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**Revision 3**

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**Unreviewed Waste Management Question  
Requirements Document  
for Saltstone Facility**

October 2014

**Distribution:**  
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**APPROVALS**

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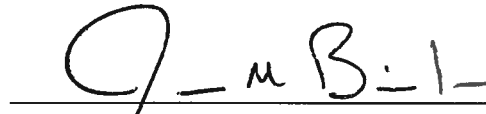


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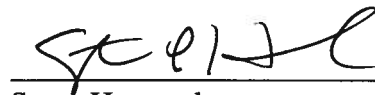
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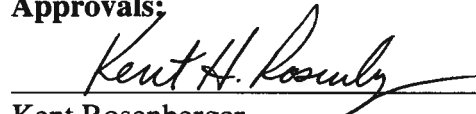


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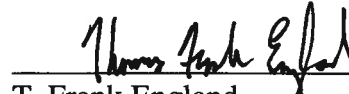
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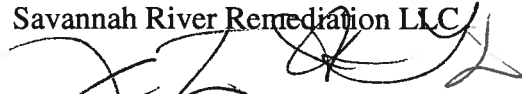
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### **REVISION SUMMARY**

<b>REV. #</b>	<b>DESCRIPTION</b>	<b>DATE OF ISSUE</b>
0	Initial Submittal	2/29/2012
1	To Support the 2009 PA Implementation (SRR-CWDA-2009-00017); Addition of Section 2.3 “Design-Build Screening Criteria (for Cylindrical Saltstone Disposal Units)”	5/29/2012
2	Addition of Section 2.4 “Design-Build Screening Criteria (for Cylindrical 32 Million Saltstone Disposal Units); incorporate acceptance of vendor supplied clean cap material into criteria no. 12; eliminate requirement for clean cap on all SDU’s except SDU 4 in criteria no. 15	4/24/2014
3	Added note to Figure 2.4-1 Modified Table 2.4-4 to add tolerances for 32 million gallon SDU design and aligned column dimension in Margin Case for 32 million gallon SDU design with SA modeling. Updated for organizational and personnel changes.	10/1/2014

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## **ACRONYMS/ABBREVIATIONS**

ARP	Actinide Removal Process
BD	Basis Document
FDC	Future Disposal Cell
FTF	F Tank Farm
GCL	Geosynthetic Clay Liner
HDPE	High Density Polyethylene
HQC	High Quality Concrete
HTF	H Tank Farm
LQC	Low Quality Concrete
MCU	Modular Caustic Side Solvent Extraction Unit
MSL	Mean Sea Level
MST	Monosodium Titanate
NDAA	Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005
PA	Performance Assessment
SA	Special Analysis
SDF	Saltstone Disposal Facility
SDU	Saltstone Disposal Unit
SPF	Saltstone Production Facility
SRNL	Savannah River National Laboratory
SRS	Savannah River Site
SWPF	Salt Waste Processing Facility
UWMQ	Unreviewed Waste Management Question
UWMQRD	Unreviewed Waste Management Question Requirements Document
WAC	Waste Acceptance Criteria
WCP	Waste Compliance Plan
WD	Waste Determination

## **1.0 INTRODUCTION**

The Saltstone Facility is located in Z Area, which is in the central region of the Savannah River Site (SRS). Z Area consists of approximately 161 acres. The Saltstone Facility consists of two facility segments, one is the Saltstone Production Facility (SPF), which receives and treats salt solution to produce saltstone. Saltstone is a cementitious waste form made by mixing salt solution, from the liquid waste tanks in the F- and H-Tank Farms (FTF and HTF) of SRS, with a dry mix containing blast furnace slag, fly ash and cement. The second facility segment is the Saltstone Disposal Facility (SDF) which consists of two existing rectangular saltstone disposal units (SDUs), Vaults 1 and 4, and a number of cylindrical SDUs referred to as Future Disposal Cells (FDCs) in the *Performance Assessment for the Saltstone Disposal Facility at the Savannah River Site* (SRR-CWDA-2009-00017) (hereinafter referred to as the 2009 PA), which are in various states of construction and startup. Six cylindrical SDUs are currently in service while a new larger cylindrical SDUs is under construction. Additional SDUs will be constructed as needed to coordinate with salt processing rates. The SDF is permitted as a Class 3 Landfill per South Carolina Department of Health and Environmental Control regulations. [DHEC\_05-12-2011\_025500-1603]

### **1.1 Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA Section 3116)**

The regulatory process to perform salt waste disposal operations at the SDF requires the development of multiple detailed technical documents with reviews or approvals by several Federal agencies. The documents involved include a NDAA Section 3116 Waste Determination (WD), *Section 3116 Determination for Salt Waste Disposal at the Savannah River Site*, and associated Basis Document (BD), *Basis for Section 3116 Determination for Salt Waste Disposal at the Savannah River Site* (DOE-WD-2005-001). The BD supports the Section 3116 Determination by the Secretary of Energy, in consultation with the United States Nuclear Regulatory Commission, that the decontaminated salt solution stream from salt processing is not high-level radioactive waste and may be disposed of in the SRS SDF.

### **1.2 U.S. Department of Energy Order 435.1, Change 1**

A Performance Assessment (PA) is used to demonstrate that low-level radioactive waste disposal or closure of facilities will meet defined performance objectives for the protection of the public and the environment into the future in compliance with the pertinent requirements of the U. S. Department of Energy's Order 435.1, Change 1, *Radioactive Waste Management*, Chapter IV, and Title 10 of the Code of Federal Regulations Part 61, *Licensing Requirements for Land Disposal of Radioactive Waste*, Subpart C, as required by the *Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA)*, Section 3116. The 2009 PA and associated documents, including Special Analyses (SAs), are prepared to support the waste determination process to be followed to ensure that the NDAA Section 3116 and DOE criteria are met before the process of operational closure of the Saltstone Facility begins. [SRR-CWDA-2009-00017]

The 2009 PA and FY 2013 SA have been developed to address the use of the 3-million gallon cylindrical SDUs. The FY 2014 SA addresses the use of the 32-million gallon cylindrical SDU design.

## **2.0 PURPOSE**

The purpose of this document is to protect the inputs and assumptions used to develop the PA/WD. SDF personnel will refer to this document to ensure that all Proposed Activities (or New Data) that may impact the 2009 PA, SA's, or WD are reviewed for continued compliance with NDAA Section 3116, DOE Order 435.1, Change 1, and PA closure requirements. This document serves as an aid for the *LW Unreviewed Waste Management Question (UWMQ)* procedure. [S4 Manual, Procedure ENG.46] This UWMQ Requirements Document (RD) is considered a "living document" as future updates will be made as requirements are identified or change. Screening personnel should use this tool as a starting point for review of an activity or new data. Current revision verification is required when using paper copies.

The requirements listed in this document are presented in two sections:

- Screening Criteria
- Design-Build Screening Criteria (for 3 Million Gallon and 32 Million Gallon Cylindrical SDUs)

Section 2.1 of this document provides examples of the potential impacts of Proposed Activities or New Data on the SDF PA/SA/WD. The requirements in Sections 2.2, 2.3 and 2.4 are to be used to correctly answer Questions 1 and 2 on OSR 46-521 (*Saltstone Unreviewed Waste Management Question (UWMQ) Screening*). [S4 Manual, Procedure ENG.46] Sections 2.3 and 2.4 apply specifically to the 3-million gallon and 32-million gallon disposal units. The review, however, should not stop at the existing lists in tables and figures. Also use other tools (e.g., interview with experts and ad hoc queries against the source documents).

### **2.1 Potential Impacts to Saltstone PA/WD**

Table 2.1-1 provides examples of Proposed Activities or New Data which may have the ability to impact material properties of the saltstone product, or impact the design/operation of the SDF disposal units.

**Table 2.1-1: Potential Impacts to Saltstone PA/WD**

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<b>Activity</b>
New Design
New Data
Design Change (Design Change Form, Design Change Package, Temp-Mod)
Procedure Change
Chemical Procurement
Non-Conformance Report (Use-As-Is or Repair Disposition)
Non-Grout Waste Form Disposal in SDF
Waste Acceptance Criteria Revision or Deviation
Computer Program Modification Trackers that Change Software Control System for Mixing and Transfer System

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## **2.2 Screening Criteria (for Saltstone Facility)**

This section provides assistance in correctly answering Questions 1 and 2 on OSR 46-521 (*Saltstone Unreviewed Waste Management Question (UWMQ) Screening*) [S4 Manual, Procedure ENG.46]

The SDF screening criteria are gleaned from the 2009 PA, any associated UWMQ Evaluations, SAs and the WD. Adherence to these criteria should ensure protection of the inputs and assumptions used to develop the 2009 PA, SA's and WD. Compliance with the PA should ensure compliance with the *Savannah River Site DOE 435.1 Composite Analysis*. [SRNL-STI-2009-00512] Review the following screening criteria in Table 2.2-1 against the Proposed Activity/New Data documented per the *LW Unreviewed Waste Management Question (UWMQ)* procedure. [S4 Manual, Procedure ENG.46]

The screening criteria were selected from the following documents in addition to those documents cited above:

- *Basis for Section 3116 Determination for Salt Waste Disposal at the Savannah River Site, DOE-WD-2005-001 (BD)*
- *Performance Assessment for the Saltstone Disposal Facility at the Savannah River Site, SRR-CWDA-2009-00017 (2009 PA)*
- *FY2013 Special Analysis for the Saltstone Disposal Facility at the Savannah River Site , SRR-CWDA-2013-00032*
- *FY2014 Special Analysis for the Saltstone Disposal Facility at the Savannah River Site , SRR-CWDA-2014-00006*

These screening criteria serve as a tool to augment, not replace, the technical inquisitiveness of the UWMQ screener. The SDF UWMQ Coordinator should be solicited as needed.



**Table 2.2-1: Screening Criteria**

<b>No.</b>	<b>Screening Criteria</b>	<b>Basis</b>	<b>Discussion (Example)</b>
1	Current SDF facility boundary has not changed	PA, Section 3.2.3.1, exposures are based on 100 meters from SDF SDUs	Ensures that the receptor locations used in the PA for the determination of potential radiological or chemical exposures is unchanged
2	Discovery of New Data does not impact conclusions of the SDF PA	PA assumptions may be impacted by New Data which could impact PA conclusions	New Data may include: regulatory changes; discoveries within the facility; meteorological and hydrogeological data
3	Waste disposed of at SDF will meet the Saltstone Waste Acceptance Criteria (WAC), which establishes the physical, chemical and radionuclide limits for all waste to ensure that, at a minimum, the following are not exceeded: Limits established by the PA/SA; SDF operating permit limits (State issued); Documented Safety Analysis limits; and Processability limits	BD, page 55	WAC, X-SD-Z-00001, establishes waste limits to ensure limits established by the PA are not exceeded
4	Salt waste batches received in the Actinide Removal Process (ARP) filter feed tank in 512-S are to remove and concentrate the insoluble solids and the Monosodium Titanate (MST) solids, if MST treatment of the waste was performed	BD, page 20	The filtration process supports the downstream facility WAC, per the Waste Compliance Plan (WCP), X-SD-G-00005
5	The concentrated solids heel in the filter feed tank (at 512-S) is washed and filtered to remove soluble sodium salts	BD, page 20	Washed solids are transferred to DWPF and acceptable spent wash waters are transferred to the SPF feed tank
6	MST strikes are conducted on all salt solution processed through ARP, even if the salt solution already does not exceed Class C concentration limits, as long as tank space objectives can be maintained with adequate operational margin	BD, pages 19 and 44	MST addition is controlled under Manual SW9.2-IOP-96H

**Table 2.2-1: Screening Criteria (Continued)**

<b>No.</b>	<b>Screening Criteria</b>	<b>Basis</b>	<b>Discussion (Example)</b>
7	MST strike tank contents are agitated for a reaction period between 4 and 24 hours based on the curie concentration of the soluble actinides to be removed	BD, pages 19 and 44	Agitation of strike tank is controlled under Manual SW9.2-IOP-96H
8	Dry feeds nominal premix ratios remain unchanged.	2009 PA Sections 2.6.4.2, 4.2.2 and Table 4.2-16	Dry feeds nominal premix ratios are: 45% slag, 45% flyash and 10% cement
9	Nominal cementitious material ratio (0.6 water to premix) for saltstone is not increased.	2009 PA Sections 2.6.4.2, 4.2.2 and Table 4.2-16	Water to premix ratio greater than 0.6 may adversely impact saltstone properties
10	SPF will receive and mix the salt solution from the Dissolution and Adjustment, ARP/MCU and SWPF processes with cement, fly ash and slag to form a homogeneous grout mixture or slurry	BD, page 25	There is uniform distribution throughout the waste form
11	Performance, design, quality requirements and service conditions for slag are not changed.	Saltstone performance is dependent on slag in the premix	Procurement specification X-SPP-Z-00003, Sections 3.1 through 3.4, specifically the requirements and service conditions for the slag used in the saltstone premix
12	SDUs only contain cementitious material that comes directly from the SPF facility or cementitious material that has equivalent chemical and physical properties to that produced in the SPF.	PA analysis assumes that the SDUs are filled with saltstone and grout originating from SPF	Placement of waste bags in the SDUs is not allowed. Cementitious materials from non-SPF sources are not allowed in the SDUs except as allowed by approved UWMQE
13	All cells used during Interim Salt Processing have an installed leachate (drain water and process water) collection system	BD, page 80	Each cell has an operational collection system for bleed and process water generated during saltstone processing
14	Leachate (drain water and process water) will be pumped at a low rate into the grout line for introduction to the cells	BD, page 80	This process occurs in such a manner to ensure the appropriate waste form
15	For SDU 4 only, two (2) feet of unused space is available between the grout layer and the bottom of the roof for clean cap material	BD, page 80	The void space is filled with clean grout post active filling as part of interim closure of a given SDU for structural support of the roof

**Table 2.2-1: Screening Criteria (Continued)**

No.	Screening Criteria	Basis	Discussion (Example)
16	Run-on and run-off controls are installed to minimize site erosion	BD, page 79	Protects long term stability of the disposal site
17	Structural integrity of the as-constructed SDUs is maintained	PA assumes that the SDU provides an effective barrier to contaminant release with no fast flow paths that would allow infiltrating water to enter or exit the SDU prior to general SDU concrete degradation	Attachments or modifications to the SDU concrete that would irreversibly degrade the SDU concrete, without appropriate concrete repair procedures to restore the SDU concrete condition, is not allowed

### 2.3 Design-Build Screening Criteria (for Cylindrical 3 Million Saltstone Disposal Units)

This section provides assistance in correctly answering Questions 1 and 2 on OSR 46-521 (*Saltstone Unreviewed Waste Management Question (UWMQ) Screening*) [S4 Manual, Procedure ENG.46]

The SDF 3 million gallon design-build screening criteria are gleaned from the 2009 PA (SRR-CWDA-2009-00017). Adherence to these criteria should ensure protection of the inputs and assumptions used to develop the 2009 PA (SRR-CWDA-2009-00017). Review the following screening criteria, in Tables 2.3-1 through 2.3-2, against the Proposed Activity/New Data documented per the *LW Unreviewed Waste Management Question (UWMQ)* procedure. [S4 Manual, Procedure ENG.46]

These screening criteria serve as a tool to augment, not replace, the technical inquisitiveness of the UWMQ screener. The SDF UWMQ Coordinator should be solicited as needed.

The Design-Build Screening Criteria was selected from the following documents:

- *Performance Assessment for the Saltstone Disposal Facility at the Savannah River Site*, SRR-CWDA-2009-00017

**Table 2.3-1: Design-Build Screening Criteria (3 Million Gallon Cylindrical SDUs)**

No.	Screening Criteria	Basis	Discussion
1	SDU design dimensions and below grade construction to the roof remain unchanged from the 2009 PA.	2009 PA, Section 3.2.1.3.2	SDU design dimensions: - 150 feet internal diameter - 22 feet internal wall height
2	Structural integrity of the as-constructed SDUs is maintained which will limit contaminant release to a controlled and low rate	2009 PA, Section 4.4.2, assumes that the SDU provides an effective barrier to contaminant release with no fast flow paths that would allow infiltrating water to enter or exit the SDU prior to general SDU concrete degradation	Attachments or modifications to the SDU concrete that would irreversibly degrade the SDU concrete, without appropriate concrete repair procedures to restore the SDU concrete condition, is not allowed. Wall-to-Floor Joints are modeled as gravel in the 2013 SA.
3	An interior coating on the SDU floor and walls is applied to retard degradation of the concrete	2009 PA, Sections 3.2.1.3.7 and 4.4.1.3	An interior coating is applied to mitigate sulfate attack on the SDU concrete prior to closure
4	Watertight feature of the SDUs, including the wall and wall joints, is maintained	2009 PA, Sections 3.2.1.3.1, 3.2.1.3.5 and 5.7	Watertight containment is considered a superior design feature over the Vault1 and Vault 4 designs. Wall-to-Floor Joints are modeled as gravel in the 2013 SA
5	Backfill is taken from "native" Z Area soils only	2009 PA, Sections 4.2.3.2.2 and 4.2.3.2.3, assumes soil properties associated with Z Area soils	Z Area soil properties are modeled in the 2009 PA to support hydrology and $K_d$ values. Using soils not from Z Area requires further evaluation
6	SDUs design/build meet the criteria listed in Tables 2.3-2 through Tables 2.3-4 and Figure 2.3-1 of this section	Provided in the cited tables and figure	Criteria are obtained from the 2009 PA for SDUs that are referred to as FDCs in the 2009 PA. Deviation from the criteria requires further evaluation

**Table 2.3-2: Materials Properties Criteria (3 Million Gallon Cylindrical SDUs)**

Material	Porosity (%)	Dry Bulk Density ( $\text{g}/\text{cm}^3$ )	Particle Density $\rho_p$ ( $\text{g}/\text{cm}^3$ )	Hydraulic Conductivity $k_{h,v}$ (cm/sec)	Effective Diffusion Coefficient $D_e$ ( $\text{cm}^2/\text{sec}$ )
Low Quality Concrete (LQC) (Lower Mud Mat)	21.1	2.06	2.61	$\leq 1.0\text{E}-08$	$\leq 8.0\text{E}-07$
High Quality Concrete (HQC) - FDCs (roof, walls, floor, Upper Mud Mat)	11.0	2.22	2.49	$\leq 9.3\text{E}-11$	$\leq 5.0\text{E}-08$

[SRR-CWDA-2009-00017, Table 4.2-16]

NOTE: Adherence to the concrete mix recipe provided in specification C-SPP-Z-00007, *Specification for Saltstone Disposal Cells 3 and 5*, Attachment 03300-A: Type V Mix Design, provides assurance that the Materials Properties Criteria in Table 2.3-2 are met for High Quality Concrete. Low Quality Concrete is Type II concrete with the mix design developed by the subcontractor meeting design requirements identified in C-SPP-Z-00007, Section 03300, Part 1.7.B.

**Table 2.3-3: Dimensional Properties Criteria (3 Million Gallon Cylindrical SDUs)**

<b>Material Zone</b>	<b>Critical Dimension</b>	<b>Material Type</b>
Roof	2% slope (min)	High Quality Concrete
	8 inches (min)	
Floor Slab/Upper Mud Mat	12 inches minimum (combined thickness)	High Quality Concrete
High Density Polyethylene (HDPE)-Geosynthetic Clay Liner (GCL)	100 mils (min) HDPE	HDPE-GCL <sup>a</sup>
Lower Mud Mat	4 inches (min)	Low Quality Concrete
<b>Radial Orientation</b>		
Wall	8 inches (min)	High Quality Concrete
HDPE	100 mils (min) HDPE	HDPE

[SRR-CWDA-2009-00017, Table 4.4-3]  
(a) Minimum thickness of 0.3 inch including GCL

## 2.4 Design-Build Screening Criteria (for Cylindrical 32 Million Saltstone Disposal Units)

This section provides assistance in correctly answering Questions 1 and 2 on OSR 46-521 (*Saltstone Unreviewed Waste Management Question (UWMQ) Screening*) [S4 Manual, Procedure ENG.46]

The SDF 32 million gallon design-build screening criteria are gleaned from the 2009 PA (SRR-CWDA-2009-00017) and FY 2014 SA (SRR-CWDA-2014-00006). Adherence to these criteria should ensure protection of the inputs and assumptions used to develop the 2009 PA (SRR-CWDA-2009-00017) and FY 2014 SA (SRR-CWDA-2014-00006). Review the following screening criteria, in Tables 2.4-1 through 2.4-4 and Figure 2.4-1, against the Proposed Activity/New Data documented per the *LW Unreviewed Waste Management Question (UWMQ)* procedure. [S4 Manual, Procedure ENG.46]

These screening criteria serve as a tool to augment, not replace, the technical inquisitiveness of the UWMQ screener. The SDF UWMQ Coordinator should be solicited as needed.

The Design-Build Screening Criteria was selected from the following documents:

- *Performance Assessment for the Saltstone Disposal Facility at the Savannah River Site, SRR-CWDA-2009-00017*
- *FY 2014 Special Analysis for the Saltstone Disposal Facility at the Savannah River Site, SRR-CWDA-2014-00006*

**Table 2.4-1: Design-Build Screening Criteria (32 Million Gallon Cylindrical SDUs)**

No.	Screening Criteria	Basis	Discussion
1	SDU design dimensions and below grade construction to the roof remain unchanged from the FY 2014 SA.	FY 2014 SA, Section 3.3	SDU design dimensions: - 375 feet (nom) internal diameter - 43 feet (nom) internal wall height
2	Structural integrity of the as-constructed SDUs is maintained which will limit contaminant release to a controlled and low rate	2009 PA, Section 4.4.2, assumes that the SDU provides an effective barrier to contaminant release with no fast flow paths that would allow infiltrating water to enter or exit the SDU prior to general SDU concrete degradation	Attachments or modifications to the SDU concrete that would irreversibly degrade the SDU concrete, without appropriate concrete repair procedures to restore the SDU concrete condition, is not allowed. The 32 million gallon units model roof, roof-to-wall, wall-to-floor, and floor joints as gravel.
3	Backfill is taken from “native” Z Area soils only	2009 PA, Sections 4.2.3.2.2 and 4.2.3.2.3, assumes soil properties associated with Z Area soils	Z Area soil properties are modeled in the 2009 PA to support hydrology and $K_d$ values. Using soils not from Z Area requires further evaluation
4	SDUs design/build meet the criteria listed in Tables 2.4-2 through Tables 2.4-4 and Figure 2.4-1 of this section	Provided in the cited tables and figure	Criteria are obtained from the FY 2014 SA for the 32 Million Gallon SDUs. Deviation from the criteria requires further evaluation
5	Mud Mats shall be a total of 10 inches thick low quality concrete	Preliminary SA Model	Mud mat chemical properties are important to performance. Hydraulic conductivity is assumed to be ordinary soil.

**Table 2.4-2: Materials Properties Criteria (32 Million Gallon Cylindrical SDUs)**

Material	Porosity (%)	Dry Bulk Density (g/cm <sup>3</sup> )	Particle Density $\rho_p$ (g/cm <sup>3</sup> )	Hydraulic Conductivity $k_{h,v}$ (cm/sec)	Effective Diffusion Coefficient $D_e$ (cm <sup>2</sup> /sec)
Low Quality Concrete (LQC) (Mud Mats)	21.1	2.06	2.61	$\leq 1.0E-08$	$\leq 8.0E-07$
High Quality Concrete (HQC) - FDCs (roof, walls, floor)	11.0	2.22	2.49	$\leq 9.3E-11$	$\leq 5.0E-08$

[SRR-CWDA-2009-00017, Table 4.2-16]

NOTE: Adherence to the concrete mix recipe provided in specification C-SPP-Z-00008, *Specification for Saltstone Disposal Site- SDU 6*, Attachment 03300-A: Type V Concrete Mix Design, provides assurance that the Materials Properties Criteria in Table 2.3-2 are met for High Quality Concrete. Low Quality Concrete is Type II concrete with the mix design developed by the subcontractor meeting design requirements identified in C-SPP-Z-00008, Section 03300, Part 2.3.A.2.

**Table 2.4-3: Design-Build Screening Criteria (32 Million Gallon Cylindrical SDUs)**

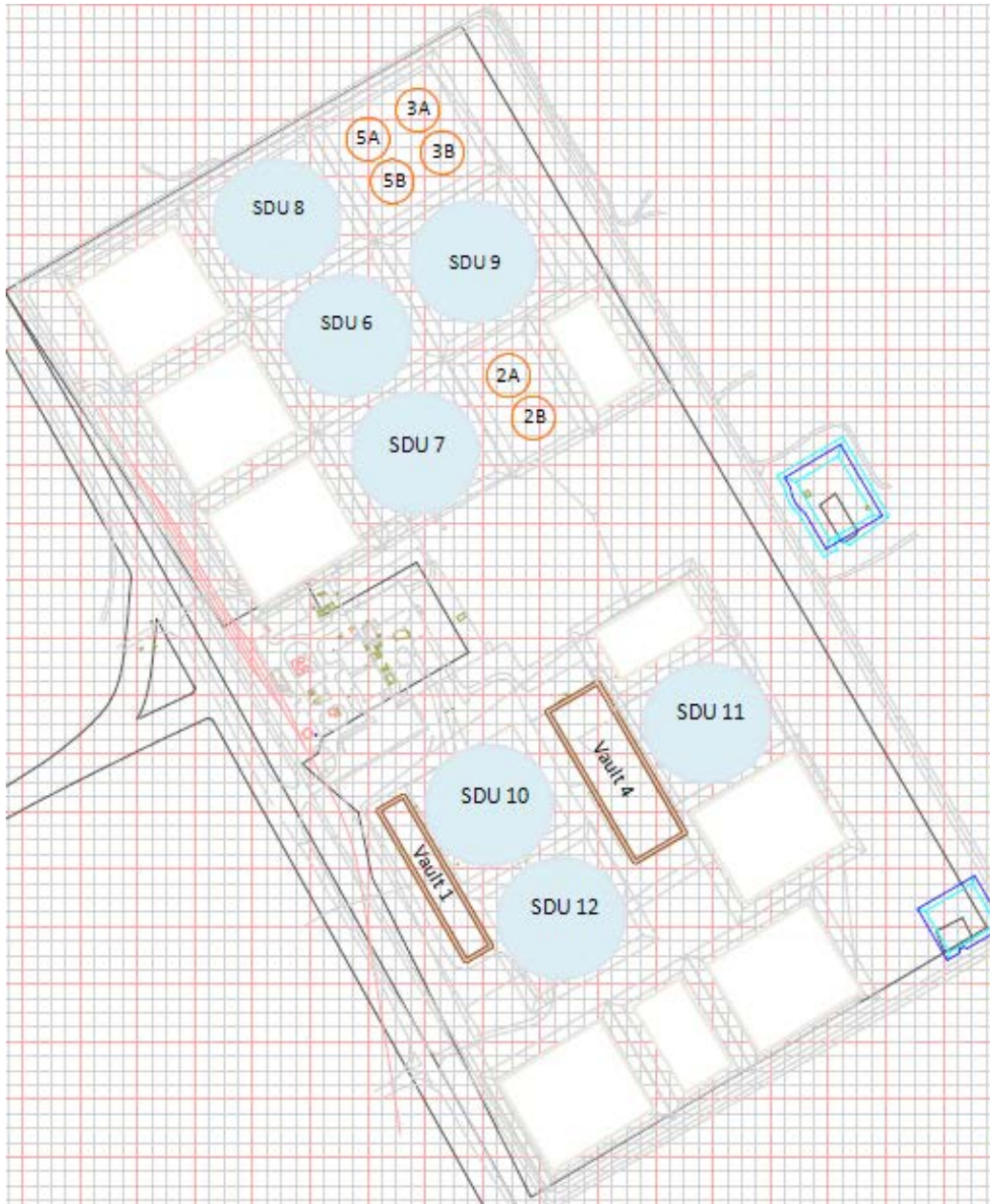
SDU Model Designation	SDU Centerline Locations <sup>a</sup>		SDU Base Elevation <sup>b</sup>
	North Coordinate	East Coordinate	(minimum) (Feet above MSL)
6	N77687	E66430	265
7	N77241	E66577	265
8	N78134	E66284	265
9	N77846	E66915	265
10	N76000	E66572	265
11	N76120	E67375	265
12	N75561	E66742	265

(a) SDU locations tolerance of +/-50 ft of the SDU centerline location as identified by the north and east coordinates.

(b) SDU Base Elevation defined as the low point of the SDU floor slab at the SDU centerline



Figure 2.4-1: SDF Layout Showing Cylindrical SDUs



Note: Numbering of the SDUs is not important, but the location (i.e., centerpoint) is important. Elevations in Figure 2.4-1 are nominal values. Minimum elevations are reflected in Table 2.4-3.



**Table 2.4-4: Dimensional Properties Criteria (32 Million Gallon Cylindrical SDUs)**

Material Zone	Critical Dimension		Material Type
	Design <sup>a</sup>	Margin Case <sup>b</sup>	
Roof	1.5% slope (+/- .3%) <sup>c</sup>	1% slope (min)	High Quality Concrete
	12 in. (+1/2, -1/4)	9 in. (min)	
Concrete Roof Joints	1,600 linear ft.	1,600 linear ft. (max)	as approved by design
Roof Support Columns	208	208 (max)	High Quality Concrete
	24 in. (+1/2, -1/4) diameter	24 in. (+1/2, -1/4) diameter	
Concrete Floor Joints	1,600 linear ft.	1,600 linear ft. (max)	as approved by design
Floor Slab	12 in. (+1/2, -1/4)	9 in. (min)	High Quality Concrete
High Density Polyethylene (HDPE)-Geosynthetic Clay Liner (GCL)	100 mils (+/- 5%) HDPE	60 mils (min) HDPE	HDPE-GCL <sup>d</sup>
Mud Mats	10 in. total (min)	8 in. total (min)	Low Quality Concrete
<b>Radial Orientation</b>			
Tapered Wall	24 in. base (+1/2, -1/4)	20 in. (min) base	High Quality Concrete
	10 in. top (+1/2, -1/4)	7 in. (min) top	
Formed Tie-Through Wall Repair	8 in. (min) HQC / Plug / LQC	7 in. (min) HQC / Plug / LQC	High Quality Concrete
	(C-CC-Z-00044 Detail 7)		Low Quality Concrete

<sup>a</sup> Design values are to be used to evaluate design submittals. Design tolerances are from Project Specification C-SPP-Z-00008, sections 3100 and 3300.

<sup>b</sup> Margin Case values (from SRR-CWDA-2014-00006, FY 2014 *Special Analysis for the Saltstone Disposal Facility at the Savannah River Site*) apply only to field installation if field conditions dictate.

<sup>c</sup> From ACI 117 as invoked in Project Specification C-SPP-Z-00008.

<sup>d</sup> GCL material thickness to be selected commensurate with HDPE selection.

### **3.0 REFERENCES**

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