PLUTONIUM DISPOSITION PROJECT (U)

Project M09A

SCOPE OF WORK

C-SOW-K-00012 Revision 0

for

Site Work (U)

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1.0 SCOPE

1.1 General Description of Work

Provide all labor, equipment, materials and services necessary to execute site work required for the installation of Plutonium Disposition facilities on K-Area. Required site work shall consist of investigation of site conditions, temporary and permanent erosion control, site preparation, excavation and backfill, installation of access walkways, driveways and parking areas, installation of utilities, and final grading and ground cover.

1.2 Background

The Office of Environmental Management has approximately 13 metric tons (MT) of plutonium in approximately 21 MT bulk materials without a 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 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. The glass will be packaged into bagless transfer cans and placed inside a Defense Waste Processing Facility (DWPF) type canister. The canisters will be transported to DWPF and filled with High Level Waste (HLW) glass. The DWPF 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 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 effort 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 the current revision of the SOW is released.

2.0 ACRONYMS/ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ASTM	American Society for Testing and Materials
BOP	Balance of Plant
BMP	Best Management Practices

CLSM	Controlled Low Strength Material
DA	Design Authority
DMO	Direct Metal Oxidation
DWPF	Defense Waste Processing Facility
ESS	Environmental Services Section
GPR	Ground Penetration Radar
GS	General Services
PC	Permit Custodian
PS	Production Support
PUD	Plutonium Disposition
SC	Safety Class
SCDHEC	South Carolina Department of Health and Environmental Services
SDD	System Design Description
SOW	Scope of Work
SRS	Savannah River Site
SS	Safety Significant
SSC	Structures Systems and Components
TBD	To Be Determined
WSRC	Washington Savannah River Company

3.0 WORK REQUIREMENTS

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

3.1.1 Performance Category

3.1.2 Functional Classification

3.1.2.1 Backfill under SS and SC structures will be SC.

3.1.2.2 All other backfill and fill will be PS

3.2 Permitting Requirements

3.2.1 Stormwater management and erosion and sediment control permitting for required site work will need to be expedited in accordance with requirements in References 6.3.2.3 and 6.3.2.4.

3.2.2 Stormwater management systems will meet the requirements of South Carolina Regulation 72-300, "Standards for stormwater Management and Sediment Reduction", (Section 3.2.2). The project involves a total land disturbance of at least 1.0 acre and greater and therefore is required to comply with NPDES General Permit No. SCR100000. See Reference 6.3.2.5.

3.3 Investigation of Site Conditions

3.3.1 A site survey will be provided at each work site showing existing natural and manmade conditions.

3.3.2 Drawing review will be provided to verify the site survey.

3.3.3 A geotechnical report will be provided to describe the nature of existing underlying soils and conditions to be disturbed by earthwork.

3.3.4 GPR work will be provided to identify underground utilities wherever excavation is required.

3.3.5 Hand excavation will be provided around electrical utilities.

3.4 Erosion Control and Flooding Prevention

3.4.1 Specific measures will be implemented to control erosion and contain sediment within the bounds of the disturbed work sites. These measures are referred to as BMPs and include use of silt fences and permanent and temporary vegetation.

3.4.2 Specific measures will be implemented to prevent open excavations from being flooded by temporary installations of diversion ditches, sandbag dams and/or sump pumps upstream of work area.

3.4.3 All erosion and sediment control measures will be inspected and documented for proper operation and stability at least once a week and within 24 hours after a ½ inch or greater rainfall event. Provide appropriate documentation recording descriptions of observations on conditions found, along with the required repairs, correctional and maintenance activities that were carried out and accepted by WSRC Environmental Services personnel.

3.5 Site Preparation

3.5.1 The top layer of soil will be stripped in areas to be graded (excavated or filled). Stripping will include removal of the upper 6 inches of soil unless directed otherwise by the engineer.

3.5.2 Topsoil free from subsoil, refuse, organic matter, clay, stones larger than 1.5 inches, course sand, and other deleterious substances will be stockpiled at locations shown on design drawings and reused on disturbed and fine graded areas requiring reseeding.

3.6 Excavation

3.6.1 All excavations will conform to the lines, grades, sections, elevations, and tolerances shown on the drawings. A smooth grade will be maintained to provide positive drainage in the intended direction at all times.

3.6.2 An initial determination will be made regarding the suitability of the excavated soil for use as backfill.

3.6.3 Any excavated soil suitable for reuse will be placed or stockpiled in designated areas.

3.6.4 Excess topsoil and excavated soils unsuitable as backfill material will be disposed of as indicated on design drawings or as directed.

3.6.5 The final 6 inches of excavation beneath a load bearing surface will be made using either equipment with a smooth blade or hand excavation.

3.6.6 Existing structures and utilities adjacent to excavations required to remain in place will be protected and supported to prevent movement. Shoring will be provided as required.

3.6.7 Deep excavations over 5' will be properly tiered with set backs, sloped and/or shored up in accordance with the clearance provided by existing nearby utilities or structures required to remain in place.

3.6.8 Trenching will be provided for a new duct bank extension to the Fan House and earthwork will be provided for two concrete pads required to support electrical sub-station equipment proposed for the Fan House.

3.7 Grading

3.71 Pad elevations for proposed new facilities will be provided. Finished floor elevations will be provided to match existing floor elevations where proposed additions are planned to adjoin to existing buildings. Top of slab or pad elevations, for proposed new facilities which will stand separated, will be established in accordance with proposed new and existing grades and contours to provide permanent positive surrounding drainage conditions.

3.8 Backfill and Fill Placement

3.8.1 Backfill and fill material will be placed under SS and SC structures in workable thickness layers that can be compacted, to a minimum dry density of 95% of maximum dry density determined in accordance with ASTM D698.

3.8.2 Backfill and fill material adjacent to SS and SC structures and under other structures (PS and GS) will be placed and compacted to a minimum dry density of 92% of maximum dry density determined in accordance with ASTM D698.

3.8.3 Backfill and fill material for driveways and parking areas away from structures will be placed and compacted to a minimum dry density of 90% of maximum dry density determined in accordance with ASTM D698.

3.8.4 Areas under excavations to be backfilled and building pad areas to be built up with fill will be maintained in a clean condition free from leaves, litter and other debris

3.9 Access Driveways and Walkways

3.9.1 Temporary gravel surfaced access driveways will be provided where required on the worksites. Gravel surface will be 2" thick crusher run stone delivered from a tested source.

3.9.2 Gravel driveways will be surfaced across full width of driveway over a graded, scarified, compacted and proof rolled subgrade.

3.9.3 Asphalt concrete paved driveways 8' to 16' wide with grassed shoulders will be provided where shown on the drawings. Asphalt pavement material will be delivered to the work sites from a central mixing plant.

3.9.4 Asphalt paved driveways will be composed of 2" of Asphalt Concrete (AC) concrete over a tack coated 2" AC binder course. The AC binder course will be placed over a prime coated compacted 6"aggregate base course which will be placed over a graded, compacted and proof rolled subgrade.

3.9.5 Walkways will be composed of 2" of AC placed over a graded, compacted and proof rolled subgrade.

3.9.6 Fan House: Approximately 300 LF of 16' wide AC paved driveway will be provided.

3.9.7 Low Level Waste Staging Bldg: Approximately 60 LF of 8' wide AC paved driveway will be provided.

3.9.8 Chiller Unit: Approximately 60 LF of 8' wide AC paved surfaced driveway will be provided.

3.9.9 Trailer Offices: Approximately 100 LF of AC paved walkways 4' wide will be provided.

3.10 Storm Drainage

3.10.1 Fan House: An 18" dia. min. RCP culvert pipe 40' long will be provided at two places, one under each of two proposed access driveways.

3.11 Sanitary Sewer Service

3.11.1 Trailer Offices: An underground 4" dia. PVC sanitary sewer drain service line will be required from the proposed new Trailer Offices and tied-in to a to an existing SS service line per BOP SOW. (Reference M-SOW-K-00022)

3.11.2 Restroom/Change Room Addition: A 4" dia. PVC SS service drain line will be required from proposed new restroom and tied-in to a to an existing SS service line per BOP SOW. (Reference M-SOW-K-00022).

3.12 Potable Water Service

3.12.1 Trailers Offices: An underground 1” dia. PVC potable water service line will be provide to the proposed Trailer Offices from a tie-in point at an existing underground potable water line source 200’ to the west or as determined by the mechanical design group.

3.12.2 Restroom/Change Room Addition: An underground 1” dia. PVC potable water service line to proposed Restroom/Change Room Addition will be provided from existing underground potable water pipeline source 40’ to the west or as determined by the mechanical design group.

3.13 Electrical Power Service

3.13.1 Trailer Offices: Provide electrical service for lighting, heating and cooling. Power source will be from existing nearby trailers or as determined by electrical design group.

3.13.2 Fan House and Tunnel/Sand Filter Installation: Provisions for electrical services will be per Electrical SOW (E-SOW-K-00017).

3.13.3 Part of an existing 24” dia. water pipe starting due east from 105-K will be converted into an electrical duct bank for a length of about 220’ where it then turns due north for a length of 60’. From here it will transition to a new 2.5’ W x 1.5’ H duct bank for a length of 180’ which will be trenched out and backfilled to the proposed Fan House location.

3.13.4 New overhead lines will be provided from 152-6K to the Fan House per Electrical SOE (E-SOW-K-00017). Two concrete pads approximately 14’ x 17’ with spill containment dikes will be provided for skid mounted unit sub-stations near the Fan House. See Ref. Dwg. SK-DE-HVAC-0005 Rev B.

3.13.5 Restroom/Changeroom Addition: Provide electrical service for lighting, heating and cooling

3.13.6 Chiller: A new overhead line and underground duct bank sections will be installed to provide 13.8 KV service to a new unit sub-station located within the chiller building per E-SOW-K-00017. Additionally a direct burial conduit will be installed to provide a communication interface between the chiller and 108-1K at the main process building. See Ref. Dwg. SK-DE-HVAC-0005 Rev B.

3.13.7 Administration Support Addition: Provide electrical power service for lighting, heating and cooling per Electrical SOW (E-SOW-K-00017).

3.13.8 Relocation and Removal of Existing Utilities: The attached spread sheet identifies the type and extent of existing utilities such as underground pipelines and duct banks that will interfere with the excavation work required in general and particularly for the Sand Filter Building.

3.13.9 Safeguards and Security: A S & S duct bank will be provided between 701-1K and 701-2K per Safeguards and Security SOW (S-SOW-K-00002).

3.14 Seeding

3.14.1 A minimum of 3” of top soil will be placed over all disturbed and denuded areas that will be provided a permanent grass cover.

3.14.2 Prior to placement of top soil, sloped surfaces will be roughened by creating shallow grooves transversely across the face of the slope.

3.14.3 All areas covered with top soil will be seeded with a grass seed mix compatible with the time of year or season that seeding is scheduled.

3.14.4 Fertilizer and lime will be applied at the time of planting and fertilizer will be applied again after germination.

3.14.5 Straw mulch will be applied within 24 hours after seeding.

3.14.6 Seeded areas will be provided irrigation as required with available rainfall to maintain adequate soil moisture at a depth of I inch.

4.0 ASSUMPTIONS

4.1 General

4.1.1 The Construction Agency will be the SRS Construction Group. DS will provide engineering documentation for the installation of site work improvements 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 manufactured components identified on engineering data sheets that do not require testing or quality documentation.

4.2 Specific Assumptions

4.2.1 Civil/Structural/Architectural

4.2.1.1 It is assumed that site preparation and site improvements will be constructed similar to that shown on drawings identified in drawing C-CT-K-00010 for “2003-2004 DBT Restricted Area (RA) Modifications”.

5.0 REFERENCES

5.1 Drawings and Sketches

5.1.1 PUD Project Drawings & Sketches

5.1.1.1 Site Layout Sketch Number: SK-DE-SAB-0006

5.1.1.2 Electrical Drawing Sketch Number: SK-DE-HVAC-0005

5.1.2 Record Drawings showing DBT site improvements in K-Area designated for installation.

5.1.2.1 C-CT-K-00013, Rev.1- 2003, 2004 Proposed DBT Restricted Area Modifications, Sheet No. 2

5.1.2.2 C-CT-K-00014, Rev.2 - 2003, 2004 Proposed DBT Restricted Area Modifications, Sheet No. 3

5.1.2.3 C-CT-K-00015, Rev.2 - 2003, 2004 Proposed DBT Restricted Area Modifications, Sheet No. 4

5.1.2.4 C-CT-K-00016, Rev.0 - 2003, 2004 Proposed DBT Restricted Area Modifications, Sheet No. 5

5.1.2.5 C-CT-K-00018, Rev.2 - 2003, 2004 Proposed DBT Restricted Area Modifications, Sheet No. 7

5.1.3 Record Documents showing existing utilities around proposed Fan House and Sand Filter Buildings.

5.1.2.1 W142225 Rev. 66, Building 901-K, Underground Water Lines, Detail Piping Plan

5.1.2.2 C-CF-K-0510 Rev. 1, K-Area, Improved Reactor Confinement System, 186 Basin Conduit Duct Bank, Site Clearance and Excavation

5.2 Design Input Documents

5.2.1 Facility Design Description

5.2.2 System Design Description

5.3 Applicable SRS & Industry Codes, Guides and Standards

5.3.1 Industry Codes and Standards

5.3.1.1	ASTM D422	Standard Test Method for Particle-Size Analysis of Soils
5.3.1.2	ASTM D698	Test Method for Laboratory Compaction Characteristics of Soils Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
5.3.1.3	ASTM D1556	Standard Test Method for Amount of Material in Soil In-Place by the Sand Cone Method
5.5.1.4	ASTM D1883	Standard Test Effort for CBR (California Bearing Ratio) of Laboratory Compacted Soils

5.3.2 SRS Guides & Standards

5.3.2.1 SRS Procedure No. 1.10, Design Authority, Procedure Manual E7, Conduct of Engineering and Technical Support.

5.3.2.2. SRS Procedure No. 2.25, Functional Classifications, Procedure Manual E7, Conduct of Engineering and Technical Support.

5.3.2.3 WSRC Environmental Compliance (ECM) Manual 3Q, Procedure ECM 12.2, Stormwater Management and Sediment Reduction

5.3.2.4 Manual No. WSRC-IM-91-69, SRS Environmental Permitting, “HOW” Manual.

5.3.2.5 Permit No. SCR100000 – SCDHEC NPDES General Permit for Stormwater Discharge from Construction Activities that are Classified as “Associated with Industrial Activity” by EPA Regulation, Issue Date: January 15, 1998, Expiration Date ?.

5.3.2.6 South Carolina Stormwater Management and Sedimentation Control Handbook for Land Disturbance Activities, SCDHEC.

5.3.2.7 Soil Survey of Savannah River Plant Area, Parts of Aiken, Barnwell, and Allendale Counties, South Carolina, Soil Conservation Service, US Department of Agriculture, June 1990.

5.4 Related Scopes of Work (SOW)

5.4.1 C-SOW-K-00009: Civil/Structural/Architectural Systems – SOW for shielding, furnace module structural design and room arrangements.

5.4.2 E-SOW-K-00017: Electrical SOW for overhead lines to Fan House and Chiller Building.

5.4.3 M-SOW-K-00022: BOP SOW for sanitary sewer, potable water and cooling water pipelines.

5.4.4 S-SOW-K-00002: SOW for Safety and Security.

6.0 ATTACHMENTS

6.1 Estimate Spreadsheet (Sheet 1 of 1)

PLUTONIUM DISPOSITION PROJECT (U) - SITEWORK QUANTITY ESTIMATE

DESCRIPTION	Earthwork											Mud Mat	Seeding		Driveways			Walkways	Utilities					
of	Removals			Strip	Excavate	Backfill	Fill	Export	Fine Grading			6" Thick	4"	Grass	AC		Base	AC	Trench, Excavate and Backfill					
WORK and MATERIAL ►	Grass		D & R	Topsoil	Soil	Soil	Soil	Spoil	Bldg/Rd	Exterior		Concrete	Topsoil	Cover	Pavement		Course	Pavement	Electrical		D & R	Reloc	SD Culvert Pipe	
Material Unit Bases ►	2" Depth		Conc.	3" AC	4" Depth	Bulk	Bulk	Bulk	Bulk	SG	FG Areas	Bldg. SG	Fin. Graded Areas		2" Surface	2" Binder	6" ABC	3" Surface	DBs		Misc. PLs/ DBs		!8"Φ RCP	
Material Units ►	SF	CY	CY	CY	CY	CY	CY	CY	CY	SF	SF	SF	CY	SF	SF	SF	CY	SF	LF	CY	CY	CY	LF	CY
WORK AREA DESCRIPTION▼																								
Fan House Facility-24" Fdn	12,700	80	0	0	240	140	70	0	370	11,500	1,200	11,500	20	1,200								Note (3)		
Driveway 300LF x 16'W + 2(6')W Sh.	9,000	60	60	0	170	0	0	20	160	5,000	4,000	0	50	4,000	5,000	5,000	100	0			NA		80	30
Duct Bank 2.5' W x 1.5' H																			180	330				
																				Note (1)				
Tunnel-17' Dp x 12' Wd	8,600	60	0	0	160	5,200	1,850	0	3,530	5,700	2,950	5,700	40	3,000	0	0	0	0	NA		NA		0	
14'W x 179'L + 30'w x 110'L																								
Sandfilter Facility- 17' Dp	40,400	250	120	0	750	18,000	8,800	0	10,000	28,150	17,500	28,200	200	17,550	0	0	0	0	NA		700(2)	150(4)	0	
(Tiered Excavation & Const. Ramp)																								
Chiller- 18" Fdn	6,240	40	0	0	120	120	25	0	150	5,700	550	5,700	10	550							NA			
Driveway 60 LF x 8'W + (2)4'W Sh.	600	10	0	0	10	0	0	10	0	1,000	600	0	10	600	500	500	10	0					0	
Duct Bank 2.0' W x 1.5' H (assumed)																			220	70				
Restroom/Changeroom-12" Fdn	3,000	20	0	0	40	0	10	0	40	3,000	650	0	10	625	0	0	0	0	NA		NA		0	
LL Waste Staging Bldg -12" Fdn	2,200	20	0	0	40	0	10	0	40	2,200	700	0	10	225	0	0	0		NA		NA			
Driveway 60LF x 8'W + 2(4')W Sh.	600	10	0	0	10	0	0	10	0	1,000	600	0	10	600	500	500	10	0					0	
Employee/Restroom Trailers 24'x48'	0	0	0	0	0	0	0	0	0	1,250	0	0	0	0	0	0	0		NA		NA			
Walkways 200 LF x 4'w	1,000	10	0	0	10	0	0	15	5	0	0		0					400					0	
S & S Duct Bank from 701-1K to 2K																			600	140				
Project Quantities - Totals ►	**84,340**	**560**	**180**	**20**	**1,550**	**23,460**	**10,765**	**35**	**14,290**	**64,500**	**28,750**	**51,100**	**350**	**28,350**	**6,000**	**6,000**	**120**	**400**	**1000**	**540**	**700**	**150**	**80**	**30**
	2 Acres																							

Notes:(1) New DB extension to Fan House Building includes excavation for two new electrical manholes = **330 CY**.
(2) Total additional excavation required for removal of existing utility lines at Sand Filter Building = **700 CY**
a) Remove 20 LF 24" dia. Service Raw Water Pipe 8' Dp @ 2 plcs = 50 CY
b) Remove 10 LF12" dia. Fire Protection Pipe 4' Dp = 10 CY
c) Remove 30 LF 2" dia. & 60 LF 8" dia. Domestic Water Pipe 4' Dp = 30 CY
d) Remove 30 LF 36"W x 12"D Intrusion Detection DB 2' dp = 10Cy
e) Remove 2 Elect. MHs & 240 LF of 24"W x12"H DB 4' Dp = 120 CY
f) Remove 30 LF 42" dia. Cooling Water Pipe 18' Dp @ 2 plcs = 400 CY
g) Remove 8 LF of 9' W x 1.5' Elect. DB 3' Dp stubbed into Bldg 190-K @2 plcs = 20CY
h) Remove 100 LF 16" dia. Storm Drain Pipe & 50 LF 10" dia. SD @ 2 plcs 4' Dp = 60 CY
j) Existing.12' wide DB 3' below grade, 5.5' clear west side of SF Bldg. was not considered for D & R or relocation.
(3) A small network of electrical lines under proposed Fan House footprint which could not be identified from referenced record drawings may require field investigation to clarify field conditions and required work.
(**4**) Relocate and Rebuild 2 Elect. MHs & 260 LF of 24"W x12"H DB 4' Dp to clear SF Facility = **150 CY**

GENERAL: All buried utility lines listed and identified hereon for removal or relocation were determined from available Record Drawings. A small unidentified network of existing buried electrical lines was also found to be within the footprint of the proposed Fan House. All identified and nonidentified utility lines requiring removal and or relocation will require verification in the field prior to any construction activity.

LEGEND		
	SF	Square Feet
	CY	Cubic Yards
	LF	Linear Feet
	LL	Low Level
	D & R	Demolition & Removal
	AC	Asphalt Concrete
	PL	Pipe Line
	DB	Duct Bank or Direct Burial
	NA	Not Applicable

REFERENCE DRAWINGS
W142225 Rev. 66, Bldg. 901-K, Underground Water Lines, Detail Piping Plan
C-CF-K-0510 Rev.1, K-Area, Improved Reactor Confinement System, 186 Basin Coduit Duct Bank, Site Clearance and Excavation
SK-DE-HVAC-0005 Rev. B, 13.8kV Power Plan and Electrical/I & C Services Including Duct Banks for HVAC Fan House and Chiller Plant