One ambulance will be stationed at the North Portal based on an assumption that the Nevada Test Site or an off-site agency will provide backup ambulance service.

- 5.3 *Repository Design Requirements Document (RDRD)*, Yucca Mountain Site Characterization Project, YMP/CM-0023, Rev. 0, ICN 1.
- 5.4 *Mined Geologic Disposal System (MGDS), Advanced Conceptual Design Report (ACD)*, DI:B00000000-01717-5705-00027, Rev. 00.
- 5.5 *Time-Saver Standards for Building Types*, 3rd Edition, McGraw-Hill Publishing Company, 1990.
- 5.6 Interoffice correspondence, Meyers to McFeely, Rees, Shoemaker, M&O Identifier LV.SD.SJM.1/98.007, *Staffing Input Memo*, January 1998.
- 5.7 *Problem Seeking - An Architectural Programming Primer*, William Pena, Cahners Books International, 1977.
- 5.8 *Surface Nuclear Facilities Space Program Analysis*, DI:BCBD00000-01717-0200-00012, Rev. 01.
- 5.9 *Repository Surface Design Engineering Files Report*, DI:BCB000000-01717-5705-00009, Rev. 00.
- 5.10 *Programming Report, W-236A Multi-Function Waste Tank Facility (MWTF) 200W Area*, Kaiser Hanford Company, W236A-T2-MT6, Rev 1 and W236A-T2-MT7, Rev 0.
- 5.11 *Performance Confirmation Plan*, DI:B00000000-00841-4600-00002, Rev 00.
- 5.12 *Site-Wide Systems and Facilities Design (Work Package 12461016M1) Non-Q, CRWMS/M&O*.
- 5.13 *Site Characterization Plan Conceptual Design Report (SCPCDR)*. SAND84-2641, SNL 1987.
- 5.14 *Mined Geologic Disposal System Architecture*, DI:B00000000-0717-5700-00011, Rev. 00.
- 5.15 *Mined Geologic Disposal System Functional Analysis Document*, DI:B00000000-01717-1708-00006, Rev. 01.
- 5.16 Department of Energy Letter, B. V. Hamilton-Ray to L. D. Foust, *Technical Direction (TD-055) Safety & Health Plan (YMP/90-37)*, November 1996.

6 USE OF COMPUTER SOFTWARE

Not applicable.

7. DESIGN ANALYSIS

7.1 INTRODUCTION

This report describes the functions required to support the administration system, maintenance and supply system, and general site transportation system located at the North Portal as delineated in the *Mined Geologic Disposal System Architecture* (Reference 5.14). Most facilities supporting these systems are located within the Balance of Plant (BOP) secured area. The Visitors Center is located just outside the BOP area.

The North Portal support facilities provide direct operational support to the waste handling operations and provide general support for the Repository and North Portal operations. The waste handling support facilities are used to maintain the security and safety of the Radiologically Controlled Area (RCA), maintain and store waste handling vehicles, track the movement of off-site waste shipments, and conduct operations training and development. This report defines general support facilities as required to support functions identified for the Administration System, Maintenance and Supply System, and Site Transportation Support Systems. These facilities are used to support personnel (e.g., administration, food service, and general training) maintenance facilities and equipment, warehouse components and supplies, and support plant safety (e.g., fire protection, general security, operations monitoring, and health safety).

Initial conceptual work has been performed on the facilities described in this report through the ACD. The facility area identified in this report with associated functions performed in the specific facility is based primarily on the *Mined Geologic Disposal System (MGDS), Advanced Conceptual Design Report (ACD)* (Reference 5.4), the *Repository Surface Design Engineering Files Report* (Reference 5.9), and *Mined Geologic Disposal System Architecture* (Reference 5.14), *Mined Geologic Disposal System Functional Analysis Document (FAD)* (Reference 5.15), and required functions identified in the RDRD (Reference 5.3) as indicated in Section 4.2. Estimated staffing is based on the *Staffing Input Memo* (Reference 5.6). Circulation allotments are based on *Problem Seeking* (Reference 5.7). Problem Seeking is a recognized space allocation programming primer. Other bases that include a comparison-to-like facilities include the *Multi-Function Waste Tank Facility - 200 West Area (MWTF) at Hanford, Washington* (Reference 5.10), and *Time-Saver Standards for Building Types* (Reference 5.5) used for the Service Station and motor pool.

7.2 ADMINISTRATION SYSTEM

The administration system performs the site management and administration services required to plan and direct Repository operations, waste handling, emplacement, development, consolidated transportation dispatch operations, and subcontract management.

Functions from other systems not included in scope of this report will be located in the Administration Building described following. These items include the Central Management and Operations Control Center which is required by the Central Command Control Operations System

and Environmental Monitoring, which is a part of the Environmental Monitoring system (Reference 5.14).

7.2.1 Required Functions

The following functions are needed for the efficient operation of the administration system. These functions reflect major drivers as derived from a number of input documents, including the RDRD, MGDS Architecture, FAD, ACD and Repository Surface Design Engineering Files report.

- **Contractor/Staff Management**
 - Program/subcontractor management, Repository management and planning, contracts management, licensing support, emplacement, development, waste handling, transportation, QA, and safety administration.
- **Government Management**
 - U. S. Nuclear Regulatory Commission (NRC)
 - DOE (NTS)
- **Payroll/Accounting**
- **Purchasing**
 - inventory and procurement management
- **Human Resources**
 - general services
 - mail, clerical, publications, library
 - travel
- **Document Control**
- **Site Records Management and Storage**
 - equipment inventory and maintenance, training, employee records, security, accident, QA, DOE/NRC documentation, facility documentation, and waste records.
- **Engineering**
 - facility (subsurface and surface), performance confirmation (PC).
- **Automated Data Processing**
 - software/hardware support, operations management and planning, transportation dispatch, PC, records.
- **Training**
 - personnel certification, equipment maintenance, general program, radiation worker

- Food Service

- Visitor Management.

For this report, it is assumed all functions will be provided on site. For centralized efficiency, some functions can be performed at a remote location (i.e., program management, payroll, human resources), if determined in a later program analysis. Other functional areas needing program scope determination include training and visitor programs.

7.2.2 Facilities

Three facilities identified to house the administrative system functions are the Administration Building, the Mockup Building, and the Visitors Center.

The Administration Building will house the majority of the functions identified, except visitor management and hands-on training. These functions will be provided in the Mockup Building and Visitors Center, Sections 7.2.2.2 and 7.2.2.3, respectively. Other functions not associated with the Administrative System and required by other systems which are located within the Administration Building and Mockup Building are identified in each building description for development of an overall facility square footage.

7.2.2.1 Administration Building

The Administration Building will provide offices for program management, payroll/accounting, purchasing, human resources, engineering, automated data processing, training, records management and storage, and other service staffing.

The office area will include conference rooms and break rooms. A main entry lobby will be provided as a waiting area for administration and training. A receptionist will be located at the main entry and act as a security control point into the facility. The general service area will include a mail room and a library. Controlled areas will be provided for document control and records storage for accident, QA, DOE/NRC, facility, and other related project documents and records. These areas will be provided with lockable entry for personnel access control.

A computer center will house equipment required to support the automated data processing systems and software/hardware support.

The central management and operations control center as required by the central command and control operations system will be located in the Administration Building. The control center will oversee all waste handling and to consolidate transportation dispatch operations. (TBV) Additional space will be needed to house satellite communication system equipment.

Additional area will be required for PC identified as part of engineering. Functional space for the PC is identified in the *Performance Confirmation Plan* (Reference 5.11). This can be a stand-alone

area; however, for functional efficiency, these functions will be located at the Administration Building and integrated with other facilities. (TBD) These spaces include areas for operational staging, sample packaging and shipping, instrument equipment storage, records storage, and a limited laboratory. The majority of samples will be shipped to off-site national laboratories for analysis. Maintenance of instruments will be integrated with the central shops. Calibration will be integrated with the calibration performed in the Waste Handling Building (WHB). Future analysis is needed to define the integration of maintenance and calibration of precision instruments associated with the radiological areas and performance confirmation.

The training area includes an auditorium for seating 50 people as shown in the ACD for safety, procedures, Occupational Safety and Health Administration (OSHA), and other similar type training. Additional spaces needed include a multi-purpose training room(s) (radiation worker, certification, equipment maintenance, general programming), training material and record storage and offices for personnel to perform these functions.

Food service includes kitchen and cafeteria areas to provide lunchroom facilities for 340 staff and operations personnel on day shift. Other lunch facilities are provided throughout the Repository, therefore the anticipated number of personnel to be served represents 80% of the total Repository operations staffing on the day shift (425 people) including staff located within the RCA, BOP, Visitor Center, and subsurface emplacement. The food service areas also will have general storage rooms, offices, and restrooms for the food service staff. A commercial-type kitchen layout will be used. An area for receiving dry and frozen foods will be provided along with food storage areas and freezers. The storage rooms will provide for both interior and exterior access, along with a receiving/shipping area. It is anticipated there will be no remote food preparation or service and staff will be served at this central facility. Minor catering may be provided at the Visitor Center for occasional events with major catering provided off-site. (TBV) The anticipated cafeteria size will be adequate to accommodate small visitor groups along with occasional off-site transportation personnel. (TBV)

An additional area will be provided within the Administration Building to house the environmental monitoring functions as a part of the surface environmental monitoring system. (TBV) Environmental monitoring will include laboratory, office, and support spaces. Laboratory, operational staging, and storage areas will be shared with PC for efficiency. Analysis of radioactive samples will be performed in laboratories within the WHB.

7.2.2.1.1 Support Areas

Men and women's restrooms will be provided. Restroom sizing will be determined by the maximum staff during one shift as outlined in the *Staffing Input Memo*. (Reference 5.6)

Janitorial closets are provided for storage of janitorial supplies.

Circulation is required for movement of personnel and equipment within the Administrative Building. Sizing of corridors will meet the requirements of RDRD 3.2.5.2.2.A, and is in accordance with circulation factors identified in *Problem Seeking*. (Reference 5.7)

Receiving/shipping is required for gas bottle storage to service laboratory sampling and equipment, food services, and miscellaneous supplies that are required by facility functions. Storage of these gases will be in accordance with NFPA 54 and NFPA 55.

7.2.2.1.2 Building Systems

The HVAC system for the Administration Building provides heating, cooling, and ventilation for the health, safety, and comfort of personnel and for the protection of equipment. The ventilation system will be industrial grade with components necessary to accomplish winter heating and summer cooling. The facility heating and cooling systems will be connected to the sitewide chilled and hot water systems and sized for anticipated use. The HVAC system for the computer center will be a stand-alone system. Chemical hoods will be provided for exhaust in the laboratory spaces. Kitchen grease exhaust hoods will be provided for kitchen exhaust.

The sanitary sewer, potable water systems and non-potable water for fire protection will be connected to the sitewide systems and sized for anticipated use. Laboratory waste will be contained and transported to appropriate disposal locations.

The facility will be protected by an automatic fire suppression and alarm system meeting the requirements of DOE 420.1 for fire protection which supersedes DOE 5480.7, Fire Protection and DOE 6430.1A, General Design Criteria including special automatic fire suppression systems to protect kitchen operations. The orders are required in RDRD 3.7.4.3.B, C, and I. The fire protection system will be connected to the sitewide system.

Normal electrical power will be provided to the facility by the sitewide substation. The substation will supply electrical power to a pad mounted transformer located near the building. Building utilities will utilize power for lighting, receptacles, alarm systems, and communication systems per RDRD 3.7.3.2.B, and 3.7.3.5.A.

Uninterruptible power supply (UPS) and standby power will be provided for the operations control center and the computer center. Standby power and UPS power will be provided for the duration required to maintain personnel safety and critical operations. Normal and standby power with UPS power is provided to critical safety systems as required in RDRD 3.7.3.2.B, C, and D. The facility will provide emergency lighting for personnel safety per RDRD 3.3.6.7.B.

Communications (telephone, radio, computer network, building/site alarm systems) will be provided for the Repository through the site communication systems as required in RDRD 3.7.3.4.A. Communications systems are yet to be defined. (TBD)

The security and safeguards system will perform the surveillance and safeguard function at the access points that lead into the BOP including security stations and personal badging access. The Administration Building is within the BOP fenced area. A receptionist will be located at the main entry to provide a secondary access control for badged personnel. It is assumed that Security Station 1 within the BOP will provide additional roving security personnel. Additional security and access control may be needed for sensitive areas (e.g., computer center) as determined by a future analysis. (TBD)

Equipment rooms will be provided for various building systems equipment as needed.

7.2.2.1.3 Facility Area Summary

For this report, the Administration Building combined the ACD Administration Building, Food Service Facility, Training Auditorium, and Computer Center into one facility. The ACD-combined 60,000-sq ft facility area appears to be appropriate. This space includes a 44,000-sq ft general administration area and environmental laboratory, a 1,000-sq ft training auditorium, an 11,000-sq ft food services area, and a 4,000-sq ft computer center. This space will adequately house the identified functions, areas and anticipated staffing levels that will be located in the facility.

Some differences from the ACD space allocation description include less laboratories, additional area for receiving/shipping, specific PC and training area, office area for licensing support as required in the RDRD 3.5.3.4, and staffing for this function which was not included in the *Staffing Input Memo*. (Reference 5.6) After reviewing the ACD systems needs and areas, it appears that the Administration Building size is adequate.

7.2.2.2 Mockup Building

The Mockup Building will provide a high-bay mockup area for hands-on training of specific operational equipment and systems used within the WHB; storage for lifting fixtures, mockup casks and tools; and control areas with associated equipment. Space for operational classroom training will be provided. Visitors will be able to view the mockup area. The Mockup Building will also accommodate functions identified in other Repository systems including testing equipment and processes developed for remote handling, operational and maintenance procedure development, operational efficiency development, process ALARA development, and equipment engineering and prototyping.

Waste handling operational systems anticipated to be duplicated within the mockup area include carrier/cask handling, assembly transfer, canister transfer, disposal container (DC) handling and welding, DC transporter loading, and waste remediation. Assembly transfer operations include cask preparation, cutting and element/basket movement within pools, assembly handling, DC load and decontamination. The scope of mockup systems will need to be verified in a future program analysis.

7.2.2.2.1 Support Areas

Men and women's restrooms will be provided. Restroom sizing will be determined by the maximum staff during one shift.

Janitorial closets are provided for storage of janitorial supplies.

Circulation is required for movement of personnel and equipment within the Mockup Building. Sizing of corridors meet the requirements of RDRD 3.2.5.2.2.A, and is in accordance with circulation factors identified in *Problem Seeking*. (Reference 5.7)

7.2.2.2.2 Building Systems

The HVAC system for the Mockup Building provides heating, cooling, and ventilation for the health, safety, and comfort of personnel and for the protection of equipment. The ventilation system will be industrial grade with components necessary to accomplish winter heating and summer cooling. The facility heating and cooling systems will be connected to the sitewide chilled and hot water systems and sized for anticipated use.

The Mockup Building sewer, potable water systems and non-potable water for fire protection will be connected to the sitewide systems and sized for anticipated use.

The facility will be protected by an automatic fire suppression and alarm system meeting the requirements of DOE 420.1 for fire protection which supersedes DOE 5480.7 and DOE 6430.1A. The orders are required within RDRD 3.7.4.3.B, C, and I. The fire protection system will be connected to the sitewide system.

Normal electrical power will be provided to the facility by the sitewide substation. The substation will supply electrical power to a pad mounted transformer located near the building. Building utilities will utilize power for lighting, receptacles, alarm systems, and communication systems per RDRD 3.7.3.2.B, and 3.7.3.5.A.

The facility will provide emergency lighting for personnel safety.

Communications (telephone, radio, computer network, building/site alarm systems) will be provided for the Repository through the sites communication system as required in RDRD 3.7.3.4.A.

The security and safeguards system will perform the surveillance and safeguards function at the access points that lead into the BOP. The Mockup Building is within the BOP fenced area, therefore it is not anticipated that any additional security within the facility will be needed other than lock and key control.

Equipment rooms will be provided for various building systems equipment, as needed.

7.2.2.2.3 Facility Area Summary

The anticipated square footage of the Mockup Building (14,000 sq ft) in this report is greater than that in the ACD (9,800 sq ft). With space requirements for the carrier/cask handling, assembly transfer, canister transfer, DC handling and welding, DC transporter loading, and waste remediation systems for the WHB as shown in the *Surface Nuclear Facilities Space Program Analysis* (Reference 5.8). It is anticipated that the minimum required mockup bay area will be 12,600 sq ft which is an increase of 3,960 sq ft over that identified in the ACD. The mockup bay area will be equipped with an overhead bridge crane for moving equipment around within the facility. There will be another 1,400 sq ft for offices, classrooms, and restrooms for staff support and training.

After reviewing the ACD systems needs and area, it appears that the Mockup Building size will need to be increased to a minimum 14,000 sq ft. The restrooms and training classrooms may need to be larger to accommodate the number of personnel training at one time and is not included in this assessment. This size increase, along with verification of operational systems requiring mockup and associated space requirements, will be determined via a later program analysis.

7.2.2.3 Visitors Center

The Visitors Center will collect, preserve, and exhibit significant objects of the Repository to increase public awareness and knowledge of the site. The Visitors Center design did not advance during the VA and is based on the ACD as required in the RDRD 3.7.4.4.0.

The following functions are needed for the efficient operation of the Visitors Center:

- General office for staffing per the *Staffing Input Memo* (Reference 5.6)
- Display for photos or material about the Repository
- Display storage for display rotation
- Work room - for supply storage and work space to assemble new or repair of existing displays
- Theater/projection room for audio/video presentations or lectures (public or government) for larger groups
- Meeting/conference for staff or small educational groups
- Reception - act as an access point into the facility at the main entry
- Canteen - food services.

7.2.2.3.1 Support Areas

Men and women's restrooms will be provided. Restroom sizing will be determined by the maximum staffing during one shift per the *Staffing Input Memo* (Reference 5.6). Public restrooms will be provided for the general public.

Janitorial closets are provided for storage of janitorial supplies.

Circulation is required for movement of personnel and visitors within the Visitors Center. Sizing of corridors meet the requirements of RDRD 3.2.5.2.2.A, and is in accordance with circulation factors identified in *Problem Seeking*. (Reference 5.7)

7.2.2.3.2 Building Systems

The HVAC system for the Visitors Center provides heating, cooling and ventilation for the health, safety, and comfort of personnel and for the protection of equipment. The ventilation system shall be commercial grade with components necessary to accomplish winter heating and summer cooling. The facility heating and cooling systems will be connected to the sitewide chilled and hot water systems and sized for anticipated use.

The sanitary sewer, potable water systems, and non-potable water for fire protection will be connected to the sitewide systems and sized for anticipated use.

The facility will be protected by an automatic fire suppression and alarm system meeting the requirements of DOE 420.1 for fire protection which supersedes DOE 5480.7 and DOE 6430.1A. The orders are required in RDRD 3.7.4.3.B, C, and I. The fire protection system will be connected to the sitewide system.

Normal electrical power will be provided to the facility by the sitewide substation. The substation will supply electrical power to a pad mounted transformer located near the building. Building utilities will utilize power for lighting, receptacles, alarm systems, and communication systems per RDRD 3.7.3.2.B, and 3.7.3.5.A.

The facility will provide emergency lighting for personnel safety per RDRD 3.3.6.7.B.

Communications (including telephone, radio, computer network, building/site alarm systems) will be provided for the Repository through the sites communication systems as required in RDRD 3.7.3.4.A.

The Visitors Center is outside the BOP security and safeguards system. It is assumed that there will not be a need for security at the Visitors Center because of its functions. However, the *Staffing Input Memo* (Reference 5.6) shows security personnel assigned to the facility. It is assumed that Security Station 1 within the BOP will provide a roving security personnel. (TBD) Facility security will be supplied by lock and key.

Equipment rooms will be provided for various building systems equipment, as needed.

7.2.2.3.3 Facility Area Summary

The 19,800 sq ft Visitors Center identified in the ACD appears to be appropriate for the functions identified. A later program analysis will need to be performed to verify the actual functions and associated facility area.

7.3 MAINTENANCE AND SUPPLY SYSTEM

The maintenance and supply system procures, stores, and distributes equipment, materials, and consumables required for efficient site operations. The system also supports maintenance of Repository facilities, equipment, instruments, and non-motor pool vehicles.

7.3.1 Required Functions

Maintenance facilities will be provided within the BOP for repair and maintenance of non-radioactive contaminated Repository equipment required for North Portal and emplacement operations. Maintenance shops for potential radioactive contaminated equipment is located in the WHB. Maintenance will be performed at the Central Shops for work needing a shop environment. It is assumed major repair of equipment and vehicles will be performed at off-site locations.

North Portal and emplacement operation warehousing will be provided for spare replacement equipment essential to the safe and efficient Repository operations, and for immediate materials and consumable supply items for operations and support functions. Operational equipment such as jumpers, lifting fixtures, and other specific equipment will be stored at other locations either on or off the Repository site.

The following functions are needed for the efficient operation of the maintenance system:

- System and staff management
- Maintenance scheduling, tracking and inventory control
- Records management and storage
 - equipment failures and repair records
- Equipment maintenance, repair and testing
 - operational equipment, alarm equipment, facility system equipment, instruments, radio
- Facility system maintenance and repair
 - grounds, balance of plant buildings, and nuclear facility buildings
- Non-motor pool vehicle repair
 - heavy vehicles and equipment
 - maintenance, grounds, supply, utility vehicles and equipment
- Maintenance equipment storage
 - maintenance tool repair and storage

The following functions are needed for the efficient operation of the supply system:

- System and staff management
- Inventory and procurement management
- Records management and storage
- Receiving/shipping
- Storage and retrieval
 - materials and supplies, operational equipment (private and DOE equipment), segregated/qualified storage for "Q" items
- Distribution and delivery
 - materials, supplies, equipment.

7.3.2 Facilities

The two facilities identified to house the maintenance and supply system functions are the Central Shops and Central Warehouse.

The maintenance scheduling, tracking, and inventory control function of the maintenance system and the inventory procurement management functions of the supply system will be integrated with and supported by the automated data processing function within the Administration Building.

7.3.2.1 Central Shops

The Central Shops will house the following maintenance operation functions along with exterior yard staging and storage for non-radiation vehicles and equipment:

- Offices for management/supervision, inventory procurement, and records management.
- Storage for procurement and maintenance records.
- General shops to support maintenance functions, i.e., electrical, carpentry, plumbing, pipefitting, painting, sheet metal, mechanical equipment, machine, and welding.
- Specialty shops to support maintenance of instrumentation for monitoring equipment and general Repository instruments, and radio repair.
- Vehicle maintenance shop for minor maintenance and repair of non-pool vehicles and motorized equipment, and other heavy duty vehicles, (i.e., fire apparatus and well logging equipment).

- Material/supply storage.
- Gas bottle storage.
- Tool repair/storage and issue.

7.3.2.1.1 Support Areas

Change rooms with associated showers and restroom facilities are provided for a total of 72 maintenance employees (includes male and female) working within the Central Shops and for 4 employees from the Service Station. The change rooms are located for direct personnel access to the support areas of the facility and are accessible from the maintenance areas. Determination of size is based on the maximum staff during one shift as outlined in the *Staffing Input Memo* (Reference 5.6).

A lunchroom is provided for 40 operations and maintenance staff assigned to the Central Shops. A lunchroom is provided for minimal food preparation and storage, eating, and space for vending machines. The room is identified in the ACD and accommodates maximum shift staff as indicated in the *Staffing Input Memo*. (Reference 5.6)

Circulation is required for movement of personnel and equipment within the Central Shops. Sizing of corridors meet the requirements of RDRD 3.2.5.2.2.A, and is in accordance with circulation factors identified in *Problem Seeking*. (Reference 5.7)

A storage area for clean and dirty coverall clothing will be located adjacent to the change rooms, with easy access for receiving/shipping. The space is sized to accommodate coverall storage for the anticipated number of workers using the change rooms as indicated in the *Staffing Input Memo*. (Reference 5.6)

7.3.2.1.2 Building Systems

The HVAC system for the Central Shops provides heating, cooling, and ventilation for the health, safety, and comfort of personnel and the protection of equipment. The ventilation system shall be industrial grade with components necessary to accomplish winter heating and summer cooling. The facility heating and cooling systems will be connected to the sitewide chilled and hot water systems and sized for anticipated use. Ventilation systems will be provided to accommodate specific shop functions such as painting, welding, and vehicle repair.

The sanitary sewer, potable water systems, and non-potable water for fire protection will be connected to the sitewide systems and sized for anticipated use.

The facility will be protected by an automatic fire suppression and alarm system meeting the requirements of DOE 420.1 for fire protection which supersedes DOE 5480.7 and DOE 6430.1A.

The orders are required in RDRD 3.7.4.3.B, C, and I. The fire protection system will be connected to the sitewide system.

This facility will meet the design requirements of NFPA 88B in regards to ventilation, electrical, and other operational considerations.

Normal electrical power will be provided to the facility by the sitewide substation. The substation will supply electrical power to a pad mounted transformer located near the building. Building utilities will utilize power for lighting, receptacles, alarm systems, and communication systems per RDRD 3.7.3.2.B and 3.7.3.5.A.

The facility will provide emergency lighting for personnel safety per RDRD 3.3.6.7.B.

Communications, (including telephone, radio, computer network, building/site alarm systems) will be provided for the Repository through the sites communication systems as required in RDRD 3.7.3.4.A.

The security and safeguards system will perform the surveillance and safeguards function at the access points that lead into the BOP. The Central Shops is within the BOP fenced area, therefore it is not anticipated that any additional security within the facility will not be needed other than lock and key control.

Equipment rooms will be provided for various building systems equipment, as needed..

Major equipment for the Central Shops includes:

- Monorail crane in the vehicle shop.
- Floor hoists in the vehicle shop.
- Compressed air from the industrial air system that is provided sitewide.
- Gas bottle storage will be located to provide exterior access storage of gases for shop activities in accordance with NFPA 54 and NFPA 55.

An exterior yard for maintained, large, operational equipment staging and for maintenance equipment storage including maintenance vehicles will be provided (private or DOE) per RDRD 3.7.4.4.M.

7.3.2.1.3 Facility Area Summary

The ACD 28,000- sq ft identified for the Central Shops appears to be appropriate for the anticipated functions. The ACD shows a first-aid room in the Central Shops; however, personnel for this function are not identified in the *Staffing Input Memo* (Reference 5.6). A first-aid room would

require staffing and is not normally provided within shop facilities of this scale. Therefore, this function was not included for this facility in this report. The first-aid function, along with appropriate sizing for the shops, will need to be verified by a later program analysis. (TBV)

7.3.2.2 Central Warehouse

The Central Warehouse will provide space to maintain an inventory of critical equipment spares (including items identified as "Q"), materials, and consumables required to maintain acceptable facility operations in an environment conducive to their safe-keeping and protection. The Central Warehouse will serve the Repository as a central distribution point. The facility will prepare and deliver equipment and supplies as needed. It is assumed that all equipment and materials will be delivered to the Repository by truck.

The office areas for management/supervision will also be provided with storage for inventory and procurement records.

The following functions are needed for the efficient operation of the Central Warehouse:

- Operational equipment/material supply/storage with automated stacking and retrieving equipment.
- General supply storage for the Repository.
- A receiving/shipping area provides loading dock and staging area for materials to be used at the Repository. Materials may include laboratory supplies, first-aid supplies, coverall storage, administrative supplies, janitorial supplies, maintenance/repair shop equipment and supplies, and maintenance supplies.

7.3.2.2.1 Support Areas

Change rooms with showers and restroom facilities will be provided for a total of 22 employees (includes male and female) working within the Central Warehouse. The change rooms are located for direct personnel access to the support areas of the facility. Determination of size is based on the maximum staff during one shift as outlined in the *Staffing Input Memo*. (Reference 5.6)

A lunchroom is provided for one shift of 12 employees assigned to the Central Warehouse. A lunchroom is provided for minimal food preparation and storage, eating, and space for vending machines. Food preparation includes heating precooked food, and food storage includes refrigeration. The room is identified in ACD functions and accommodates the maximum shift staff as indicated in the *Staffing Input Memo*. (Reference 5.6)

A storage area for clean and dirty coverall clothing will be located adjacent to the change rooms, with easy access for receiving/shipping. The space is sized to accommodate coverall storage for the

anticipated number of workers using the change rooms as indicated in the *Staffing Input Memo*. (Reference 5.6)

7.3.2.2.2 Building Systems

The HVAC system for the Central Warehouse provides heating, cooling, and ventilation for the health, safety and comfort of personnel and for the protection of equipment. The ventilation system shall be industrial grade with components necessary to accomplish winter heating summer cooling. The facility heating and cooling systems will be connected to the sitewide chilled and hot water systems and sized for anticipated use.

The sanitary sewer, potable water systems, and non-potable water for fire protection will be connected to the sitewide systems and sized for anticipated use.

The facility will be protected by an automatic fire suppression and alarm system meeting the requirements of DOE 420.1 for fire protection which supersedes DOE 5480.7 and DOE 6430.1A. The orders are required in RDRD 3.7.4.3.B, C, and I. The fire protection system will be connected to the sitewide system.

Normal electrical power will be provided to the facility by the sitewide substation. The substation will supply electrical power to a pad mounted transformer located near the building. Building utilities will utilize power for lighting, receptacles, alarm systems, and communication systems per RDRD 3.7.3.2.B and 3.7.3.5.A.

The facility will provide emergency lighting for personnel safety per RDRD 3.3.6.7.B.

Communications (including telephone, radio, computer network, building/site alarm systems) will be provided for the Repository through the sites communication system as required in RDRD 3.7.3.4.A.

The security and safeguards system will perform the surveillance and safeguards function at the access points that lead into the fenced area of the BOP. However, because of the storing of vital equipment or spare parts within the Central Warehouse, space for additional security personnel will be provided as shown in the *Staffing Input Memo* (Reference 5.6), and/or alarms, CCTV surveillance and assessment may be provided. (TBD) Doors will be controlled with lock and key.

Equipment rooms will be provided for various building systems equipment, as needed.

7.3.2.2.3 Facility Area Summary

The ACD does not provide any building layout information about the Central Warehouse, however, it does list a number of functions, requirements, and the overall square footage of the facility.

The 57,000-sq ft identified for the Central Warehouse in the ACD appears to be appropriate for the anticipated functions. By using a rule of thumb for determining storage space within the Central Warehouse, the net storage area equals 38,000 sq ft. (Reference 5.5) The net storage area is the actual area occupied by inventory, excluding aisles, space for empty pallets, receiving/shipping areas, honeycombing (empty storage area), special inventory (inspection, etc.) interferences (columns, odd corners, etc.) and miscellaneous spaces (offices, restrooms/change rooms, equipment, etc.). The rule of thumb is: the gross warehouse area (total square footage) is equal to the net storage area times a 1.5 multiplier. A later program analysis will need to be performed to verify the required area when material quantities to be warehoused are definitively identified.

7.4 SITE TRANSPORTATION SUPPORT SYSTEM

The general site transportation provides rail, road, and transportation safety and support systems required to transport personnel and materials between the various facilities and areas of the Repository site. The site transportation support system described in this report includes functional definition and verification of onsite motor pool services, including vehicle maintenance, repair, dispatch and staging, and site vehicle fuel supply. General rail and road systems, including site parking and safety lighting, are not discussed in this report.

7.4.1 Required Functions

It is assumed major vehicle repair will be performed at off-site repair facilities and minor light-vehicle maintenance will be provided on site, (i.e., oil change, tune up, tire change). The following functions are needed for the efficient operation of the general site transportation system described in this report:

- System and staff management
- Records storage
- Motor pool vehicle dispatch
- Motor pool vehicle parking
- Vehicle maintenance and repair
- Parts and tool storage
- Vehicle wash
- Vehicle fueling station.

Motor pool vehicles include those vehicles supporting the Repository program that are not directly associated with a program system with a specific function. Vehicles that will be maintained by this system include light vehicles associated with the motor pool, and security, medical, fire, and monitoring systems. It is assumed that heavy vehicles, including fire apparatus and well-logging equipment, will be maintained at the Central Shops as will vehicles required for maintenance and supply system operations. The fueling station will provide diesel and gasoline for all vehicles located outside of the RCA supporting the North Portal operations. These vehicles include maintenance vehicles and equipment, light cars and trucks, heavy vehicles, fire apparatus, ambulances, and other miscellaneous rolling equipment requiring gasoline or diesel to operate.

The overall vehicle maintenance concept described in this report will need to be further verified and developed in future program analysis.

7.4.2 Facilities

Facilities identified to support the general site transportation system includes the Facility Service Station, fueling station, and vehicle parking.

The following vehicles are assumed to meet the needs of the facilities defined in the ACD. (TBD)

- Security - 8 vehicles
 - 3 for security stations (1 per station)
 - 3 for facilities with security (1 per facility)
 - 1 for site touring
 - 1 for management
- Fire - 1 fire chief
- Medical - 1 ambulances
- Monitoring - 4 vehicles
 - 2 environmental
 - 2 performance confirmation
- Health Physics - 4 vehicles
 - 2 - 1 per portal
 - 2 nuclear facilities
- Motor Pool - 15 vehicles
 - 1 per 25 personnel for 375 personnel (375 personnel includes all Repository personnel maximum per Shift 1, excluding security and maintenance personnel per *Staffing Input Memo* (Reference 5.6).
- Total Vehicles Supported - 33.

It is assumed bussing of employees to and from the Site will be provided by NTS operations. (TBV) Facility for bus storage and repair is not included in this report. Equipment to haul disabled vehicles to off-site repair facilities will be provided by off-site non-repository operations.

The maintenance function will provide light maintenance and repair, including oil changes, tune up, tire changes, and other minor procedures for these light vehicles. Major repair will be performed at an off-site facility.

7.4.2.1 Service Station

The Service Station will provide office space for management/supervision, along with records storage of inventory procurement and maintenance records. An office or area will be needed for general motor pool dispatching functions. The dispatch area and manager's office may be combined for better use of personnel and efficiency.

Storage space will be provided for maintenance and repair parts (oil filters, tune-up parts, tire repair, etc.), tools, fluids, and waste developed from the repair operations..

It is assumed that there will be two vehicle maintenance bays provided for minor repairs or general maintenance. These bays will be provided with floor hoists. A third bay will serve as a vehicle wash or may also serve as an overflow for maintenance; this bay will not have a floor hoist.

7.4.2.1.1 Support Areas

It is assumed that change rooms with associated showers in the Central Shops will accommodate the Service Station employees, however, men and women's restrooms will be provided in the Service Station. Determination of size is based on the maximum staff during one shift as outlined in the *Staffing Input Memo*. (Reference 5.6)

It is assumed that lunchroom accommodations will be provided at the Central Shops for the Service Station staff. However, a break room and space for vending machines will be provided in the Service Station.

7.4.2.1.2 Building Systems

The HVAC system for the Service Station provides heating, cooling and ventilation for the health, safety, and comfort of personnel and the protection of equipment. The ventilation system shall be industrial grade with components necessary to accomplish winter heating and summer cooling. The facility heating and cooling systems will be connected to the sitewide chilled and hot water systems and sized for anticipated use.

The sanitary sewer, potable water systems, and nonpotable water for fire protection will be connected to the sitewide systems and sized for anticipated use.

The facility will be protected by an automatic fire suppression and alarm system meeting the requirements of DOE 420.1 for fire protection which supersedes DOE 5480.7 and DOE 6430.1A. The orders are required in RDRD 3.7.4.3.B, C, and I. The fire protection system will be connected into the sitewide system.

Normal electrical power will be provided to the facility by the sitewide substation. The substation will supply electrical power to a pad mounted transformer located near the building. Building

utilities will utilize power for lighting, receptacles, alarm systems, and communication system per RDRD 3.7.3.2.B and 3.7.3.5.A.

Communications (telephone, radio, computer network, building/site alarm systems) will be provided through the sites communication systems for the Repository as required in RDRD 3.7.3.4.A.

The security and safeguards system will perform the surveillance and safeguards function at the access points that lead into the BOP. The Service Station is within the BOP fenced area, therefore it is not anticipated that any additional security within the facility will be needed other than lock and key control of doors and fuel shut off.

Compressed air will be connected to the sitewide industrial air system for supplying air to the floor hoist and miscellaneous hand tools that will be used.

An oily water separation system will be used for collecting, separating, and accumulating oily water waste products. The system will be connected to the waste water system.

7.4.2.1.3 Facility Area Summary

The ACD does not provide any building layout information about the Service Station, however, it does list a number of functions, requirements, and overall square footage of the facility.

The estimated area required to perform functions within the Service Station is based on information in *Time Saver Standards for Building Types* (Reference 5.5) for a like facility, i.e., automobile service station. The facility described in Reference 5.5 has two service bays, a car wash/or service bay, tool and material storage, men and women's restrooms, and an office or service area. The basic square footage for this facility is 1,505 sq ft.

It is assumed that the Service Station personnel will use the change rooms and lunchroom facilities in the Central Shops providing the buildings are adjacent to each other. However, the Service Station is an industrial-type environment where there may be periods of standby after completing assigned tasks. A small break room is a practical solution for providing an habitable environment in which to wait. The break room is based upon seating for a minimum of four individuals per the *Staffing Input Memo* (Reference 5.6). It is assumed that the break room will not be a place for food preparation, however, there will be space for two vending machines.

With seating for four individuals at 15 sq ft per person per the Uniform Building Code (UBC) (min) and space for two vending machines at an assumed 6 feet of equipment with 10 sq ft per linear foot for equipment/access areas. Therefore, the total area required is:

Seating 4 persons by 15 sq ft per person = 60 sq ft
Vending - 6 feet by 10 sq ft per linear foot = 60 sq ft
Total area 60 + 60 = 120 sq ft

Circulation is required for movement of personnel within the office, storage room, and break room. Sizing of the circulation area or corridors complies with RDRD 3.2.5.2.2.A, and is in accordance with circulation area factors identified in *Problem Seeking* (Reference 5.7). The circulation pathways and corridors provide for egress to comply with NFPA 101, Life Safety Code. The circulation area factors are:

Office/Dispatch Area	240 sq ft
Break room	120 sq ft
Storage	<u>140 sq ft</u>
Total Assigned Area	500 sq ft
16% Circulation Factor	
Total Area Required for Circulation	80 sq ft

Miscellaneous systems required for support of the Service Station include fire protection, electrical, and communication systems. The following floor area analysis for mechanical/electrical space is based on the requirements identified in Section 7.4.2.1.2 Building Systems and *Problem Seeking* (Reference 5.7) for square footage factoring.

Service Station Area	1,505 sq ft
Break room	120 sq ft
Circulation	<u>80 sq ft</u>
Total new Service Station	1,705 sq ft
5% Mechanical/Electrical Factor	
Total area required for mechanical space: $1,705 \text{ sq ft} \times .05 = 85.25$ or 85 sq ft	

The Service Station includes a dispatch/supervisors office, men and women restrooms, material/tool storage, two service bays, and one car wash or service bay for a total floor space of 1,505 sq ft. Additional floor space is needed to accommodate a 120-sq ft break room, 85 sq ft for mechanical space, and 80 sq ft for building circulation. A new service station of 1,790 sq ft (or 1,800 sq ft) is needed to provide for the functions outlined in Section 7.4. The Service Station area described in the ACD is 1,200 sq ft, where as, this report shows a need for a minimum of 1,800 sq ft, or 600 sq ft additional space.

7.4.2.2 Fueling Station (Island)

The fueling station for the motor pool and Repository is based on the *Time-Savers Standards for Building Types* (Reference 5.5) for two fueling service islands, with one island having two pumps for unleaded gasoline and another island having two pumps for diesel. Each service island will be provided with compressed air and water.

7.4.2.3 Vehicle Parking

There are 15 motor pool vehicles that are not directly assigned to a specific facility or function but are identified in Section 7.4.2. Parking for the motor pool vehicles is taken from the *Time-Savers*

Standards for Building Types (Reference 5.5) for parking lot dimensions. The assumed angle of parking will be at 90 degrees and the stall will be 10 ft wide by 19 ft deep. The minimum driveway width is 24 ft and the lot width will be one row plus one driveway, for 43 ft. The square footage per car will be 430 sq ft. With 15 vehicles in the motor pool, at 430 sq ft per car, 6,450 sq ft is required. However, if the lot width is two rows plus one driveway, the square footage per car would be 310 sq ft, or 4,650 sq ft. For this report, the parking lot size will be based on one row plus one driveway. The *Time-Savers Standards for Building Types* (Reference 5.5) shows a typical lot layout for a service station with a floor area of 1,504 sq ft, two fueling islands, and site space for parking. The total square footage of the lot is 12,500 sq ft, or 100 ft by 125 ft. Since the site allows for a future addition to the Service Station of one bay, it is concluded that the lot size in this report will be adequate for an 1,800-sq ft service station, two fueling islands, and parking for 15 vehicles.

8. CONCLUSIONS

Due to the unqualified/unconfirmed input data used in this report, the output/conclusions from this report cannot be used as input into documents supporting procurement, fabrication, or construction unless they are controlled and tracked as TBV or TBD in accordance with NLP-3-15. These conclusions are intended to support the VA design.

This report verifies functions foreseen in the ACD in light of current project direction. Some functions are not fully defined in scope or may not be identified in this VA or in the ACD. It is suggested that in the following design phase, for development of spacial program analysis, operational representatives knowledgeable in the specific systems be identified for the functional area to qualify and develop further direction of functions required to support the CRWMS project. Some major functional areas needing further development and analysis which have been identified in this report include:

- Determination of administrative functions which are to be located at the Repository or at a remote site (i.e., Las Vegas).
- Training program requirements.
- Scope assessment of visitor management program.
- Determination of mockup program requirements with possible consolidation of mockup arrangements.
- Determination of central and remote location maintenance requirements with appropriate shop identification and sizing, and integration of instrumentation/calibration shops.
- Determination of materials and quantities to be warehoused and staged on and off-site including consumable supplies, spare facility equipment, operational equipment (jumpers, lifting fixtures, etc.), items identified as quality effecting, and emplacement operation equipment.

- Verification of vehicle service/repair concept.
- Development of detailed facility sizing basis for Administration Building, Mockup Building, Visitor Center, Central Shops, Central Warehouse, and Facility Service Station through individual space program analysis.
- Determination of logistics functions associated with systems not defined in this report and impact to the functions identified (i.e., laundry, subsurface equipment storage/repair).
- Determination of record items to be archived, managed, and stored.
- Determination of facility security for the Visitors Center and Central Warehouse.

This report also develops several facility square footages related to the anticipated functions. Table 8-1 identifies the facility, functional areas provided within the facility, and an estimated square footage.

9. ATTACHMENTS

Not used.

Table 8-1. Facilities

FACILITY	FUNCTIONAL AREAS	FLOOR AREA DEVELOPED BY THIS REPORT (SQ FT)
Administration Building	<p>Following the ACD area breakdown:</p> <ul style="list-style-type: none"> •Administration area, contractor/staff management, government management, payroll/accounting, purchasing, human resources, document control, records management, engineering, training, licensing support, environmental monitoring, support areas •Food Service Facility <ul style="list-style-type: none"> kitchen lunchroom serving area food/supply storage restrooms •Computer Center <ul style="list-style-type: none"> automated data processing mechanical equipment offices central management and operations center •Training Auditorium <ul style="list-style-type: none"> 50 seat capacity <p>TOTAL ADMINISTRATION BUILDING:</p>	<p>44,000</p> <p>11,000</p> <p>4,000</p> <p>1,000</p> <p>60,000</p>
Central Warehouse	Storage space, receiving and shipping dock, offices, lunchroom change room/restrooms with lockers and showers	57,000 (facility only)
Central Shops	Crafts Shops (electrical, plumbing mechanical, welding, automotive, machinery, carpentry, etc.) offices, lunchroom, change rooms with lockers and showers	28,000 (facility only)
Mockup Building	High-bay mockup room (hands-on training) classrooms, offices, restrooms	14,000
Visitors Center	Theater, meeting rooms, reception area, display area, food service, offices, restrooms	19,800
Motor Pool and Facility Service Station	Dispatch/supervisor office, material/tool storage, car wash, maintenance bays (light maintenance only), motor pool parking	1,800 (facility only) 100 ft by 125 ft yard area