

**TECHNICAL SAFETY REQUIREMENTS  
SAVANNAH RIVER SITE**

**SOLID WASTE MANAGEMENT FACILITY**

February 2005

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*IG-SR-3, 2/04*

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SAVANNAH RIVER SITE

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List of Acronyms, Abbreviations, and Symbols

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ALARA	As Low as Reasonably Achievable
ANSI	American National Standards Institute
CFR	Code of Federal Regulations
CSL	Criticality Safety Limit
DCA	Double Contingency Analysis
DOE	Department of Energy
DVS	Drum Venting System
FGE	Fissile Gram Equivalent
ICP	Inventory Control Program
LCO	Limiting Condition for Operation
LCS	Limiting Control Setting
LFL	Lower Flammability Limit
mph	miles per hour
NCSE	Nuclear Criticality Safety Evaluation
NFW	Naval Fuels Waste
PEC	Plutonium Equivalent Curies
QA	Quality Assurance
SAR	Safety Analysis Report
SL	Safety Limit
SR	Surveillance Requirement
SRS	Savannah River Site
SWB	Standard Waste Box
SWD	Solid Waste Division
SWMF	Solid Waste Management Facility
TVEF/MWPF	TRU Waste Visual Examination Facility/Mixed Waste Processing Facility
TRU	Transuranic
TSA	Temporary Storage Area
TSR	Technical Safety Requirement
USQ	Unreviewed Safety Question
V&P	Vent and Purge
VOC	Volatile Organic Compound
WSRC	Westinghouse Savannah River Company

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## Revision Log

<u>Revision #</u>	<u>Date</u>
Original Issue	
Rev. 1	June 1999
This revision added additional controls for the TRU drum retrieval operation. In addition, the document format was updated throughout.	
Rev. 2	September 1999
This revision removed reference to the 253-H waste compaction facility (it was decommissioned); removed reference to the Long-Lived Waste Storage Building; removed requirement to limit chemical inventories based on Appendix B of Chapter 3 of the SAR; placed additional controls on the solvent storage tanks and revised some administrative program requirements.	
Rev. 3	July 2002
This revision replaced all references to DOE 5480.21 and .22 with references to 10 CFR 830 Subpart B, "Nuclear Safety Management." This revision replaced "speed control" with "access control" as an Administrative Control under the Traffic Control Program. Changed function title "Shift Supervisor" to "First Line Manager" to match facility terminology. Removed requirement for response plans to be approved by the SWD Operations Manager or designee prior to implementation. Added requirement for DOE to approve response plans prior to implementation. Combined coverage for Intermediate Level Tritium Vaults and Intermediate Level Non-Tritium Vaults as "Intermediate Level Vaults" in Table 1.1-1 and Process Administrative Controls Section 5.5.2.6.14. Added new CSL and DCA controls under the Nuclear Criticality Safety Program. Added new Table 5.5.2.7-1, "Criticality Safety Limits for TRU Waste Storage Pads." Added criticality controls for Hazard Category 3. Added new Section 6, "Design Features," as required by 10 CFR 830 Subpart B.	
Rev. 4	May 2003
This revision allows a total Temporary Storage Area inventory of up to the limits specified in Chapter 3 of the SAR. Storage of Naval Reactor Components will now be controlled such that the cumulative container radiological inventory stored in each NRCSA shall be within Hazard Category 3 limits. In the NRCSA, each naval reactor component is no longer considered a separate segment. With regard to criticality safety for Hazard Category 3 process areas, the TSRs now reference the SAR Chapter 6 for specific inventory controls. Deleted reference in Section 6.1.1 to culverts being used for segmentation. Revised inventory limit in a single TSA from 1,250 Pu-239 equivalent curies (PEC) to 3,900 PEC when a single drum in that TSA exceeds 130 PEC.	
Rev. 5	July 2004
This revision changed the Criticality Safety Limit for concrete culverts containing loose waste and corrected the Nuclear Criticality Safety Evaluation reference for polyethylene boxes.	
Rev. 6	January 2005
This revision deleted the Waste Certification Facility (724-8E) from the scope of the TSR.	

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Revision Log

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Rev. 7	January 2005
This revision changed 5.5.2.6.3.1 and m to clarify vent and purge procedures.	
Rev. 8	February 2005
This revision added AC 5.5.2.6.3.o to address the removal of a drum from the vent and purge machine to allow repairs in the event of a system malfunction.	

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**Section 1**  
**Use and Application**

## 1.0 USE AND APPLICATION

## 1.1 Introduction and Scope

## 1.1.1 Technical Safety Requirement Applicability

This document contains the Technical Safety Requirements (TSRs) for the Solid Waste Management Facility (SWMF). The SWMF is comprised of numerous FACILITIES. These FACILITIES provide for storage, treatment and/or disposal of hazardous, mixed, and radioactive wastes generated onsite and offsite. The FACILITIES covered by the TSRs are identified below.

Table 1.1-1 FACILITIES Covered by the SWMF TSRs

Facility	Location
Old Radioactive Waste Burial Ground	643-E
E-Area TRU Waste Storage Pads	Within 643-7E and 643-26E
Greater Confinement Disposal Area	Within 643-7E
Used Equipment Storage Areas	Within 643-7E and 643-26E
Naval Reactor Component Storage Areas	Within 643-7E and 643-26E
643-7E Buried Waste	Within 643-7E
Solvent Storage Tanks	H-Area
E-Area Hazardous and Mixed Waste Storage Buildings and Low Level Waste Storage Pads 20-22	Within 643-7E
Mixed Waste Management Facility	Within 643-7E
N-Area Hazardous Waste and Mixed Waste Storage Buildings and Waste Storage Pads	N-Area
B-Area Mixed Waste/Hazardous Waste Storage Building	B-Area
Low Activity Waste Vaults	Within 643-26E
Intermediate Level Vaults	Within 643-26E
E-Area Vault Trenches	Within 643-26E

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## 1.1 Introduction and Scope

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### 1.1.2 Methodology

This TSR document was prepared in accordance with guidance contained in the Code of Federal Regulations, 10 CFR 830 Subpart B, "Nuclear Safety Management." The TSR derivation methodology, criteria, and conclusions are contained in Chapter 5 of the SWMF Safety Analysis Report (SAR).

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## 1.2 Definitions

## ----- NOTE -----

Defined terms in this list appear in all-capitalized type throughout this Technical Safety Requirement document

<u>Term</u>	<u>Definition</u>
FACILITY	Table 1.1-1 lists the FACILITIES covered by the TSR. FACILITY boundaries and activities are described in the Safety Analysis Report (SAR).
MODE	The status or operating condition of a FACILITY or PROCESS AREA in the SWMF. See Section 1.3 for the descriptions of individual MODES.
PROCESS AREA	A defined area in the FACILITY that may consist of a tank, system, cell, room, building, or an entire area. A PROCESS AREA may be a portion of a FACILITY or an entire FACILITY area covered by a particular operation or procedure.  An Example of a PROCESS AREA would be bay number 3 in Building 710-B. Building 710-B is a B-Area Mixed Waste/Hazardous Waste Storage Building.
RESPONSE PLAN	A plan that is developed and implemented to restore the FACILITY or PROCESS AREA into TSR compliance. The philosophy and content of RESPONSE PLANS are outlined in the Administrative Controls Section of the TSR document.

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 1.3 Modes
 

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The MODES of the FACILITY or PROCESS AREAS are defined below. The SWMF consists of many PROCESS AREAS, which perform specific, independent functions in the accomplishment of the mission of the FACILITY. Because there are numerous PROCESS AREAS and their operations can be performed independently of other PROCESS AREAS, a separate MODE designation can apply to each of the PROCESS AREAS. The MODE designation for the entire FACILITY will be designated by the PROCESS AREA in the highest MODE. The hierarchy of MODES from the highest to lowest is OPERATION, STANDBY, and SHUTDOWN.

If in OPERATION and a condition arises which places a PROCESS AREA outside the authorization basis the affected PROCESS AREA shall be placed in STANDBY. Entry into STANDBY shall be considered in cases where a question exists with respect to compliance with the authorization basis, or with any question regarding the safety of continued operation.

- |       |                  |   |
|-------|------------------|---|
| 1.3.1 | OPERATION        | A MODE in which the FACILITY or PROCESS AREA is performing its mission as a waste storage, treatment, or disposal site and is capable of receiving waste for disposal, treatment, or storage. Transfer, movement or other operational activities involving waste are allowed.   |
| 1.3.2 | STANDBY          | A MODE in which the FACILITY or PROCESS AREA is performing its mission as a waste storage, treatment or disposal site. Receipt, transfer, movement or other operational activities involving waste are not allowed unless approved by the Solid Waste Division Operations Manager.  |
| 1.3.3 | SHUTDOWN         | A MODE in which, for the purpose of further safety review and direction, operation of a FACILITY is restricted as mandated by SWD or DOE. The FACILITY or PROCESS AREA can perform its mission as a waste storage, treatment, or disposal site. Receipt, transfer, movement or other operational activities involving waste are not allowed unless approved by DOE. |
| 1.3.4 | INTERIM CLOSURE* | A MODE in which the FACILITY or PROCESS AREA is performing its mission of containing the disposed waste and active maintenance during preparations toward FINAL CLOSURE. Transfer or movement of waste is not allowed.  |
| 1.3.5 | FINAL CLOSURE*   | A MODE in which the FACILITY or PROCESS AREA is performing its mission of containing the disposed waste by achieving long-term stability of the PROCESS AREA without active maintenance. Transfer or movement of waste is not allowed.  |

\*These MODES only apply to waste disposal FACILITIES that have been closed.

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**Section 2**  
**Safety Limits**

## 2.0 SAFETY LIMITS

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Safety Limits (SLs) are limits on important process variables that directly protect the integrity of those barriers that are necessary for preventing the uncontrolled release of radioactive or other hazardous materials.

Application of the TSR selection criteria and methodology, which are based on 10 CFR 830, Subpart B, has resulted in the identification of no process variables that require SLs.

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**Section 3/4**  
**Limiting Control Settings,**  
**Limiting Conditions for Operation,**  
**and Surveillance Requirements**

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**3.0/4.0 LCSs, LCOs AND SURVEILLANCE REQUIREMENTS**

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- 3.0 Limiting Control Settings (LCSs) are settings on safety systems that control process variables to prevent exceeding Safety Limits (SLs). Since no SLs were identified for inclusion in the TSR, no LCSs are required.

Limiting Conditions for Operation (LCOs) are limits established at the lowest functional capability or performance level of equipment required for safe operation of the FACILITY. Application of the TSR selection criteria and methodology, which are based on 10 CFR 830 Subpart B, has resulted in no systems, components, or parameters being identified that require LCOs.

- 4.0 Surveillance Requirements (SRs) are requirements under a particular LCO that relate to testing, calibration, or inspection of equipment or conditions to ensure that the necessary quality of systems and components is maintained and that FACILITY operations comply with the LCO. Since no LCOs were identified, no SRs are necessary.
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**Section 5**  
**Administrative Controls**

## 5.0 ADMINISTRATIVE CONTROLS

5.1 Responsibility

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5.1.1 The SWD Operations Manager shall hold each FACILITY Manager responsible for overall FACILITY operation and for delegating (in writing) the succession to this responsibility during any absences.

5.1.2 A qualified Shift Manager/Supervisor shall be responsible for the local command function of the FACILITY during OPERATION. During any unavailability of the Shift Manager/First Line Manager while in OPERATION, a qualified individual shall be designated to assume the command function. As part of this command function, the Shift Manager/First Line Manager or designee shall ensure operation of the FACILITY is in accordance with an approved TSR.

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## 5.2 Organization

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### 5.2.1 Organization

- a. Lines of authority, responsibility, and communication shall be established for the highest management levels, through intermediate levels, up to and including the operating organization positions.
- b. The individuals who train the operating staff, carry out radiological control functions, or perform Quality Assurance (QA) functions may report to the FACILITY Manager; however, they shall have sufficient freedom to ensure their independence from operating pressures.

### 5.2.2 FACILITY Staff

The FACILITY Staff organization shall be as follows:

- a. At least one qualified Shift Manager/First Line Manager shall be available to the FACILITY during OPERATION. FACILITY operations shall be performed under the cognizance of a qualified Shift Manager/First Line Manager. FACILITY control shall be carried out by qualified operators according to written procedures.
  - b. On-call support personnel shall be assigned by the FACILITY Manager.
  - c. Personnel who perform TSR functions (e.g., operators and personnel involved in the movement of waste implementing TSR requirements) shall have their maximum number of working hours and maximum number of consecutive days on duty limited in accordance with administrative procedures.
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5.3 TSR Control

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- 5.3.1 Changes to the TSR shall be made under appropriate Administrative Controls and reviewed according to the TSR, Section 5.7.
  - 5.3.2 Proposed changes to the TSR shall be reviewed and approved by DOE prior to implementation.
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## 5.4 Response Plans

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- 5.4.1 The purpose of a RESPONSE PLAN is to ensure that additional analysis or administrative and management controls are in place when abnormal situations arise and the FACILITY or PROCESS AREA is outside of normal operating conditions defined by the TSR and an approved procedure does not currently exist to address the situation. A RESPONSE PLAN has two functions. The first function is to restore the affected FACILITY or PROCESS AREA to a safe condition. The second function is to determine what further actions are required to ensure the affected FACILITY or PROCESS AREA is operating within the framework of the TSRs. A RESPONSE PLAN is intended to provide FACILITY personnel with the written direction needed to safely accomplish these two functions. These plans, however, do not prohibit reliance upon operator training and experience in the correction of the condition for immediate mitigation of an unsafe or worsening condition as addressed in Section 5.6.3.

RESPONSE PLANS would primarily be used to identify corrective actions when the requirements for the Process Administrative Controls in Section 5.5.2.6 are not met and an approved emergency procedure or abnormal response procedure does not currently exist to address the situation. However, RESPONSE PLANS are not limited to only Process Administrative Controls. These plans can also be used to implement compensatory actions or surveillances to reduce risk for other Administrative Controls when necessary. The RESPONSE PLAN should state what operations are permitted, including the initial conditions and precautions necessary to perform the operations in a safe manner. For Solid Waste FACILITIES, the expected corrective actions will typically consist of waste movement to restore the required inventory or segmentation conditions. Prior to implementation, the RESPONSE PLAN shall be approved by the Facility Manager or designee for submittal to DOE and processed in accordance with TSR change procedures, including obtaining DOE approval. Upon DOE approval of the RESPONSE PLAN, all future FACILITY activities necessary to restore compliance with the TSR are required to be performed under the RESPONSE PLAN. DOE approval for closure or termination of the RESPONSE PLAN is not required once TSR compliance is restored. The RESPONSE PLANS should be developed, approved and initiated within 7 Days.

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## 5.5 Procedures and Programs

### 5.5.1 Procedures

#### 5.5.1.1 Scope

Written procedures shall be established, implemented, and maintained covering the following activities:

- a. Operational activities
- b. The emergency and abnormal operating conditions
- c. Security plan implementation
- d. Emergency plan implementation
- e. All surveillances required by TSRs
- f. Administrative aspects of FACILITY operation
- g. All programs specified in Section 5.5.2

#### 5.5.1.2 Review, Revision, and Approval

Each procedure of Requirement 5.5.1.1, and revisions thereto, shall be reviewed in accordance with Requirement 5.7.1, approved by the FACILITY Manager or designee in accordance with approved administrative procedures prior to implementation, and reviewed periodically as set forth in administrative procedures.

#### 5.5.1.3 Temporary Changes

Temporary changes to procedures of Requirement 5.5.1.1 may be made provided each change is made and reviewed in accordance with approved administrative procedures.

### 5.5.2 Programs

The following programs shall be established, implemented, and maintained in accordance with DOE Orders, as applicable.

#### 5.5.2.1 Area Emergency Plan

1. The Area Emergency Plan shall define specific measures, policies, and actions to prevent or minimize injuries, damage to property, and impact on the environment caused by accidents, natural disasters, or deliberate damage within the area of responsibility.

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## 5.5 Procedures and Programs

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### 5.5.2.1 Area Emergency Plan (continued)

2. The SWD Operations Manager, through the Emergency Preparedness Manager, shall ensure that an emergency preparedness program is established in accordance with applicable DOE Orders, based on formal hazards assessment and requirements. The program should contain the following elements at a minimum:
  - a. Emergency Response Organization
  - b. Operational Emergency Event Classes
  - c. Notification
  - d. Consequence Assessment
  - e. Protective Actions
  - f. Medical Support
  - g. Recovery and Reentry
  - h. Emergency FACILITY and Equipment
  - i. Training
  - j. Drills and Exercises
  - k. Program Administration
3. Solid Waste program FACILITIES shall be covered by the Savannah River Site (SRS) Emergency Plan developed for the SWD as defined in the SRS Emergency Plan, WSRC-SCD-7, Solid Waste Annex H.

### 5.5.2.2 FACILITY Fire Protection Program

1. A FACILITY fire protection program shall be established to minimize the following:
  - a. Threats to the public health or welfare resulting from a fire
  - b. Undue hazards to site personnel from a fire
2. The fire protection program shall address the following elements and implement them as required:

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## 5.5 Procedures and Programs

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### 5.5.2.2 FACILITY Fire Protection Program (continued)

#### a. Fire Prevention

- 1) Fire-resistive construction
- 2) Control of combustibles
- 3) Control of ignition sources
- 4) FACILITY inspections
- 5) Handling of combustible or flammable liquids and gases

#### b. Fire Control

- 1) Automatic detection/suppression and alarm systems
- 2) Fire Watches (as necessary)
- 3) Adequate fire barriers (e.g., walls, doors, dampers)
- 4) Proper availability and maintenance of FACILITY fire fighting equipment
- 5) Identification of FACILITY fire fighting personnel, responsibilities, and training
- 6) 24-hour fire fighting coverage
- 7) Proper Fire Control Pre-Plans that adequately cover manual fire fighting methods and possible emergency conditions during fire fighting and that identify special hazards within the FACILITY

### 5.5.2.3 Configuration Control Program

A Configuration Control Program shall be implemented that:

- a. Identifies and documents the technical baseline of structures, systems, components, and computer software;
- b. Ensures that changes to the technical baseline are properly developed, assessed, approved, issued, and implemented; and
- c. Maintains a system for recording, safeguarding, and indicating the status of technical baseline documentation on a current basis.

### 5.5.2.4 This Section Deleted

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## 5.5 Procedures and Programs

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### 5.5.2.5 Waste Acceptance Criteria Program

The SWMF shall only accept waste that meets the requirements of the Westinghouse Savannah River Company (WSRC) 1S Waste Acceptance Criteria Manual. This includes (where indicated by the Waste Acceptance Criteria) implementation of a waste certification program approved by the SWD, to ensure safe management of waste, provide assurance that waste being sent to SWMF meets each FACILITY's Waste Acceptance Criteria and to ensure that the inventory for accidents analyzed in the authorization basis documents is not exceeded. The waste certification program shall include a description and characterization of each waste stream generated (or the method used to characterize the waste). This characterization shall include a physical form description, a radionuclide and mixed material content and distribution, and the physical and chemical properties of the waste.

### 5.5.2.6 Process Administrative Controls

The Administrative Controls specified in this section focus on programs that are assumed in the safety analysis for determining consequences or frequencies of postulated accidents. Section 5.5.2.6 (1) contains controls that apply to all FACILITIES. The remaining items in this section contain the specific Administrative Controls for each individual FACILITY. Controls with regard to criticality are discussed in Section 5.5.2.7 of the TSR.

#### 1. General

- a. Each FACILITY shall have a radionuclide and hazardous waste Inventory Control Program (ICP) in place as applicable. The ICP shall ensure that the quantities at each FACILITY are maintained (e.g., measurement uncertainties or biases are included for high fissile content material) within the limits in the Authorization Basis Documents.
- b. Administrative controls shall be placed on the E-Area drainage system to ensure that localized flooding will not seriously degrade or remove the cover above the buried waste and to ensure it is available to divert any liquid releases to the sedimentation basins. Performance of ground maintenance on the buried waste cover ensures that the waste remains covered. Maintenance of the soil cover or engineered cover is a primary assumption in the accident analysis with regard to buried waste. The E-Area drainage

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## 5.5 Procedures and Programs

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### 5.5.2.6 Process Administrative Controls (continued)

system shall be inspected on a quarterly basis to ensure it will function as designed. The inspection intervals are based on engineering judgment and operating experience.

- c. Waste may be stored on a temporary basis within the SWMF while a treatment, storage or disposal area is being designated. Administrative controls shall be established to control the temporary storage of waste. These controls shall address location, storage configuration and length of time that temporary storage is permitted. Temporary storage of waste shall be functionally identical to storage of other waste as addressed in the Authorization Basis Documents.
- d. Traffic controls (e.g., access control) shall be implemented as required to minimize the potential for a passing vehicle to impact waste stored above ground. Examples of possible controls would include the use of a spotter, posted speed limits within the vicinity of a FACILITY, and pre-evolution briefings of personnel who will be involved in the transfer of waste to or from a FACILITY.
- e. All containerized waste forms stored in above-ground FACILITIES shall be approved as defined in SWMF SAR, Chapter 5, Table 5.3-32.
- f. Storage and Disposal FACILITY personnel shall inspect all containers prior to placing them into their respective FACILITIES. A representative sample of containers shall be inspected on a monthly basis. Only the outer storage container needs to be inspected. Potentially weakened containers shall be repackaged in approved containers as determined and directed by operating procedures.
- g. Nominal train speed on tracks passing adjacent to waste areas is 25 mph.
- h. Unescorted access shall be limited to personnel who have received adequate training to ensure they are familiar with the material present in the FACILITY and are knowledgeable in the appropriate action to take when an event occurs.

The specific exceptions to these requirements are discussed in the individual subsections where applicable.

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## 5.5 Procedures and Programs

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### 5.5.2.6 Process Administrative Controls (continued)

#### 2. Old Radioactive Waste Burial Ground

No activities that will uncover buried waste shall be conducted in the Old Burial Ground. The soil cover prevents the airborne transport of waste, fires, and vegetative uptake, and minimizes personnel exposure.

The cover shall be inspected on a monthly basis (or after an event that could have caused a significant removal, e.g., heavy rain, flooding). Areas that indicate significant erosion or subsidence has taken place shall have additional cover added. Areas where buried waste has been uncovered shall have the exposed waste covered. Performance of ground maintenance on the buried waste cover ensures that the waste remains covered.

#### 3. TRU Waste Storage Pads

- a. The inventory enclosed in an approved container shall not generate a combustible gas concentration, except as noted under Item k of this section, that exceeds the corresponding material's lower flammability limit. The approved containers shall incorporate venting requirements as necessary (including use of the remote venting system during the TRU retrieval activity to provide a path for venting of flammable gases.)
- b. The inventory enclosed in an approved container shall not generate internal heat sufficient to result in spontaneous combustion or cause a degradation of package/container features that are credited with acting as a confinement barrier.
- c. No TRU waste shall be stored within 60 feet of an active rail centerline; however, this distance may be reduced to 30 feet where the posted nominal speed limit is 5 mph.
- d. Any TRU waste container whose contents exceed 0.90 Pu-239 plutonium equivalent curies (PEC) shall either be located in a culvert or comparable container or be controlled on a temporary basis in accordance with the requirements of Section 5.5.2.6.1c, except when in transit or during processing activities (characterization, etc.).

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## 5.5 Procedures and Programs

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### 5.5.2.6 Process Administrative Controls (continued)

- e. The total activity of drums or other containers located in a given Temporary Storage Area (TSA) while outside culverts or other comparable containers shall not contain more than 3900 Pu-239 PEC, for the case where any one container located outside the culvert exceeds 130 PEC. Additionally, the total inventory of all high-activity drums located in all TSAs on the TRU Pads while outside culverts shall not exceed the values identified in Chapter 3 (Section 3.4) of the SAR.
- f. The lids may be removed from multiple culverts for maintenance, inspection or other operations as necessary, providing the lids are replaced when operations are complete, or at the end of the workday.
- g. The inventory of an individual container placed on the TRU pads and the total inventory on the TRU pads shall not exceed the values identified in Chapter 3 of the SAR.
- h. The culverts on TRU Pad 1 shall not be uncovered (this does not prohibit “exposing” the sides of some of these culverts during the process of retrieving TRU Pad 2 waste drums) and the two Mound Lab culverts on TRU Pad 2 shall not be moved. If movement/exposure of these containers becomes necessary, safety analysis shall be performed to ensure the appropriate safety precautions are taken.
- i. TRU waste not required to be in culverts is stored in closed steel containers (55 and/or 83-gallon) that are stacked in one of the following two types of arrays:

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(continued)

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5.5 Procedures and Programs

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## 5.5.2.6 Process Administrative Controls (continued)

- 1) A “solid” array (with no aisles) where the drums are stacked in no more than two layers with the top layer of drums stacked directly on top of the bottom layer (or on top of metal strips that increase stability and/or allow airflow clearance), or
- 2) An aisle-spaced array where the drums are stacked in no more than three layers with all drums banded to fire-resistant pallets.

NOTE: TRU mixed waste drums stored on permitted, unrounded pads after March 1, 1996 shall be stored in arrays in accordance with Section 5.5.2.6 (3.i.2).

- j. Standard Waste Boxes (SWBs) shall be stacked as follows:
  - 1) SWBs shall not be stacked more than three high. In addition, any SWBs on the third tier must weigh less than 2634 pounds.
  - 2) No more than 636 SWBs may occupy exterior pad positions on the second and third tiers.
- k. Drums exiting the vent and purge machine that have an initial hydrogen concentration greater than or equal to 4% shall be moved to a designated storage area and have a buffer zone established prior to entering the time period where their vapor space is potentially flammable. Once a drum has been placed in the designated storage area (a designated storage area must be located on a covered TRU pad), it shall not be moved until all drums in that area have a steady-state hydrogen concentration below the Lower Flammability Limit (LFL).
- l. A Calibration Check shall be performed on the Gas Chromatograph associated with the Vent and Purge (V&P) machine prior to and within 24 hours of any measurement used to confirm that the headspace gas in a TRU drum is not flammable.
- m. A drum undergoing V&P that has an initial Volatile Organic Compound (VOC) concentration greater than or equal to 1% must be purged until the VOC concentration is less than 1% unless the drum has undergone V&P for greater than 8 hours total purge and sample time. A drum that has had a total purge and sample time of greater than 8 hours may be removed from the V&P machine prior to achieving a VOC concentration less than 1% and managed as “potentially flammable” in accordance with controls specified in “Solid Waste Management Facility Handling and Processing of Flammable Drums on SWMF TRU Waste Pads Justification for Continued Operations” (WSRC-TR-2004-00618), as amended.
- n. The inventory in the TRU Waste Visual Examination Facility/Mixed Waste Processing Facility (TVEF/MWPF) shall be controlled (or segmented) such that it remains within Hazard Category 3 (as defined by DOE-STD-1027-92).

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## 5.5 Procedures and Programs

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### 5.5.2.6 Process Administrative Controls (continued)

- o. In the event of a Drum Venting System (DVS) failure, a TRU drum undergoing vent and purge that has not been purged to satisfy the criteria in AC 5.5.2.6.3k and 5.5.2.6.3m for hydrogen and VOCs (that allows the drum to exit the DVS) may be removed from the DVS in order to repair and restore the DVS. A drum removed from the DVS under this control shall be managed and stored at the DVS staging area as an unvented drum in accordance with controls specified in "Solid Waste Management Facility Handling and Processing of Flammable Drums on SWMF TRU Waste Pads Justification for Continued Operations" (WSRC-TR-2004-00618), as amended, until the drum is returned to the DVS for reprocessing.

Basis: With the DVS inoperable, operations cannot be performed to reduce the hydrogen and VOCs to satisfy the DVS exit criteria in AC 5.5.2.6.3k and 5.5.2.6.3m. Removing the drum from the DVS and managing the drum using the controls specified in the JCO for unvented drums allows the drum to be managed safely while the DVS is restored.

#### 4. Greater Confinement Disposal Area

No activities shall be performed that could disturb the grout without first completing an Unreviewed Safety Question Determination.

#### 5. Used Equipment Storage Areas

The cumulative equipment radiological inventory being stored in a Used Equipment Storage Area shall be within a Hazard Category 3 (as defined by DOE-STD-1027-92).

#### 6. Naval Reactor Component Storage Areas

Storage of Naval Reactor Components shall be controlled such that the cumulative radiological inventory in each NRCSA shall be within a Hazard Category 3 (as defined by DOE-STD-1027-92). Radioactive inventory in shipping packages with current DOT Type B Certificates of Compliance may be excluded from the NRCSA radiological inventory as allowed by DOE-STD-1027-92.

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## 5.5 Procedures and Programs

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### 5.5.2.6 Process Administrative Controls (continued)

#### 7. 643-7E Buried Waste

No activities that will uncover buried waste shall be conducted in areas where waste has been covered. The soil cover prevents the airborne transport of waste, fires, and vegetative uptake, and minimizes personnel exposure. The cover shall be inspected on a monthly basis (or after an event that could have caused a significant removal, e.g., heavy rain, flooding). Areas that indicate significant erosion or subsidence has taken place shall have additional cover added. Areas where buried waste has been uncovered shall have the exposed waste covered. Performance of ground maintenance on the buried waste cover ensures that the waste remains covered.

#### 8. Solvent Storage Tanks (607-33H through 607-36H)

The inventory in the Solvent Storage Tanks shall be controlled such that the inventory in each tank remains within a Hazard Category 3 (as defined by DOE-STD-1027-92).

In addition to the control of inventory, only water shall be used for blending and no material shall be added to a tank such that flash point of the tanks contents will fall below 140°F. These controls are required to ensure each tank can be considered a segment.

#### 9. E-Area Hazardous and Mixed Waste Storage Buildings and Pads

The inventory in Buildings 643-43E and 643-29E and the Waste Storage Pads shall be controlled (or segmented) such that the building and pads (or segment) remain within a Hazard Category 3 (as defined by DOE-STD-1027-92).

#### 10. Mixed Waste Management Facility

See item 7.

#### 11. N-Area Hazardous Waste/Mixed Waste Storage Buildings and Waste Storage Pads

The inventory in Buildings 645-N, 645-2N, 645-4N, and the Waste Storage Pads shall be controlled (or segmented) such that the buildings and pads remain within a Hazard Category 3 (as defined by DOE-STD-1027-92).

#### 12. B-Area Mixed Waste/Hazardous Waste Storage Building 710-B

The inventory in Building 710-B shall be controlled (or segmented) such that it remains within Hazard Category 3 (as defined by DOE-STD-1027-92).

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## 5.5 Procedures and Programs

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### 5.5.2.6 Process Administrative Controls (continued)

#### 13. Low Activity Waste Vaults

The inventory in the Low Activity Waste Vaults shall be controlled (or segmented) such that it remains within Hazard Category 3 (as defined by DOE-STD-1027-92).

Most waste in the vaults is contained in B25 boxes. These containers are loaded into this FACILITY for disposal. To ease FACILITY operations and maximize the volume of material that can be placed in a vault, the containers are placed in the vaults in a manner that precludes inspections. Given the relatively small amount of waste in any individual container and the protection from the elements afforded by the structure, monthly container inspections in this FACILITY are not required.

#### 14. Intermediate Level Vaults

The inventory in the Intermediate Level Vaults shall be controlled (or segmented) such that it (or each defined segment) remains within a Hazard Category 3 (as defined by DOE-STD-1027-92). Due to the location of the waste (in a below-grade cell with no personnel access) monthly container inspections in this FACILITY are not required.

#### 15. E-Area Vault Trenches

The inventory in the E-Area Vault Trenches shall be controlled (or segmented) such that it remains within Hazard Category 3 (as defined by DOE-STD-1027-92).

### 5.5.2.7 Nuclear Criticality Safety Program

#### 1. The Nuclear Criticality Safety Program shall:

- a. Be a formal, documented system for the control of nuclear safety parameters and their bases, identification, and verification; and
- b. Provide a tracking system for the status of audits findings.

#### 2. The SWMF Manager shall ensure that the SWD Operations Manager complies with the Nuclear Criticality Safety Program.

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## 5.5 Procedures and Programs

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### 5.5.2.7 Nuclear Criticality Safety Program (continued)

3. The SWD Operations Manager (or his designee) shall ensure:
  - a. Nuclear Criticality Safety Evaluations (NCSEs) are performed when required;
  - b. FACILITY personnel receive nuclear criticality safety training; and
  - c. Activities are controlled to comply with established subcritical margins:
    - 1) The double contingency principle shall be applied
    - 2) Administrative control shall be used only when engineering control is not practical
    - 3) Operating Limits and conditions shall be stated in operating procedures
    - 4) Criticality Safety Limits (CSLs) are established for each Hazard Category 2 PROCESS AREA and container type within the FACILITY. Table 5.5.2.7-1 lists CSLs used in the operation of the TRU Waste Storage Pads. Criticality controls are also identified for Hazard Category 3 PROCESS AREAS. These limits and accompanying controls are based on the engineered and administrative features relied upon to prevent and/or mitigate the consequences of control failure. No single, credible failure event shall result in the potential for a criticality accident.
    - 5) For each inadvertent criticality scenario identified in the Double Contingency Analysis (DCA), the DCA gives two or more controls that protect the subcritical limit. All DCA controls shall be implemented to prevent a criticality. If it is found that one of the controls is not implemented, or that there is a failure to complete or follow an implemented control, or that operations are outside one of the identified contingencies or controls, then appropriate action shall be taken (e.g., place the affected FACILITY or PROCESS AREA in a safe condition and restore the FACILITY or PROCESS AREA). Note that these generic action statements are intended to provide general guidance on the steps to follow in the event a DCA control is not implemented or fails.
    - 6) A TSR violation will occur if a CSL is exceeded.

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## 5.5 Procedures and Programs

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### 5.5.2.7 Nuclear Criticality Safety Program (continued)

#### 4. Nuclear Criticality Safety Evaluations (NCSEs)

- a. NCSEs, for the purpose of these TSRs, are Criticality Safety Analyses performed to approved WSRC nuclear criticality safety requirements (e.g., WSRC-SCD-3, formerly WSRC-IM-93-13) and includes Nuclear Criticality Safety Analyses performed prior to currently approved criticality safety requirements (e.g., WSRC-IM-93-13).
- b. NCSEs shall be the base documents for Nuclear Criticality Safety Control. Processes shall be shown to be subcritical under all normal and credible abnormal operating conditions.
- c. NCSEs shall document the calculations and judgments used in determining that nuclear criticality safety is ensured.
- d. NCSEs shall be used to evaluate new processes or process changes (not currently addressed by an approved NCSE) before any fissionable material is processed, stored, or relocated.

#### 5. Approved Containers

Programmatic controls shall be implemented to ensure each container type used to handle fissionable material in the FACILITY addresses the safe amount of fissionable material that may be present in the containers, the maximum safe number of containers that may be in an approved storage location, and any other special precautions that must be taken to safely handle the approved container loaded with fissionable material. These parameters shall be maintained in a controlled document (e.g., NCSEs).

#### 6. Approved Storage Locations

Programmatic controls shall be implemented to analyze all proposed storage locations for fissionable material. This analysis shall establish the requirement for safe storage of fissionable material. The requirements shall state any necessary configuration limitations for the various types of containers that may be stored in the approved storage location. These parameters shall be maintained in a controlled document (e.g., NCSEs).

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## 5.5 Procedures and Programs

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### 5.5.2.7 Nuclear Criticality Safety Program (continued)

#### 7. Criticality Controls for Hazard Category 3 PROCESS AREAS

- a. Fissile gram equivalent (FGE) is the mass of fissile material expressed as equivalent of one nuclide (e.g., Pu-239) when a mixture actually contains multiple fissionable nuclides. Equivalencies are based on ANSI Standards for fissile nuclides, and NCSEs for non-fissile fissionable nuclides.
- b. Inventory controls shall be implemented for the following Hazard Category 3 PROCESS AREAS to ensure that inventory limits specified in Chapter 6 of the SWMF SAR are maintained. (These PROCESS AREAS do not have CSLs.)
  - TRU Waste Visual Examination Facility/Mixed Waste Processing Facility (TVEF/MWPF)
  - Used Equipment Storage Areas
  - Naval Reactor Component Storage Areas
  - Solvent Storage Tanks
  - Mixed Waste Storage Building in 643-E
  - Hazardous Waste/Mixed Waste Storage Buildings in N Area
  - Hazardous Waste Storage Building 710-B
  - E-Area Vault (EAV) Trenches in 643-26E
  - Intermediate Level Vault
  - Low Activity Waste Vaults
8. The following PROCESS AREAS are closed; they are no longer receiving waste and do not have CSLs:
  - Greater Confinement Disposal (GCD) Area
  - Buried waste in Old Radioactive Waste Burial Ground 643-E
  - Buried waste within the Solid Waste Disposal Facility 643-7E
  - Mixed Waste Management Facility within 643-28E
9. The criticality safety basis for containers approved in the future will be developed on a case-by-case basis to ensure criticality safety.

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## 5.5 Procedures and Programs

## 5.5.2.7 Nuclear Criticality Safety Program (continued)

Table 5.5.2.7-1 Criticality Safety Limits for TRU Waste Storage Pads

Facility	Item No.	SWMF Approved Containers	Criticality Safety Basis	Criticality Safety Limits	
				Inventory per Container	Configuration Restrictions
E-Area TRU Waste Storage Pads (within 643-7E)	1a	55-gallon drums	N-NCS-E-00008	485 g FGE Pu-239 per container	3-foot spacing of fissionable material from fissionable material in non-approved containers
	1b	Steel boxes			
	1c	Concrete culverts (55-gallon drummed waste and polyethylene boxed waste)			
	1d	Concrete casks			
	2a	Five polyethylene boxes containing failed HEPAs >195 g FGE Pu-239 stored as loose waste in culverts	DPSPU-85-272-121 and N-NCS-E-00006	910 g FGE Pu-239 per culvert	3-foot spacing of fissionable material from fissionable material in non-approved containers
	2b	Concrete culverts (loose waste)	N-NCS-E-00006	390 g FGE Pu-239 per culvert	
	3	FB-Line special big black steel boxes	N-NCS-E-00016	Less than 656 g FGE Pu-239	3-foot spacing of fissionable material from fissionable material in non-approved containers
	4	SWBs	N-NCS-E-00017	Less than 650 g FGE Pu-239	3-foot spacing of fissionable material from fissionable material in non-approved containers

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Procedures and Programs

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## 5.5.2.8 Radiation Protection Program

Procedures for personnel radiation protection shall be prepared consistent with DOE requirements and shall be approved, implemented, and maintained for all operations involving personnel radiation exposure. The radiation protection program shall ensure that the radiation exposure of onsite and offsite individuals is maintained within applicable DOE limits and As Low as Reasonably Achievable (ALARA).

## 5.5.2.9 Quality Assurance Program

Refer to SWMF SAR Chapter 14 (Quality Assurance) for a description of the Quality Assurance Program.

## 5.5.2.10 Unreviewed Safety Question (USQ) Program

A program shall be established, implemented, and maintained for USQs, based on the requirements in 10 CFR 830 Subpart B, "Nuclear Safety Management."

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## 5.6 Reporting Requirements

### 5.6.1 General Requirements

Written reports and oral notifications shall be submitted to DOE in accordance with DOE regulations regarding reporting requirements. These reports and notifications shall be prepared in accordance with approved procedures and shall be reviewed and approved by WSRC line management prior to DOE submittal.

### 5.6.2 TSR Violations

Since the TSR does not include SLs, LCSs, LCOs or SRs, a TSR violation occurs if there is repeated neglect for the observance of the Administrative Controls or non-compliance with the potential for serious consequences.

The TSR shall require the following actions to be taken in the event that a TSR violation occurs:

- a. Place the affected FACILITY or PROCESS AREA in a safe condition and restore the FACILITY or PROCESS AREA in accordance with an approved RESPONSE PLAN. Transfers or movements of waste in the affected area shall be limited to those that are needed to remove an imminent threat of a release.
- b. Notify DOE of the violation.
- c. Review the matter, and record the results of the review, including the cause of the condition and the basis for any corrective actions, to preclude reoccurrence.

### 5.6.3 Conditions Outside TSR

In an emergency, if a situation develops that is not addressed by the TSR, site personnel are expected to use their training and expertise to take actions to correct or mitigate the situation. Also, site personnel may take actions that depart from a requirement in the TSRs provided that (1) an emergency situation exists; (2) these actions are needed immediately to protect the public health and safety; and (3) no action consistent with the TSR can provide adequate or equivalent protection. Such action must be approved at a minimum by a qualified Operator or First Line Manager. If emergency action is taken, both a verbal notification shall be made to DOE-Savannah River, and a written report shall be made to DOE-Headquarters within 24 hours.

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## 5.7 Reviews and Assessments

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### 5.7.1 FACILITY Reviews

FACILITY personnel shall review activities affecting the safe operation of a nuclear FACILITY to ensure that day-to-day activities are conducted in a safe manner. These reviews shall include, as a minimum, the following elements:

- a. USQ Evaluations
- b. Proposed tests and experiments
- c. Procedures (required by the TSR)
- d. Programs (required by the TSR)
- e. FACILITY changes and modifications
- f. TSR changes
- g. FACILITY operation, maintenance, and testing
- h. DOE and industry issues of safety significance
- i. Other safety-related issues

These reviews may be performed by individual reviewers or by a review committee. If individual reviews are utilized, reviewers shall not perform the above required review of their own work or work for which they have direct responsibility. Reviewers shall possess sufficient education, experience, expertise, and safety analysis and technical training in the review subject area. When performing reviews, a cross-disciplinary determination is necessary. If a cross-disciplinary review is deemed necessary, personnel of the appropriate discipline shall perform such reviews.

### 5.7.2 Independent Oversight

Periodic environmental, safety, health, and quality assurance assessments shall be performed by an organization independent from the Division organization to provide oversight of FACILITY operations and safety programs.

### 5.7.3 Self-Assessments

Periodic environmental, safety, health, and quality assurance self-assessments shall be performed by the Division organization, a safety program organization or a committee matrixed to the Division to verify compliance with DOE and other regulatory requirements.

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## 5.8 Staff Qualifications and Training

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### 5.8.1 Qualification

A program shall be established to ensure that identified FACILITY staff meet established qualification requirements for their positions. This program shall adhere to qualification requirements established in accordance with applicable DOE orders.

### 5.8.2 Training

An initial training and retraining program for the identified FACILITY staff shall be established and maintained. This program shall adhere to training requirements established in accordance with applicable DOE regulations. For appropriate designated positions, training shall include familiarization with relevant industry operational experience.

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5.9 Record Retention

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5.9.1 Records shall be identified for retention and shall be retained for the period specified by WSRC's Records Inventory and Disposition Schedule as delineated by DOE Orders/guidance.

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**Section 6**  
**Design Features**

## 6.0 DESIGN FEATURES

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Section 6 identifies the passive design features of the FACILITY, which, if altered or modified, could have an effect on safe operation. The areas addressed are; passive components, and configuration and physical arrangement.

The feature and/or function being controlled is the actual design or function of the equipment, component, system, or structure. All the design features are being controlled to the existing design drawings, design specifications, and Code of Record. The actual equipment, system, structure, or component itself is not being controlled since the function or feature is passive. The design feature or function is being controlled to ensure that if the equipment, system, structure, or component is modified or replaced that the modification or new equipment has essentially the same feature, form, fit, and function as the original equipment. Typically, the material or construction or the actual physical dimensions of the item are controlled as a design feature.

Design features will have a safety class or safety significant functional classification per current procedures. However, the SC/SS designation will apply only to the feature or function credited in the safety analysis. The actual equipment, systems, structures, or components may be classified as general service or production support rather than the higher level functional classification of the design feature or function.

### 6.1 PASSIVE COMPONENTS

#### 6.1.1 Culverts

The culverts and their lids are constructed from reinforced concrete and provide confinement for high-activity TRU waste. The culverts are constructed of non-combustible (fire-resistant) materials to prevent the spread of external or internal fire.

#### 6.1.2 Standard Waste Boxes

The Standard Waste Boxes are constructed of non-combustible material to prevent the spread of fire, both internal and external.

#### 6.1.3 Drum Venting System

The Drum Venting System cabinet, exhaust filter train housing, and the inlet filter/blast shield provide a passive function that directs hot gases released from a deflagration away from the operators.

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6.0 DESIGN FEATURES (continued)

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6.2 CONFIGURATION AND PHYSICAL ARRANGEMENT

There are no additional configuration and physical arrangement controls associated with operations in SWMF beyond the controls identified in the Administrative Controls.

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## **Appendix A**

### **Bases**

B2/3/4.0 SL, LCS, LCO, and SR APPLICABILITY  
BASES

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B2.0, B3.0, B4.0     The Bases Section is not required, since there were no Safety Limits (SLs), Limiting Control Settings (LCSs), Limiting Conditions for Operation (LCOs) or Surveillance Requirements (SRs) identified.

The TSR derivation methodology, criteria, and conclusions are contained in Chapter 5 of the SWMF SAR.

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