PLUTONIUM DISPOSITION PROJECT (U)
Project M09A

SCOPE OF WORK

M-SOW-K-00017 Revision 1
for
Can-in-Canister Loading, Storage, and Transport System (U)

Originated by: Marc Cameron Date: 3/20/07
Marc Cameron
Mechanical Engineer

Reviewed by: EC Tefft III Date: 3/20/07
Edward Tefft
Senior Mechanical/Process Engineer

Approved by: Clayton Holloway Date: 3/20/07
Clayton Holloway
Mechanical Lead

Approved by: Roderick King Date: 3/20/07
Roderick King
Electrical/I&C Lead

Approved by: Ghada S. Elchoufi Date: 3/20/07
Ghada Elchoufi
C/S/A Lead

Approved by: Date: 3-20-07
Drew Negus
Plant Design Lead

Approved by: John Hammond Date: 3-20-07
John Hammond
Construction Lead

Approved by: Larry Milton Date: 3/20/07
Larry Milton
Design Authority

Approved by: B.C. Patel Date: 3/21/07
B.C. Patel
Project Engineer

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ADC/RO: EC Tefft III
Date: 3/20/07

Revision Page

Revision	Revision Date	Affected Section	Description of Change
0	3/9/07	N/A	Initial Revision
1	3/21/07	Section 3.2 and Attachment 2	Added Torque Wrench to Mechanical Equipment List and Updated Bulk C/S/A Materials

Table of Contents

Section **Page**

1.0 SCOPE 4
- 1.1 General Description 4
- 1.2 Background 4

2.0 ACRONYMS/ABBREVIATIONS 5

3.0 DESCRIPTION OF PHYSICAL WORK 5
- 3.1 Performance Category and Functional Classification (SC, SS, PS, GS) 5
- 3.2 Mechanical/Nuclear/Process 6
- 3.3 Instrumentation and Controls 8
- 3.4 Electrical 9
- 3.5 Plant Design 10
- 3.6 Civil/Structural/Architectural 10

4.0 ASSUMPTIONS 10
- 4.1 General Assumptions 10
- 4.2 Specific Assumptions 11
- 4.3 High Business Decision Estimate Range (BDER) 12
- 4.4 Maintenance Strategy 12

5.0 TECHNOLOGY DEVELOPMENT ISSUES 12

6.0 REFERENCES 12
- 6.1 Drawing List 12
- 6.2 Design Input Documents 13
- 6.3 Applicable SRS & Industry Codes, Guides and Standards 14
- 6.4 Related Scopes of Work (SOW) 15
- 6.5 Miscellaneous 15

7.0 ATTACHMENTS 15
- Attachment 1. Bulk Electrical Materials 16
- Attachment 2. Bulk C/S/A Materials 21

1.0 SCOPE

1.1 General Description

This Scope of Work (SOW) Covers the Can-in-Canister Loading, Storage and Transport System for the Plutonium Disposition Project. Can-in-Canister Loading, Storage and Transport receives Bagless Transfer Cans, assembles cans into magazines, stores magazines, and assembles magazines into DWPF canisters suitable for filling with high-level waste (HLW) glass. The Can-in-Canister Loading, Storage and Transport System receives bagless transfer cans from Bagless Can Storage via the Material Handling System. The loaded DWPF canisters are moved to DWPF via a Transportation Trailer.

1.2 Background

The Office of Environmental Management has approximately 13 metric tons (MT) of plutonium in approximately 21 MT bulk materials without any defined disposition path. The Plutonium Disposition (PUD) Project is critical to meet the Department of Energy's strategic goal of providing a responsible resolution to the permanent disposal of the nation's excess high-level radioactive materials and waste; and to enable the cleanup of Environmental Management sites.

The Plutonium Disposition Facility (PDF) will be located at the K-Area Complex (KAC) to disposition up to approximately 13 Metric Tons (MT) of Environmental Management (EM) owned surplus plutonium. The facility will utilize a vitrification process to vitrify plutonium into a lanthanide borosilicate (LaBS) glass matrix. This glass will be packaged into bagless transfer cans and placed inside a Defense Waste Processing Facility (DWPF) type canister. The canister will be transported to DWPF and filled with High Level Waste (HLW) glass. The canisters will be stored in the Glass Waste Storage Buildings and later transported to the geologic repository at Yucca Mountain.

This Scope of Work (SOW) has been developed for the purpose of facilitating construction cost and schedule estimates for the Conceptual Design Report (CDR) on the PUD project. The input to this SOW was the approved technical baseline consisting of a Facility Design Description (FDD) and associated System Design Descriptions (SDD). Every intent has been made to assure alignment and consistency between this SOW and the appropriate sections of the technical baseline, in order to provide accurate estimates. This SOW is not a PUD technical baseline document. A more detailed description of the system can be found in the associated SDD listed in the reference section.

A **HOLD** is placed to identify information that is preliminary in nature, results from a design uncertainty, originates from insufficient documentation, needs verification, or identifies a discrepancy. A **TBD** is placed to identify places in the text where numeric values or descriptive information is not available at the time that the current revision of the SOW is released.

2.0 ACRONYMS/ABBREVIATIONS

Acronym / Abbreviation	Definition
BDER	Business Decision Estimate Range
DCS	Distributed Control System
DOE	Department of Energy
DWPF	Defense Waste Processing Facility
FDD	Facility Design Description
GS	General Support
HLW	High-Level Waste
ICS	Integrated Control System
I&C	Instrumentation and Controls
LaBS	Lanthanide Borosilicate
KAC	K Area Complex
MC&A	Material Control and Accountability
MLS	Magazine Loading and Storage System
MT	Metric Tons
PDF	Plutonium Disposition Facility
PLC	Programmable Logic Controller
PS	Production Support
PUD	Plutonium Disposition
PUV	Plutonium Vitrification
SC	Safety Class
SDD	System Design Description
SOW	Scope of Work
SRS	Savannah River Site
SS	Safety Significant
TBD	To Be Determined
WSRC	Washington Savannah River Company

3.0 DESCRIPTION OF PHYSICAL WORK

3.1 Performance Category and Functional Classification (SC, SS, PS, GS)

3.1.1 Performance Category

3.1.1.1 The Performance Category for all functions in the Can-In-Canister Loading, Storage and Transport System is PC-2. (Refer to G-FDD-K-00001)

3.1.2 Functional Classification

3.1.2.1 The Can-In-Canister Loading, Storage and Transport System shall be designed in accordance with the requirements of WSRC Manual WSRC-E7, Conduct of Engineering and Technical Support Procedure 2.25 Rev. 14, “Functional Classification”.

3.1.2.2 All equipment in the Can-In-Canister Loading, Storage, and Transport System falls under the Functional Classification, Production Support (PS). (Refer to G-FDD-K-00001)

3.2 Mechanical/Nuclear/Process

3.2.1 Can-In-Canister Loading, Storage, and Transport System

3.2.1.1 Refer to the basic block flow diagram M-M8-K-00009 and layout sketch SK-DE-MLS-0001 for the Can-In-Canister Loading, Storage, and Transport System. This system is remotely operated using hoists, cranes, robots and other remotely operated equipment to load bagless transfer cans containing vitrified plutonium oxide into DWPF canisters and the canisters in turn onto a Transportation Trailer for transport to DWPF. The major components are:

- Pick and Place Robot :
  - Equipment No. MLS-ROB-020
- Bridge Robot with Telescoping Arm (Above Cells):
  - Equipment No. MLS-CRN-010 and MLS-ROB-010
- Overhead Bridge Crane with Hoist and Grapple:
  - Equipment No. MLS-CRN-050 and MLS-TRLY-050
- Magazine Loading Station:
  - Equipment No. MLS-STAT-031
- Canister Loading Station
- Bagless Can Lag Storage Rack
- Empty Magazine Storage Rack
- Loaded Magazine Storage Rack
- Empty Canister Storage Rack
- Loaded Canister Storage Rack
- Bagless Can Storage Rack
- Robotic Bridge Crane (Located in Bagless Storage Room)
  - Equipment No. MLS-CRN-001 and MLS-ROB-001
- Torque Wrench
  - Equipment No. MLS-TOOL-001

Note: All quantities for the above equipment are one each.

3.2.2 Pick and Place Robot

3.2.2.1 The Pick and Place Robot is designed to transfer bagless cans from the -14 level dumbwaiter to Bagless Can Lag Storage or the Magazine Loading Station (also Lag Storage to the Magazine Loading Station) to be scanned by a barcode reader. See Data Sheet No. M-DS-K-00084.

3.2.3 Bridge Robot with Telescoping Arm

3.2.3.1 The Bridge Robot with Telescoping Arm will be located above the Magazine Loading and Canister Loading cells and is designed to place loaded magazines into an empty canister or magazine storage rack. The telescoping arm allows for precise insertion of a magazine into a canister or designated storage rack position. The Bridge Robot with Telescoping Arm will handle all movement of empty and loaded magazines. See Data Sheet No. M-DS-K-00087.

3.2.4 Overhead Bridge Crane with Hoist and Grapple

3.2.4.1 The Overhead Bridge Crane (25 ton) with Hoist and Grapple (also including rails and supports) is designed to transport canisters (empty and loaded) to and from the Canister Storage Rack, place canisters into the Canister Loading Station and load canisters onto the Transportation Trailer. All canister handling operations will utilize the Overhead Bridge Crane.

3.2.4.2 The Overhead Bridge Crane with Hoist and Grapple will also be used for remote handling for maintenance/replacement of the following equipment: Bridge Robot with Telescoping Arm, Pick and Place Robot, Magazine Loading Station, Canister Loading Station and other racks, etc. located in cell areas. See Data Sheet No. M-DS-K-00085.

3.2.5 Magazine Loading Station

3.2.5.1 The Magazine Loading Station is designed to rotate and hold each magazine in a horizontal position while loading bagless cans and installing cap. The Loading Station repositions each magazine vertically for Bridge Robot Telescoping Arm engagement. See Data Sheet No. M-DS-K-00086.

3.2.6 Canister Loading Station

3.2.6.1 The Canister Loading Station is a structural base (See Drawing No. SK-DE-MLS-0001) designed to hold each canister while it is being scanned by a barcode reader, loaded with magazines and a temporary plug is installed. The Loading Station includes a remote display weigh scale. See Data Sheet No. J-JD-K-00042.

3.2.7 Bagless Can Lag Storage Rack

3.2.7.1 The Bagless Can Lag Storage Rack is designed to temporarily store 28 bagless cans (enough for one canister) prior to loading into magazines. See SK-DE-MLS-0001 for layout.

3.2.8 Empty Magazine Storage Rack

3.2.8.1 The Empty Magazine Storage Rack is designed to store 21 empty magazines and closure caps, enough for one week's supply. See SK-DE-MLS-0001 for layout.

3.2.9 Loaded Magazine Storage Rack

3.2.9.1 The Loaded Magazine Storage Rack is designed to store 180 loaded magazines. See SK-DE-MLS-0001 for layout.

3.2.10 Empty/Loaded Canister Storage Rack

3.2.10.1 The Empty/Loaded Canister Storage Rack is designed to store 12 canisters in any combination of empty and/or loaded canisters. See SK-DE-MLS-0001 for layout.

3.2.11 Bagless Can Storage Rack

3.2.11.1 The Bagless Can Storage Rack will be located on -14' level and will be designed for temporary storage of loaded bagless cans before transportation to 00' level to be loaded into magazines.

3.2.11.2 The Bagless Can Storage Rack will be designed to store a four months supply of loaded bagless cans in the case of a melter outage at DWPF.

3.2.12 Robotic Bridge Crane (Bagless Storage Room)

3.2.12.1 The Robotic Bridge Crane located in the Bagless Can Storage Room on -14' level will be designed to move bagless cans from a shielded cart to storage or to the dumbwaiter to 00' level or from storage to the dumbwaiter. It will also be capable of removing the top of the shielded cart so that the bagless cans can be removed. See M-DS-K-00165.

3.2.13 Torque Wrench

3.2.13.1 The Torque Wrench shall be designed to loosen and tighten ACME nuts to aid in removal and replacement of various stationary, remotely controlled equipment in the Can-In-Canister Loading, Storage and Transport System (See Data Sheet M-DS-K-00154).

3.3 Instrumentation and Controls

3.3.1 Process Controls

The Can-In-Canister Loading, Storage, and Transport System processors are defined below. Serial links from all of the processors listed below to the DCS I/O Cabinet ICS-CAB-110 will be provided by the vendor but wiring will be by SRS. ICS-CAB-110 can be expanded for direct I/O but none is planned at this time. Refer to the Attachment 1 - Bulk Electrical Materials for cable and conduit descriptions and quantities. Approximately 6 core drills will be needed for these installations. For details on wiring refer to Magazine Loading Control Block Diagram J-J8-K-00019

3.3.1.1 The main overhead bridge crane (see data sheet M-DS-K-00085) shall be wired to the canister area PLC in cabinet MLS-CAB-050 and locally controlled by console MLS-CNSL-050.

3.3.1.2 The canister loading bridge robot MLS-ROB-010 with telescoping arm (see data sheet M-DS-K-00087) shall be wired to the canister area PLC in cabinet MLS-CAB-050 and locally controlled by console MLS-CNSL-051.

3.3.1.3 The magazine loading station MLS-STAT-031 (see data sheet M-DS-K-00086)

including loading piston, table tilt, station index feeder, and Dumb Waiter MH-ELEV-002 (see data sheet M-DS-K-00103 and MH bulk take-off for wiring) shall be wired to the magazine loading station PLC in cabinet MLS-CAB-030 and locally controlled by console MLS-CNSL-030.

3.3.1.4 The pick and place robot MLS-ROB-020 (see data sheet M-DS-K-00084) shall be wired to the Magazine Loading Can Pick and Place Processor in cabinet MLS-CAB-020 and locally controlled by console MLS-CNSL-020.

3.3.1.5 The robotic bridge crane, MLS-CRN-001 and MLS-ROB-001 (see data sheet M-DS-K-00165) located in bagless can storage shall be wired to a processor in cabinet MLS-CAB-040 with associated console MLS-CNSL-040 located in the magazine loading control room.

3.3.1.6 A High BDER option of two process "Black" (i.e. unclassified) system barcode readers would put one in the canister loading area MLS-RDR-011 and one in the magazine loading area MLS-RDR-012. They would be similar to the barcode readers in the MC&A system described below and defined in data sheets J-JD-K-00066 and J-JD-K-00067 except that they would be black and would be wired to the DCS I/O cabinet ICS-CAB-110 serial I/O cards.

3.3.2 MC&A System

See the MC&A Control Block Diagram J-J8-K-00032 for details on Magazine Loading MC&A equipment and the Mechanical/Nuclear/Process section for description of major equipment in the magazine loading and canister loading areas. For details on the canister weighing scale MLS-SCL-001 see data sheet J-JD-K-00042. This scale shall be floor mounted in the Canister loading cell. There shall be a remote readout to be located in the control room in the Purification Wing. Cables and equipment associated with the MC&A system are designated as “Red” (i.e. classified) and will be installed per requirements of S-SRI-K-00005 (e.g. marking, separation). Also, cables and associated raceway will be labeled and inspected per project security plan documents. (See S-SOW-K-00002) For details on the canister barcode reader MLS-RDR-001 see data sheet J-JD-K-00066. For details on the magazine bar code reader MLS-RDR-002 see data sheet J-JD-K-00067.

3.4 Electrical

3.4.1 The Can-In-Canister Loading, Storage, and Transport System will contain the following major electrical components and services. The major electrical components will be provided as Engineered Equipment. This Scope of Work includes all raceway, power, control cables/terminations between field equipment and local controls and/or Purification Wing Control Room controls. Provide onsite setup and assembly of the referenced Engineered Equipment. Refer to Attachment 1 – Bulk Electrical Materials for cable and conduit descriptions and quantities (See Attachment 1). Approximately 20 core drills will be needed for these installations.

3.4.1.1 Can-In-Canister Remote Cameras and Viewing System, approx. 10 cameras, see Data Sheet No. E-DS-K-00020, Sketch No. SK-DE-MLS-0005, and drawing No. E-EB-K-00704. Cameras will be supplied with mounting brackets. Several cameras will be mounted on cranes. These cameras will be supplied to crane vendor with cabling specifications and designed into the crane cable/festoon systems. Several cameras will be wall mounted. Cameras in the Magazine Loading and Canister Loading Cells will be mounted on a special base with a bail for remote lifting/replacement. See conceptual details on sketch SK-DE-MLS-0006.

3.4.1.2 Electrical power distribution shall be as shown on single line drawing E-E2-K-02226. Existing Motor Control Center (MCC) 22E shall be refurbished and reconfigured as required to match the new design. This is located in Equipment Room in the Purification Wing. New feeders shall be routed to each new load as shown on this drawing.

3.4.1.3 Grounding shall include connection of all new permanent electrical equipment and/or skids to the existing ground grid system. This Scope of Work shall include approximately 10ft long pigtails with bolted terminations. Small movable equipment shall be grounded in accordance with code and/or industry practices.

3.5 Plant Design

3.5.1 No piping is associated with this Scope of Work.

3.6 Civil/Structural/Architectural

3.6.1 For structural and architectural modifications to the building structure including penetrations, penetration seals and core drills refer to C-SOW-K-00009

Follow manufacturer's recommendations for the support details of the following items:

- Pick and Place Robot
- Bridge Robot with Telescoping Arm (Above Cells)
- Crane with Hoist and Grapple
- Magazine Loading Station
- Robotic Bridge Crane (Bagless Storage Room)

See drawing SK-DE-MLS-0004 for structural details for the following items:

- Canister Loading Station
- Bagless Can Lag Storage Rack
- Can Storage Rack
- Empty Magazine Storage Rack
- Loaded Magazine Storage Rack
- Empty Canister Storage Rack
- Loaded Canister Storage Rack
- Bagless Can Storage Rack

For electrical equipment and instruments, see sketch No. SK-DE-MLS-0006.

3.6.2 Field to provide/install 1" thick carbon steel plate around each conduit inside cell areas. Also, around conduits and pull boxes located in bagless storage room. This is to provide radiation shielding for cables in these conduits. Refer to SK-DE-MLS-0006 for bulk material details.

4.0 ASSUMPTIONS

4.1 General Assumptions

4.1.1 The Construction Agency will be the SRS Construction Group. Design Services will provide engineering documentation for the installation of this equipment and will rely on the use of SRS Guides and Standards.

4.1.2 SRS Construction Group will procure all bulk materials.

4.1.3 SRS Construction Group will procure all off-the-shelf components and equipment identified on engineering data sheets that do not require testing or quality documentation.

4.2 Specific Assumptions

4.2.1 Mechanical

4.2.1.1 The existing bridge crane (Including rails) in the purification wing of KAC will be replaced.

4.2.1.2 The Transportation Trailer belongs to the Material Handling System scope (Refer to M-SOW-K-00027).

4.2.1.3 The existing DWPF grapple is the basis for the estimate.

4.2.1.4 The existing KAC truck bay shield door is assumed to be operational. No cost will be incurred by PUD.

4.2.2 Instrumentation and Controls

4.2.2.1 Construction scope includes initial calibration of instruments installed per this SOW.

4.2.2.2 No radiation resistant (hardened) cables required

4.2.3 Electrical

4.2.3.1 No Hanford type connectors or jumpers will be required, refer to SK-DE-MLS-0006.

4.2.3.2 Existing grounding grid is intact and adequate for grounding of new equipment.

4.2.3.3 Existing Public Address system in Purification Wing can be restored to service with minimal work and connected/made compatible with new Public Address system being provided in KAC by PUD project. Refer to E-EF-K-02088, note 4.

4.2.3.4 Engineered Equipment will include all hardware and (interconnect) cabling necessary for onsite assembly of equipment installed on vendor skid (or shipping splits disassembled at factory to ease shipping). Terminations will utilize vendor assembled connectors or detailed wiring/connection drawings will be provided. Interface cables to customer power (utility) connections and/or remote control functions will be specified by vendor and furnished by the field.

4.2.3.5 Cranes and robotic equipment that utilize cable reels and/or festoon systems shall be supplied with the required cables and connectors.

4.2.3.6 No radiation resistant (hardened) cables required.

4.2.4 Plant Design

4.2.4.1 No specific assumptions have been made in this group.

4.2.5 Civil/Structural/Architectural

4.2.5.1 4” core drills can be made through the floor of each cell, cutting rebar as

required. This is to allow installation of 3" riser conduits.

4.2.5.2 Assume all anchor bolts used for equipment and commodity supports will be A36 Drillco Maxi Bolts.

4.2.5.3 Assume the Functional Classification for drilling holes in concrete surface is SC.

4.2.5.4 For electrical conduits and equipment supports, use cookbook No. C-CI-G-0039.

4.3 High Business Decision Estimate Range (BDER)

4.3.1 Barcode readers designed specifically for product tracking, product selection and in-process inventory will be part of the High BDER scope. Currently, it is assumed that the MC&A barcode readers mentioned in Section 3.3.2 will also be used to accomplish these tasks.

4.4 Maintenance Strategy

4.4.1 Maintenance and replacement of equipment for Can-In-Canister Loading, Storage and Transport will be by remote removal to shielded/isolate area (outside cells). No one is planned to enter the Magazine Loading or Canister Loading cells during normal operation, therefore all equipment in these areas will be designed for remote removal for maintenance and replacement (Refer to M-ESR-K-00017).

5.0 TECHNOLOGY DEVELOPMENT ISSUES

5.1 The Pick and Place Robot design concept for magazine loading has not been developed and will need development and proof of concept for the PUD project.

5.2 The Bridge Robot with Telescoping Arm design concept for canister loading has not been developed and will need development and proof of concept for the PUD project.

6.0 REFERENCES

6.1 Drawing List

6.1.1 PUD Project Drawings & Sketches

6.1.1.1 E-DS-K-00020 – Magazine Loading and Storage Camera System

6.1.1.2 E-E2-K-02226 – Magazine Loading/Storage – Single Line

6.1.1.3 E-EB-K-00704 – Magazine Loading/Storage Viewing System Block Flow Diagram

6.1.1.4 J-J8-K-00019 – Magazine Loading/Storage Material Handling System Control Block Diagram

6.1.1.5 J-J8-K-00034 – Magazine Loading MC&A Block Diagram

6.1.1.6 J-JD-K-00042 – Data Sheet for Canister Weigh Scale

6.1.1.7 J-JD-K-00066 – Data Sheet for Magazine Loading Barcode Reader No. 1

6.1.1.8 J-JD-K-00067 – Data Sheet for Magazine Loading Barcode Reader No. 2

6.1.1.9 M-DS-K-00084 – Data Sheet for Pick and Place Robot

6.1.1.10 M-DS-K-00085 – Data Sheet for Crane with Hoist and Grapple

6.1.1.11 M-DS-K-00086 – Data Sheet for Magazine Loading Station

6.1.1.12 M-DS-K-00087 – Data Sheet for Robot with Telescoping Arm

6.1.1.13 M-DS-K-00154 – Data Sheet for Torque Wrench

6.1.1.14 M-DS-K-00165 – Data Sheet for Robotic Bridge Crane

6.1.1.15 M-M8-K-00009 – Magazine Loading/Storage, Canister Loading/Transport Block Flow Diagram

6.1.1.16 SK-DE-MLS-0001 – Magazine & Canister Loading Layout, Plan, and Sections

6.1.1.17 SK-DE-MLS-0002 – Magazine Loading/Storage Floor Plan at Elev. -14’-0” and Floor Plan at Elev. 0’-0”

6.1.1.18 SK-DE-MLS-0003 – Magazine Loading/Storage Floor Plan at Elev. +21’-0” and Floor Plan at Elev. +30’-0”

6.1.1.19 SK-DE-MLS-0004 – Magazine Loading/Storage Rack Design, Sections and Details

6.1.1.20 SK-DE-MLS-0005 – Magazine Loading/Canister Loading, Electrical, and I&C Layout

6.1.1.21 SK-DE-MLS-0006 – Magazine Loading/Canister Loading Layout, Electrical Raceway, and Radiation Shielding

6.1.2 Existing Savannah River Site (SRS) Drawings

6.1.2.1 C-CM-H-07056 – CBU-Salt Processing Program Actinide Removal Process 4500# Lifting Yoke for Agitators, Pumps & Cooling Coils

6.1.2.2 C-CM-H-07057 – CBU-Salt Processing Program Actinide Removal Process 1/2 Ton Lifting Yoke for O-Ring Gasket Flange

6.1.2.3 W144532 – Purification Area Basement Plan, Power & Instrumentation

6.1.2.4 W144533 – Purification Area First Floor Plan, Power & Installation

6.1.2.5 W752550 – Details of ACME Stud, ACME Nut, Dowel Pin, and Trunnion

6.1.2.6 W752199 – Details of 3” Conn. Nozzle, Nut Ret./Dutchman, Vessel Agitator

6.2 Design Input Documents

The following Facility Design Description and System Design Descriptions are the baseline documents used to develop this SOW.

6.2.1 Facility Design Description

6.2.1.1 G-FDD-K-00001, Rev: B, “PUV Facility Design Description”

6.2.2 System Design Description

6.2.2.1 M-SYD-K-00002, Rev: B, “Can-In-Canister Loading, Storage, and Transport System (MLS) SDD”

6.2.3 Safeguards and Security Requirements Identification document

6.2.3.1 S-SRI-K-00005, Rev: 0, KAC Safeguards and Security Requirements Identification Document for Plutonium Disposition.

6.2.4 Maintenance Strategy

6.2.4.1 M-ESR-K-00017, Rev: 0, “Plutonium Disposition Facility Maintenance and Replacement Strategy”.

6.3 Applicable SRS & Industry Codes, Guides and Standards

6.3.1 Industry Codes and Standards

6.3.1.1 NFPA 801, Standard for Fire Protection for Facilities Handling Radioactive Materials, February 6, 2003

6.3.2 SRS Guides & Standards

6.3.2.1 WSRC-IM-95-58, Standard 03252-G, Rev: 1, Installation and Testing of Concrete Anchors, December 19, 2005

6.3.2.2 WSRC-IM-95-58, Standard 15980-G, Rev: 3, Installation and Calibration of Instruments July 16, 2004

6.3.2.3 WSRC-IM-95-58, Standard 16051-G, Rev: 2, Installation of Electrical Raceway Systems and Cable Trays April 24, 2003

6.3.2.4 WSRC-IM-95-58, Standard 16052-G, Rev: 3, Installation of Electrical Wires, Cables and Terminations August 15, 2005

6.3.2.5 WSRC-IM-95-58, Standard 16053-G, Rev: 2, Installation of Electrical Equipment February 12, 2004

6.3.2.6 WSRC-IM-95-58, Standard 16056-G, Rev: 2, Installation of Grounding Systems August 19, 2003

6.3.2.7 WSRC-TM-95-1, Standard 03010, Rev: 1, Coring, Chipping, and Drilling in Concrete, December 19, 2005

6.3.3 DOE Orders & Standards

6.3.3.1 DOE Manual 470.4-6, Rev: Chg.1, Nuclear Materials Control and Accountability, August 14, 2006

6.3.3.2 DOE/RW-0333P, Rev: 17, Quality Assurance Requirements and Description, 5/8/2006

6.4 Related Scopes of Work (SOW)

6.4.1 M-SOW-K-00015, Bagless Transfer System – This related SOW provides information on the bagless cans which will be provided as input to the Magazine Loading System.

6.4.2 E-SOW-K-00017, Electrical Power Supply System – This related SOW provides information on the electrical power supply for all systems. Electrical power is supplied to main electrical distribution equipment, which is utilized to service process and BOP equipment electrical needs.

6.4.3 C-SOW-K-00009, Structural & Architectural Mods for Process Building

6.4.4 J-SOW-K-00002, Integrated Control System – This related SOW provides the interface to (automated) process control systems and/or MC&A network equipment included associated with this work scope.

6.4.5 M-SOW-K-00027, Material Handling System – This related SOW provides details on how material is transported between systems.

6.4.6 S-SOW-K-00002, Safeguards and Securities – This related SOW provides details on safeguard and security measures being implemented for each of the systems.

6.5 Miscellaneous

6.5.1 C-CI-G-0039, Rev: 0, Electrical Conduit and Equipment Supports, February 9, 2005.

6.5.2 WSRC-TR-06-0043, Rev: 0, Plutonium Vitrification Facility Consolidated Hazard Analysis, January 2007.

7.0 ATTACHMENTS

Attachment 1. Bulk Electrical Materials

Attachment 2. Bulk C/S/A Materials

Attachment 1. Bulk Electrical Materials

CABLE AND RACEWAY ESTIMATE TOTALS

Cable Quantities

Cable Size/Type	Total (ft)
1-3/c#10 w/1-#12gnd	1,020
1-3/c#4/0 w/1-#6gnd	160
1-3/c#6 w/1-#8gnd	50
1-3/c#2 w/1-#6gnd	20
36/c #16	640
16/c #16	300
1/c#12	2,730
#4/0	300
#6	20
3/c #18	320
3/c #19	160
Grand Total	5,720

All Raceway Types and Quantities
Grouped by Red Designation

Red	RCWY	Total (ft)
N	3/4" IMC	1,130
	3" IMC	430
	1" IMC	40
	2" IMC	780
	1 1/2" IMC	140
Y*	3/4" IMC	450
Grand Total		2,970

* Red conduit contains wiring for classified systems, and installation and support is more difficult than for “black”, unclassified wiring systems.

CABLE AND RACEWAY ESTIMATES BY EQUIPMENT

Item #	From Equipment	To Equipment	Cable Estimates			Raceway Estimates				
			Length (ft)	Qty	Cable size/description	Length (ft)	Qty	Size/Desc.	Red	Notes/Comments
1	MCC-22E	Truck bay roll-up door motor	170	1	1-3/c#10 w/1-#12gnd	160	1	3/4" IMC	N	
2	MCC-22E	Pick & Place Robot in Mag Loading cell	160	1	1-3/c#10 w/1-#12gnd	150	1	3/4" IMC	N	
3	MCC-22E	Magazine Loading Station in Mag Loading cell	160	1	1-3/c#10 w/1-#12gnd	150	1	3/4" IMC	N	
4	MCC-22E	Material Lift Platform (Elv -20 to -14)	210	1	1-3/c#10 w/1-#12gnd	200	1	3/4" IMC	N	
5	MCC-22E	Bridge Crane/robot arm in Bagless Storage Room	160	1	1-3/c#10 w/1-#12gnd	170	1	3/4" IMC	N	
6	MCC-22E	Bridge Crane w/Hoist & Grapple in Purification Wing	160	1	1-3/c#4/0 w/1-#6gnd	150	1	3" IMC	N	
7	MCC-22E	Canister Loading Station in Canister Loading cell	160	1	1-3/c#10 w/1-#12gnd	150	1	3/4" IMC	N	

Item #	From Equipment	To Equipment	Cable Estimates			Raceway Estimates				
			Length (ft)	Qty	Cable size/description	Length (ft)	Qty	Size/Desc.	Red	Notes/Comments
8	MCC-22E	New Power Transformer in Purification Wing Electrical Room	50	1	1-3/c#6 w/1-#8gnd	40	1	1" IMC	N	
9	New Power Transformer in Purification Wing Electrical Room	New Power Panel in Purification Wing Electrical Room	20	1	1-3/c#2 w/1-#6gnd	30	1	2" IMC	N	
10	New Power Panel in Purification Wing Electrical Room	(2) duplex receptacles at/on Bridge Crane with Hoist/Grapple	160	3	1/c#12	150	1	3/4" IMC	N	Dedicated receptacles on crane (Hot, Neut, Gnd)
11	New Power Panel in Purification Wing Electrical Room	(5ea) Duplex receptacles in Purification Wing Control Room	150	15	1/c#12	140	1	1 1/2" IMC	N	Dedicated receptacles for control panels (Hot, Neut, Gnd)
12	New Control Station in Existing Control Room, Purification Wing	Bridge Crane w/Hoist & Grapple in Purification Wing	320	1	36/c #16	300	1	2" IMC	N	

Item #	From Equipment	To Equipment	Cable Estimates			Raceway Estimates				
			Length (ft)	Qty	Cable size/description	Length (ft)	Qty	Size/Desc.	Red	Notes/Comments
13	New Control Station in Existing Control Room, Purification Wing	Pick & Place Robot in Mag Loading cell	160	1	36/c #16	150	1	2" IMC	N	
14	New Control Station in Existing Control Room, Purification Wing	Magazine Loading Station in Mag Loading cell	160	1	36/c #16	150	1	2" IMC	N	
15	New Control Station in Existing Control Room, Purification Wing	Bridge Crane/robot arm in Bagless Storage Room	160	1	16/c #16	150	1	2" IMC	N	
16	New Control Station in Existing Control Room, Purification Wing	Canister Loading Station in Canister Loading cell	140	1	16/c #16	130	1	2" IMC	N	
17	Magazine and Canister Loading Cells	Magazine and Canister Loading Cells	0	0	see comments	10	15	3" IMC	N	Riser conduits into cell through coredrills
18	Equipment	Ground Grid	300	1	#4/0	0	0	0	N	Grounding
19	Equipment	Ground Grid	20	1	#6	0	0	0	N	Grounding

Item #	From Equipment	To Equipment	Cable Estimates			Raceway Estimates				
			Length (ft)	Qty	Cable size/description	Length (ft)	Qty	Size/Desc.	Red	Notes/Comments
20	Bar code reader MLS-RDR-001 in Mag Loading cell	New I/O Cabinet in Existing Control Room, Purification Wing	160	1	3/c #18	150	1	3/4" IMC	Y	Red circuit, requires separation
21	Bar code reader MLS-RDR-002 in Canister Loading cell	New I/O Cabinet in Existing Control Room, Purification Wing	160	1	3/c #18	150	1	3/4" IMC	Y	Red circuit, requires separation
22	Weigh Scale in Canister Loading	New I/O Cabinet in Existing Control Room, Purification Wing	160	1	3/c #19	150	1	3/4" IMC	Y	Red circuit, requires separation

Attachment 2. Bulk C/S/A Materials

B-Block	System	Material Type	Document #	Estimated Quantity
Magazine & CIC Loading	Pick & Place Robot	3/4" Dia. A36 Maxi Bolts	M-DS-K-00084	4
		A36 1/2" plate (4' X 4')	M-DS-K-00084	1
		ACME Nut	W752550	8
		ACME Stud	W752550	8
		Dutchman	W752199	8
		Master Dowel Pin	W752550	1
		Slave Dowel Pin	W752550	1
	Bridge Robot W/Telescoping Arm	N/A	M-DS-K-00087	N/A
	Overhead Bridge Crane with Hoist & Grapple	1" Dia. A36 Maxi Bolts	M-DS-K-00085	232
		A36 3/4" plate (1'-4" X 1'-4")	M-DS-K-00085	58
	Magazine Loading Station	3/4" Dia. A36 Maxi Bolts	M-DS-K-00086	16
		A36 3/4" plate (1' X 1')	M-DS-K-00086	4
		ACME Nut	W752550	4
		ACME Stud	W752550	4
		Dutchman	W752199	4
		Master Dowel Pin	W752550	1
		Slave Dowel Pin	W752550	1
	Robotic Bridge Crane	3/4" Dia. A36 Maxi Bolts	M-DS-K-00165	120
		A36 3/4" plate (1' X 1')	M-DS-K-00165	30

B-Block	System	Material Type	Document #	Estimated Quantity
Magazine & CIC Loading	Bagless Can Lag Storage Rack	Miscellaneous steel	SK-DE-MLS-0001 & SK-DE-MLS-0004	Use referenced documents for material take off
	Empty Magazine Storage Rack	Miscellaneous steel	SK-DE-MLS-0001 & SK-DE-MLS-0004	Use referenced documents for material take off
	Loaded Magazine Storage Rack	Miscellaneous steel	SK-DE-MLS-0001 & SK-DE-MLS-0004	Use referenced documents for material take off
	Bagless Can Storage Rack	Miscellaneous steel	SK-DE-MLS-0001 & SK-DE-MLS-0004	Use referenced documents for material take off
	Electrical Components Supports	1" A36 steel plate for shielding	SK-DE-MLS-0006	Use referenced documents for material take off
	Scale	3/4" Dia. A36 Maxi Bolts	SK-DE-MLS-0006	4
		A36 1/2” plate (4' X 4')	SK-DE-MLS-0006	1
		ACME Nut	W752550	4
		ACME Stud	W752550	4
		Dutchman	W752199	4
		Master Dowel Pin	W752550	1
		Slave Dowel Pin	W752550	1

B-Block	System	Material Type	Document #	Estimated Quantity
Magazine & CIC Loading	Cameras (9)	1/2" Dia. A36 Maxi Bolts	SK-DE-MLS-0005	36
		A36 1/2" plate (1' X 1')	SK-DE-MLS-0005	9
		ACME Nut	W752550	9
		ACME Stud	W752550	9
		Dutchman	W752199	9
		Master Dowel Pin	W752550	9
		Slave Dowel Pin	W752550	9
	Barcode Readers (2)	1/2” Dia. A36 Maxi Bolts		8
		A36 1/2” plate (1’ X 1’)		2
		ACME Nut	W752550	2
		ACME Stud	W752550	2
		Dutchman	W752199	2
		Master Dowel Pin	W752550	2
		Slave Dowel Pin	W752550	2
	Lifting Yokes (3)			
	Capacity: Less than 2 tons	A36 Steel	C-CM-H-07056	1
	Capacity: Less than 1 ton	A36 Steel	C-CM-H-07057	1
	Capacity: Less than 100 lb	A36 Steel	C-CM-H-07057	1