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1S SRS Waste Acceptance Criteria Manual

Procedure 3.06 E-Area TRU Pads Transuranic Waste Acceptance Criteria [1]

Rev. 8
10/01/01

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Date:	10/01/01
1S: SRS Waste Acceptance Criteria Manual Procedure Revision Summary	
1.	Procedure and Revision #:

	WAC 3.06, Rev. 8
2.	Procedure Title: E-Area TRU Pads Transuranic Waste Acceptance Criteria
3.	Effective Date: 10/01/01
4.	Procedure Changes Revisions include the following: 1. Promulgates TRU waste packaging criteria to the waste generator to minimize repackaging by the Solid Waste Division. 2. Delineates the requirements and criteria for vented packaging using TRU waste bags.
5.	Training Requirements: As with any procedure revision, employees affected by the procedure need to familiarize themselves with the changes. Additional training may be required to implement the revised requirements.

Purpose

This procedure describes general information for transuranic (TRU) waste generators for preparing and shipping TRU and mixed TRU waste (MTRU) to Solid Waste Division (SWD). It establishes specific criteria for the acceptance of contact-handled TRU waste (CH-TRU) and mixed TRU waste at the TRU storage pads located at the Solid Waste Management Facility (SWMF) in E Area. It incorporates requirements found in Federal and State laws and regulations, Department of Energy (DOE) Orders, Waste Isolation Pilot Plant Waste Acceptance Criteria (WIPP-WAC), WSRC procedures, and SWD technical safety requirements. This procedure also identifies the documentation required with each TRU waste package to facilitate interim waste storage and to substantiate process (acceptable) knowledge for TRU waste certification to the WIPP-WAC.

Scope

This procedure applies to all transuranic waste presented for acceptance by SWD for interim storage and eventual processing to meet the WIPP-WAC. These criteria provide specific requirements for contact handled TRU waste. Criteria for acceptance of remote handled (RH-TRU) waste packages will be developed by SWD on a case by case basis.

General Information

The radionuclide concentration limit for TRU waste applies to the contents of a waste package at the time of waste certification. The mass of the waste container (including any liner) and shielding shall not be used in calculating the TRU concentration.

In addition to TRU waste acceptance criteria, all generators must comply with prerequisite Waste Minimization program requirements before shipment of TRU or mixed TRU waste to the SWMF.

Any waste known or suspected to be contaminated with TRU radionuclides shall be evaluated as soon as possible in the generating process and determined to be:

- recoverable material
- TRU waste
- other waste

TRU waste shall not be mingled with other wastes.

Before plutonium-bearing material is declared waste, it must be subjected to discard limit analysis in accordance with Material Control and Accountability Manual 14Q, Procedure 2.08 - Discard, Inventory, Adjustments, and Losses. This analysis ensures that no recoverable plutonium residues are stored and disposed of as waste.

TRU waste shall be stored and handled in a manner unlikely to alter its TRU designation. Packaged TRU waste shall be stored in a manner that protects waste against contaminants, physical damage, moisture, or any other effect that would lower the quality of or cause deterioration of the waste or waste packaging. Generators shall take measures to prevent containers from being exposed to conditions that allow for water intrusion.

Defense waste (defined by the Nuclear Waste Policy Act of 1982 as waste generated by programs, including defense nuclear materials production, defense nuclear waste and materials byproduct management, defense research and development) must be kept separate from non-defense waste, if feasible, according to DOE Order 435.1. Generation and disposition of non-defense waste by SRS facilities is outside the scope of this Waste Acceptance Criteria (WAC). Generators of such waste should notify SWD.

Nonconformances shall be addressed as specified in SRS Waste Acceptance Criteria Manual 1S Procedure 1.02 "Waste Acceptance Criteria Program Requirements for Radioactive Waste".

Deviations shall be addressed as specified in SRS Waste Acceptance Criteria Manual 1S Procedure 5.01 "Waste Acceptance Criteria Deviations".

Terms and Definitions

Transuranic (TRU) waste - radioactive waste containing more than 100 nanocuries (3700 becquerels) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for: (1) high-level radioactive waste; (2) waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by the 40 CFR Part 191 disposal regulations; or (3) waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61.

Contact-handled TRU waste - TRU waste with a package surface dose rate (Beta + Gamma + Neutron) not greater than 200 mrem per hour. The container itself provides sufficient protection, and no extra shielding is required. (B3)

Remote-handled TRU waste - TRU waste that requires shielding in addition to that provided by the packaging to protect people nearby from radiation exposure, where the external surface dose rate (Beta + Gamma + Neutron) at the outer surface of the package exceeds 200 mrem per hour but is less than 1,000 rem per hour. (B3)

Plutonium Equivalent Curie (PE-Ci) - An equivalent radiotoxic hazard of a radionuclide normalized to Pu-239. (B3)

Internal layer of confinement - An internal layer of confinement is any boundary that restricts, but does not prohibit, the release of hydrogen gas across the boundary. Examples of internal layers of confinement are plastic bags with closure methods allowed below and metal cans fitted with filter vents. Punctured plastic bags, liner bag open at the end, pieces of plastic sheeting wrapped around the waste for handling, and metal cans with lid closures that allow free hydrogen release are not considered as internal layers of confinement. Bags shall be closed using a twist-and-tape or fold-and-tape method. Internal layers of confinement are of three types: (1) liner bags, (2) inner bags, and (3) filtered bags. (B3 and B17)

See Glossary for other terms and definitions.

Responsibilities

SRS Waste Acceptance Criteria Manual IS Procedure 1.02 "Waste Acceptance Criteria Program Requirements for Radioactive Waste" describes responsibilities for the SRS Waste Acceptance Criteria Program, which includes TRU waste.

Procedure

A decision tree (Attachment D, TSD Facility Selection Decision Tree) is attached that may be used as a tool to identify applicable acceptance requirements for waste types. The waste acceptance criteria are organized in the following categories and subcategorizes:

- A. Waste characteristics
 - 1. General
 - 2. Chemical
 - 3. Physical
 - 4. Radiological
- B. Packaging
 - 1. General
 - 2. Outermost Packaging
 - 3. Internal Layers of Confinement
 - 4. Labels
- C. Documentation

The basis for the criteria in these categories is identified in Attachment C, "Basis Matrix." If any of the criteria cannot be met or a prohibited item is associated with the waste, a deviation may be requested by the generator in accordance with WAC 5.01, "Waste Acceptance Criteria Deviations".

A. Waste Characteristics

1. General

- Contents of containers shall be determined by analyses and/or through a process of "acceptable knowledge." (B1 and B2)
- TRU waste shall be identified by the parameters appearing in Attachment A. (B1 and B2)

2. Chemical

- Waste shall have hazardous constituents only as "co-contaminants" of the waste. (B3)
- Waste shall have hazardous materials only in the Environmental Protection Agency (EPA) hazardous waste codes specified in Attachment B. (Note: waste with some other EPA codes may be accepted for storage with an approved deviation request.). (B3, B4 and B23)
- Waste shall not contain chemicals that will adversely react with other components in the container to result in corrosion, explosion, heat generation, flammable gas generation, non-flammable gas generation, or toxic by product generation. (B3)
- Waste shall be compatible with the packaging. (B3)
- Waste shall contain no non-radionuclide pyrophorics as defined in 29 CFR 1910.1200 (Pyrophorics shall be stabilized or treated to remove their hazardous properties). (B3)
- Waste shall contain less than 1 percent by weight pyrophoric forms of radionuclides for each container. (B3)
- Waste shall not contain ignitables as defined by 40 CFR 261.21. (B3)
- Waste shall not contain corrosives as defined by 40 CFR 261.22. (B3)
- Waste shall not contain reactive wastes as defined by 40 CFR 261.23. (B3)
- Waste shall not contain explosives as defined by 49 CFR 173.50. (B3)
- Waste shall not contain compressed gases as defined by 49 CFR 173.115. (B3)
- Waste shall contain less than 50-ppm polychlorinated biphenyls (PCB's). (B3)
- Waste shall contain less than 2 liters liquid in a 55-gallon drum or less than 8 liters in a SWB or less than 1 inch of liquid in the bottom of any internal container. (B3)

3. Physical

- Waste shall not have classified characteristics. (B5)
- Waste shall not contain unpunctured aerosol cans. (B18)
- Sealed containers greater than 4 liters are prohibited. They shall be vented or punctured with a hole at least 3/8" in diameter. (B18)
- Heat sealed unvented bags are prohibited.

4. Radiological

- TRU waste shall be assayed or otherwise evaluated to determine the kinds and quantities of radionuclides present. (B10)
- The weight of the container, including inner containers, and shielding, shall not be used in calculating the specific activity of the waste. (B12)
- Waste container shall have surface contamination less than 20 dpm/100 cm² for [alpha]-emitters and less than 200 dpm/100 cm² for [beta]/[gamma] emitters. (B3)
- Waste shall contain less than or equal to 195 fissile gram equivalent (FGE) of Pu-239 per 55-gal drum or 325 FGE of Pu-239 per Standard Waste Box (SWB). (B3)
- The limits in the proceeding radiological criteria are not applicable for TRU waste containing beryllium. TRU waste with beryllium shall be accepted only with an approved deviation request. (B6)
- Waste shall contain less than or equal to 80 Pu-equivalent Ci (PE-Ci) per 55gallon drum or 130 PE-Ci per SWB. (B3)
- Heat load for containers shall be less than (a) 59.8 BTU/hr for containers without anion resin, (b) 2.0 BTU/hr for containers with anion resin. (B8 and B9)
- Waste package shall have a maximum contact dose rate ([beta]+[gamma]+[eta]) at no point greater than 200 mrem /hr. Neutron dose shall be reported separately on form OSR 29-90 "Transuranic Waste Container Characterization." (B3 and B7)
- Waste shall have [alpha]-activity from TRU radionuclides greater than 100 nCi/g of waste matrix. The lower concentration limit for transuranic waste (100 nCi/gm of waste) shall apply to the

contents of any single waste package at the time of assay. (B3 and B11)

B. Packaging

1. General

- Waste material with sharp edges or projections shall be taped or additionally protected to ensure package integrity. (B13)
- Bulky or heavy waste items shall be blocked inside the container to prevent shifting during handling. (B6)

2. Outermost Packaging

- Waste shall be packaged in: (1) United States Department of Transportation (DOT) 7A Type A 55 gallon drum or (2) TRUPACT-II Standard Waste Box (SWB). (B3)
- All other packaging requires an approved Container Approval Request (OSR 29-57). The Container Approval Request shall be submitted for approval per Manual 1S, Appendix A-16. (B22)

NOTE: Container Approval Requests shall be provided to the Solid Waste Certification Coordinator (SWCC) and approved by Solid Waste Engineering prior to procurement, fabrication, and/or acceptance of an alternative waste container to a SWD Treatment, Storage, or Disposal Facility (TSDF).

- Packaging shall be in good condition with no visible cracks, holes, bulges, corrosion, or other damage. (B14)
- Packaging shall be closed in accordance with instructions provided per SRS Transportation Safety Manual 19Q by the Packaging Commodity Management Center (PCMC). (B15 and B16)
- All waste packaging shall be vented using a filter to prevent the escape of any radioactive particulate and to eliminate any pressurization. The filter vent shall be approved by SWD. (B1 & B3)
- Filter vents shall have a minimum diffusivity of 1.90E-6 moles per sec per mole fraction at 25 degrees C. (B17)
- Filter vents in drums shall be installed in accordance with instructions provided per SRS Transportation Safety Manual 19Q by the PCMC (B16)
- Standard Waste Boxes shall have at least two filter vents. (B16 and B17)
- Drum gross weight shall be less than 1,000 lbs.(B3)
- Standard Waste Box (SWB) gross weight shall be less than 4,000 lbs. (B3)
- All layers of confinement will be vented or filtered if the heat generation values exceed those listed

3. Internal Layers of Confinement

**Maximum Heat Generation (Btu/Hour)
Layers of Confinement**

Packaging	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>		
55 Gallon Drum			0.1730	0.1604		0.1007	0.07
Standard Waste Box			0.2327	0.2204		0.1215	0.08

- A layer of confinement may be eliminated by puncturing a layer with a hole at least 3/8" inch diameter.

- Drum liners, if used, will be vented or filtered and are considered as an internal layer of confinement.

4. Labels

For waste generator applied labels or markings:

- All characters used in labeling and marking 55-gallon drums or smaller TRU waste packages must be at least 1/2-inch high. (B6)
- All characters used in labeling and marking TRU waste packages larger than 55-gallon drums must be at least 1-inch high. (B6)
- All labeling and marking must be placed on at least two opposite vertical sides of a cylindrical waste package. (B6)
- All labeling and marking must be placed once in the upper two-thirds of each vertical side of a rectangular waste package. (B6)
- Labels or markings shall be:
 - durable, in English, and printed on or affixed to the surface of a package or on a label or tag,
 - displayed on a background of sharply contrasting color,
 - unobscured by labels or attachments,
 - located away from any other marking (such as advertising) that could substantially reduce its effectiveness, and
 - non-fading and non-smearing. (B3 and B19)
- All labels and markings applied shall have a predicted ten-year life in a Level C storage environment and shall be compatible with the waste packaging and its protective coating (Epoxy-polyamide paint or Electromark plastic stickers are examples of ten-year labeling and marking.). (B6)
- The waste package shall be marked with the unique waste package identification recorded on OSR 29-90. This package identification must be painted on the package or a stainless steel tag may be attached to the package. The tag shall be:
 - legibly stamped with characters at least 1/4-inch high, and
 - securely attached to the waste container with a corrosion resistant wire. (B6)
- Each package holding hazardous waste shall be legibly marked with the statement "HAZARDOUS WASTE--Federal law prohibits improper disposal." labeled with EPA Hazardous Waste Numbers and the "material descriptions" of the waste code for all hazardous constituents, and labeled with the letters LDR. (B6 and B20)
- Each package of mixed TRU waste shall be labeled with the date on which waste began accumulating per Manual 3Q. (B24)
- Waste packages that contain beryllium shall be marked "WASTE CONTAINS BERYLLIUM" (B6)
- Each package shall be labeled with Radioactive Material labels per Manual 5Q. (B21)
- Generator shall mark the package with the gross weight and tare weight (tare weight is the weight of the packaging plus the weight of non-waste items such as liners, blocks, and shielding). (B6)

C. Documentation

1. Data Package

- Generator shall complete a OSR 29-90, "Transuranic Waste Container Characterization Form". This data should be submitted to the SWD as a package at least two (2) weeks before planned shipment to allow for review. (B6)
- Generators shall submit a request for deviations using an OSR 29-41 at least two weeks before

planned delivery of the waste to SWD. (B6)

Records

Records generated as a result of implementing this procedure are processed in accordance with Procedure Manual 1B, MRP 3.31, "Records Management."

References

References used in this procedure are presented in the Reference section of this manual.

Forms

OSR 29-41, Request/Approval for Deviation to SRS Waste Acceptance Criteria Manual

OSR 29-57, Container Approval Request

OSR 29-90, Transuranic Waste Container Characterization Form

Requirements Control System

1. DOE Order 435.1, Radioactive Waste Management

Attachments

Attachment A. Waste Material Parameters and Descriptions

Attachment B. EPA Hazardous Waste Codes and Material Descriptions

Attachment C. Basis Matrix

Attachment D. TSD Facility Selection Decision Tree

Attachment A. Waste Material Parameters and Descriptions

Waste Material Parameter	Description
Iron based Metals/Alloys	Iron and steel alloys in the waste; does not include the waste container materials
Aluminum based Metals/Alloys	Aluminum or aluminum-based alloys in the waste materials
Other Metals	All other metals found in the waste materials
Other Inorganic Materials	Nonmetallic inorganic waste, including concrete, glass, firebrick, ceramics, sand, and inorganic sorbents.
Cellulosics	Materials generally derived from high polymer plant carbohydrates (e.g. paper, cardboard, wood, cloth)
Rubber	Natural or man-made elastic latex materials; (e.g. surgeons' gloves, leaded rubber

	materials)
Plastics (waste material)	Man-made materials derived from petroleum feedstock (e.g. polyethylene, polyvinylchloride)
Organic Matrix	Cemented organic resins, solidified organic liquids, and sludges
Inorganic Matrix	Any homogeneous materials consisting of sludge or aqueous-based liquids, which are solidified with cement, calcium silicate, or other solidification agents (e.g. waste water treatment sludge, cemented aqueous liquids, and inorganic particulates)
Soils/Gravel	Naturally occurring soils, contaminated with inorganic waste materials
Adsorbed Liquids	Adsorbent damp with liquid
Filters	Discarded HEPA filters or process filters
Steel (packaging material)	55-gallon drums
Plastic (packaging materials)	90-mil polyethylene drum liner and plastic bags
Void Space	Potentially usable space inside the outermost container, not including unfilled space inside internal containers or packages, such as bags and waste cuts.

Attachment B. EPA Hazardous Waste Codes and Material Descriptions

EPA Hazardous Waste Codes	Material Description
F001	Halogenated solvents used in degreasing--tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, chloro-fluorocarbons
F002	Halogenated solvents--tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane
F003	Non-halogenated solvents--xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, methanol
F004	Non-halogenated solvents--cresols, cresylic acid, nitrobenzene
F005	Non-halogenated solvents--toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, 2-nitropropane
D004	Arsenic
D005	Barium
D006	Cadmium
D007	Chromium
D008	Lead
D009	Mercury
D010	Selenium
D011	Silver
D018	Benzene

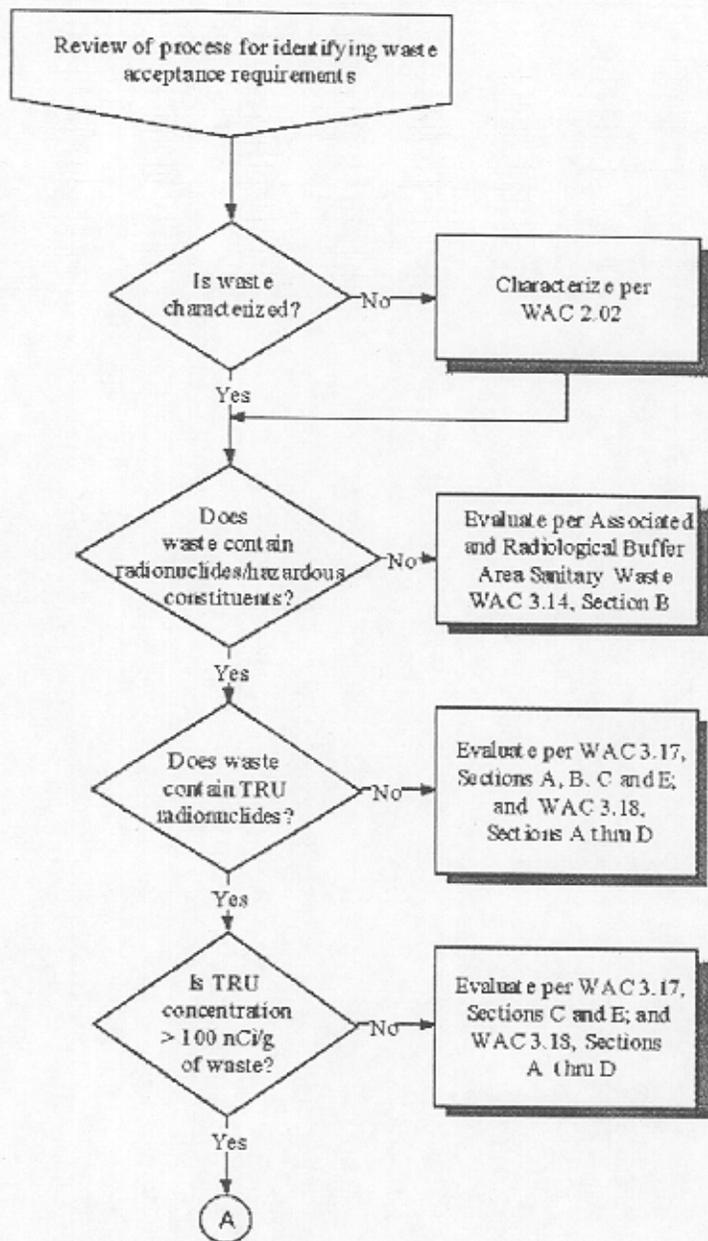
D019	Carbon tetrachloride
D021	Chlorobenzene
D022	Chloroform
D026	Cresol
D027	1,4-dichlorobenzene
D028	1,2-dichloroethane
D029	1,1-dichloroethylene
D030	2,4-dinitrotoluene
D032	Hexachlorobenzene
D034	Hexachloroethane
D035	Methyl ethyl ketone
D036	Nitrobenzene
D037	Pentachlorophenol
D038	Pyridine
D039	Tetrachloroethylene
D040	Trichloroethylene
D043	Vinyl chloride
P015	Beryllium powder

Attachment C. Basis Matrix

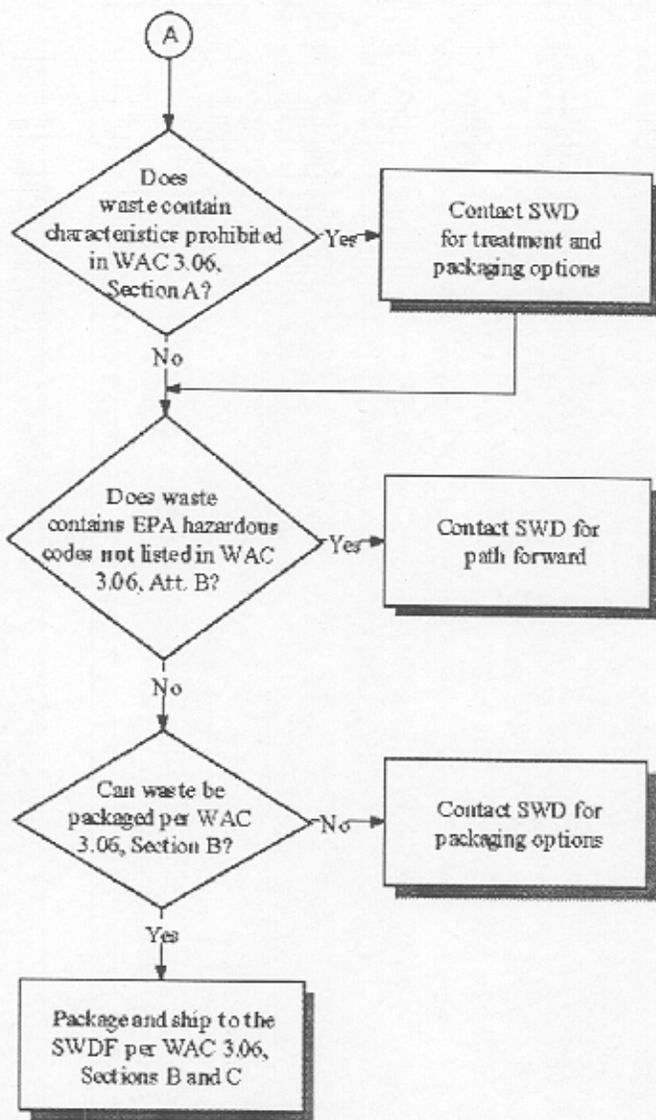
Requirement	Basis
B1	Waste Isolation Pilot Plant Waste Analysis Plan (WIPP-WAP) Attachments B, B1 through B6 of the Hazardous Waste Facility Permit, EPA No. NM4890139088
B2	CAO 94-1012, Carlsbad Area Office Quality Assurance Program Document
B3	WIPP-WAC Rev. 7
B4	DOE Order 435.1-1, Ch. 3, B.(1)
B5	DOE Order 435.1-1, Ch. 3, O.
B6	Good Management Practice
B7	Radiological Control Manual 5Q, Table 2-2
B8	TSR 5.5.2.6.01
B9	TSR 5.5.2.6.03.b, Procedure 643-E-2011
B10	DOE Order 435.1-1, Ch. 3, I.(2)
B11	DOE Order 435.1-1
B12	DOE Order 435.1-1, Ch. 3, A.

B13	Radiological Control Manual 5Q 413-1
B14	Solid Waste SAR (WSRC-SA-22) Section 2.5
B15	DOT 49 CFR 178.2 (c)(1)(ii)
B16	Transportation Safety Manual 19Q
B17	TRUPACT II SARP Docket Number 21-9218
B18	TRUPACT-II Content Codes (TRUCON) DOE/WIPP 89-004, Rev. 12
B19	40 CFR 172.304 -- Marking requirements
B20	South Carolina Hazardous Waste Management Regulations Section R.61-79.265.173. Management of Containers (as amended 6-27-97)
B21	Radiological Control Manual 5Q
B22	SRS Waste Acceptance Criteria Manual 1S
B23	SRS RCRA Part A Permit Application
B24	Environmental Compliance Manual 3Q

Attachment D. TSD Facility Selection Decision Tree (Page 1 of 2)



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