

### **A.5.2 TANK REQUIREMENTS**

The types and sizes of process and storage tanks and vessels needed for facility operations would depend on the salt processing alternative utilized. Summary listings of the tanks required for the Small Tank Precipitation, Ion Exchange, Solvent Extraction, and Direct Disposal in Grout processes are given in Tables A-7, A-8, A-9, and A-10, respectively (WSRC 2000d). The characteristics of these tanks form the basis for development of accident scenarios and consequences projected in Appendix B.

### **A.5.3 TRANSFER FACILITIES**

New transfer facilities would be required to direct the flow of process streams among the various facilities employed in the salt processing alternatives. These include feed lines to the facilities, transfer lines between facilities, and several valve boxes, diversion boxes, and pump pits directing the stream flows (WSRC 1998o, 2000c). Details of the processing-related transport facilities are described in Table A-11. The integration of these new facilities into existing facilities is illustrated in Figures A-18 through A-21 (WSRC 1998e, 1999c).

### **A.5.4 SUPPORT FACILITIES**

Each alternative would require other support facilities including service, office, and substation buildings. The service building would be a single-story, 21,000-23,700-square-foot steel-framed structure with concrete or brick siding. This building would contain electrical and mechanical maintenance shops, control rooms for the process and for the remote crane, a health physics office, conference room, and offices for operations personnel. The structure would also house two 500-kilowatt (kW) diesel generators and associated equipment (WSRC 1998o). The office building would typically be a 22,500-square-foot single-story structure capable of providing personnel emer-

gency shelter protection. It would house offices, a conference area, cafeteria, and restroom facilities for support personnel (e.g., engineering support, facility management, and clerical staff). The support facilities for each technology would include a process simulator building.

An electrical substation building, encompassing 600 square feet, would be needed for each alternative. A chemical storage area would be located on a concrete slab adjacent to the process building and add approximately 30 feet to the length of the process building. The area would be protected from the elements and contain storage tanks for chemicals used in the process. Dikes would be located around the tanks to contain any potential spills and to prevent inadvertent mixing of chemicals.

### **A.5.5 SALTSTONE VAULTS**

As many as 16 saltstone disposal vaults beyond the currently existing two vaults would be constructed in Z Area to support the salt disposal alternatives (Figure A-22). Nominal dimensions of the additional vaults would be 300 feet long by 200 feet wide by 25 feet high. Each vault would consist of six cells, 100 feet long by 100 feet wide, to contain about 6,600 cubic meters of saltstone grout per cell. Interior and exterior walls would be 18 inches thick and the base slab would be 30 inches thick. The roof slab would be 18 inches thick. The interior floor and walls for each cell would be painted with epoxy to inhibit infiltration of moisture during grout curing. Any voids left in the grout in a cell would be filled with nonradioactive grout prior to final vault closure to help ensure structural integrity. All vaults would be equipped with cameras and lights to monitor filling, and thermocouple assemblies to monitor heat generation during the curing process. The six-cell configuration of the vaults would facilitate a pouring rotation that would meet grout-cooling requirements. As with the existing saltstone vaults, the additional vaults would be considered near-surface containment structures and covered with soil after vault closure for additional shielding.

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**Table A-7.** Tanks for Small Tank Precipitation Process.

Tank	Tank size (gallons)	Number of tanks	Radioactive	Stream characteristics	Ventilation flow per tank (cfm)
MST Storage Tank	400	1	No	MST	Natural
Process Water Tank	80,000	1	No	Well water	Natural
NaTPB Storage Tank	20,000	1	No	NaTPB solution	100
Copper Nitrate Feed Tank	500	1	No	15 wt% Copper Nitrate	Natural
Formic Acid Feed Tank	500	1	No	90 wt% Formic Acid	Natural
Fresh Waste Day Tank	25,000	1	Yes	Feed	100
Precipitation Tank	15,000	2	Yes	Feed/PPT	10
Concentrate Tank	10,000	1	Yes	PPT	10
Filtrate Hold Tanks	100,000	2	Yes	DSS	10
Wash Tank	10,000	1	Yes	PPT	10
Recycle Wash Hold Tank	10,000	1	Yes	Feed/DSS <sup>a</sup>	10
Precipitate Reactor Feed Tank	10,000	1	Yes	PPT	10
Precipitate Reactor	10,000	1	Yes	PPT/PHA	10
Precipitate Reactor Condenser	610	1	Yes	PHA	(b)
Precipitate Reactor Decanter	610	1	Yes	PHA	(b)
Precipitate Reactor Overheads Tank	7,500	1	Yes	Dilute PHA <sup>c</sup>	10
Precipitate Hydrolysis Aqueous Surge Tank	40,000	1	Yes	PHA	10
Organic Evaporator	1,750	1	Yes	Benzene <sup>d</sup>	10
Organic Evaporator Condenser	610	1	Yes	Benzene <sup>d</sup>	(b)
Organic Evaporator Decanter	610	1	Yes	Benzene <sup>d</sup>	(b)
Organic Evaporator Condensate Tank	1,000	1	Yes	Benzene <sup>d</sup>	(b)
Salt Cell Vent Condenser	310	1	Yes	Benzene <sup>d</sup>	(b)
Organic Waste Storage Tank	40,000	1	Yes	Benzene <sup>d</sup>	10
Cleaning Solution Dump Tanks	1,000	2	Yes	0.01 × PPT <sup>e</sup>	10

DSS = Decontaminated Salt Solution, cfm = cubic feet per minute, PPT = Precipitate slurry, PHA = Precipitate Hydrolysis Aqueous, NaTPB = sodium tetraphenylborate.

- Recycled wash water will hold a diluted DSS but with higher cesium concentration. This stream is conservatively chosen to be feed for radionuclide emissions and DSS for chemical emissions.
- Condensers and decanters do not have independent ventilation. The vapor stream that enters each of these devices includes the nitrogen purge of each of the originating vessels.
- The final processing step in the precipitate reactor concentrates PHA by evaporation. This is the only time the precipitate reactor overheads tank receives any waste. The condensed overheads consists of water and entrained PHA. The amount of entrainment is assumed the same as any other boiling interface,  $DF=4.4 \times 10^6$ .
- Benzene includes minor quantities of other, heavier organic compounds including biphenyl. The radionuclide concentration in the solution is less than dilute PHA and make an insignificant contribution to radionuclide emissions.
- Cleaning solution is used to clean the cross flow filters and may be contaminated with some dilute mixture of PPT slurry. This stream is conservatively chosen to be 0.01 times the concentrations for PPT slurry.

**Table A-8.** Tanks for Ion Exchange Process.

Tank	Tank size (gallons)	Number of tanks	Radioactive	Stream characteristics	Ventilation Flow per tank (cfm)
Process Water Tank	20,000	1	No	Well Water	Natural
MST Storage Tank	400	1	No	MST	Natural
Caustic Feed Tank	5,000	1	No	1 M NaOH	100
Resin Make-up Tank/Column Preparation Tank	2,000/ 3,000	1	No	CST	100
Oxalic Acid Feed Tank	200	1	No	2% H <sub>2</sub> C <sub>2</sub> O <sub>4</sub>	100
Caustic Feed Tank	500	1	No	1 M NaOH	100
Loaded Resin Hold Tank	15,000	2	Yes	CST	100
Ba-137 Decay Tanks/ Product Holdup Tank	2,000/ 5,000	2	Yes	DSS	100
DSS Hold Tanks	100,000	2	Yes	DSS	100
Resin Hold Tank	10,000	1	Yes	CST Slurry	Existing tank in DWPF <sup>a</sup>
Alpha Sorption Tank	100,000	1	Yes	Feed	100
Recycle Blend Tank	100,000	1	Yes	CSS	100
Sludge Solids Receipt Tank	10,000	1	Yes	Feed/MST Slurry	100
Cleaning Solution Dump Tank	1,000	1	Yes	0.01 × MST Slurry <sup>b</sup>	100
Wash Water Hold Tank	25,000	1	Yes	0.25 × CSS <sup>c</sup>	100
CST Ion Exchange Column	3,000	2	Yes	CST Slurry,	10
	3,000	2	Yes	DSS <sup>d</sup>	10

CSS = Clarified Salt Solution; DSS = Decontaminated Salt Solution; MST = Monosodium Titanate; CST = Crystalline Silicotitanate ion exchange resin, cfm = cubic feet per minute.

- This change at DWPF is not expected to impact DWPF stack emissions.
- Cleaning solution is used to clean the cross flow filters may be contaminated with some dilute mixture of MST slurry. This stream is conservatively chosen to be 0.01 time the concentrations for MST slurry.
- The wash water hold tank will hold wash water from the sludge solids receipt tank. The solution washed from the sludge is CSS, which is diluted by the washed water. The dilution is conservatively chosen to be 0.25.
- Two columns are assumed loaded at any one time and the other two are assumed to contain only DSS-resin slurry.

TC For the Direct Disposal in Grout alternative, in which the grout would contain a large amount of radioactive cesium, special equipment would be used to control contamination during vault filling operations. A 500-cubic-foot-per-minute air flow ventilation system would be equipped with a pre-filter, high-efficiency particulate air (HEPA) filter and fan, and connected ductwork. Radiation monitors and dampers would be included (WSRC 1998e,o).

**A.5.6 PILOT PLANT**

To achieve pilot scale testing a salt processing process, a pilot plant would be

needed, as specified in Chapter 2 (Section 2.7.6). DOE intends to only construct and operate a Pilot Plant for the selected alternative. However, in the event that DOE decides to demonstrate more than one technology, the Pilot Plant units would be developed and operated in series. Therefore, impacts associated with more than one Pilot Plant would not occur at the same time, but would extend over a longer period. The pilot plant would provide scaled process data, utilizing equipment ranging from 1/100 to 1/10 the size of the full-scale facility (WSRC 2000e). Process streams would consist of real radioactive waste from various HLW tanks to

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M4-10  
M4-11

**Table A-9.** Tanks for Solvent Extraction Process.

Tank	Tank size (gallons)	Number of tanks	Radioactive	Stream characteristics	Ventilation flow per tank (cfm)
Process Water Tank	20,000	1	No	Well water	Natural
MST Storage Tank	400	1	No	MST	Natural
Caustic Feed Tank	5,000	1	No	1 M NaOH	10
Oxalic Acid Feed Tank	200	1	No	2% H <sub>2</sub> C <sub>2</sub> O <sub>4</sub>	10
Caustic Feed Tank	500	1	No	1 M NaOH	10
Caustic Dilution Feed Tank	15,000	1	No	2.0 M caustic	10
Caustic Storage Tank	5,000	1	No	50% caustic	10
Filter Cleaning Caustic Tank	500	1	No	1 M NaOH	10
Caustic Makeup Tank	1,000	1	No	0.5 M NaOH	10
Solvent Wash Solution Makeup Tank	1,000	1	No	0.5 M NaOH	10
Nitrate Acid Feed Tank	1,000	1	No	50% HNO <sub>3</sub>	10
Nitrate Acid Charge Tank	1	1	No	50% HNO <sub>3</sub>	Natural
Strip Feed Tank	4,000	1	No	0.005 M HNO <sub>3</sub>	
Chem Additive Tank	100	1	No	Process water	10
Isopar Makeup Tank	2,000	1	No	Isopar <sup>®</sup> L	10
Isopar Hold Tank	5,000	1	No	Isopar <sup>®</sup> L	10
Isopar Feed Tank	500	1	No	Isopar <sup>®</sup> L	10
Modifier Makeup Tank	500	1	No	1.0 M Cs7SBT in Isopar <sup>®</sup> L	10
Extractant Makeup Tank	50	1	No	0.2 M BobCalix in Isopar <sup>®</sup> L	10
Trioctylamine Tank	5	1	No	Trioctylamine	10
Solvent Makeup Tank	1,000	1	No	0.01 BobCalix, 0.5 M Cs7SBT, and 0.001 M TOA in Isopar <sup>®</sup> L	10
Alpha Sorption Tank	125,000	1	Yes	Feed	100
Salt Solution Feed Tank	125,000	1	Yes	Clarified salt solution	100
Strip Stages (15)	114	1	Yes	Organic phase	None
Strip Effluent Stilling Tank	500	1	Yes	Strip solution	100
Strip Make-up Tank	25,000	1	Yes	Strip solution	100
Strip Organic Removal Stages (2)	15	1	Yes	Strip solution	100
Wash Water Hold Tank	25,000	1	Yes	~2M Na salt solution, 1/4 dilution of CSS	100
Ba-137 Decay Tanks	2,500	2	Yes	DSS	100
Caustic Solvent Wash Tank	1,000	1	Yes	DSS	100
Solvent Hold Tank	1,000	1	Yes	Organic phase	100

**Table A-9.** (Continued).

Tank	Tank size (gallons)	Number of tanks	Radioactive	Stream characteristics	Ventilation flow per tank (cfm)
Solvent Wash Tank	1,000	1	Yes	Organic phase	100
Kerosene Still	1,000	1	Yes	Organic phase	None
Kerosene Condensate Tank	1,000	1	Yes	Organic phase	None
Re-alkaline Stages (2)	15	1	Yes	Organic phase	None
Solvent Acid Wash Stages (2)	15	1	Yes	Organic phase	None
Scrub Stages (2)	15	1	Yes	Organic phase	None
Raffinate Organic Removal Stages (2)	15	1	Yes	DSS	None
Extraction Stages (15)	114	1	Yes	Clarified salt solution	None
DWPF Salt Feed Tank	100,000	1	Yes	Strip solution	100
Aqueous Raffinate Stilling Tank	500	1	Yes	DSS	100
DSS Hold Tanks	100,000	2	Yes	DSS	100
Sludge Solids Receipt Tank	10,000	1	Yes	Feed/MST slurry	100
Cleaning Solution Dump Tank	1,000	1	Yes	0.01 × MST slurry <sup>a</sup>	100

CSS = Clarified Salt Solution; DSS = Decontaminated Salt Solution; MST = Monosodium Titanate.

a. Cleaning solution is used to clean the cross flow filters and may be contaminated with some dilute mixture of MST slurry. This stream is conservatively chosen to be 0.01 times the concentrations for MST slurry.

**Table A-10.** Tanks for Direct Disposal in Grout Process.

Tank	Tank Size (gallons)	Number of Tanks	Radioactive	Stream Characteristics	Ventilation Flow (cfm)
MST Storage Tank (non-rad)	400	1	No	MST	natural
Process Water Tank (non-rad)	5,000	1	No	Well Water	natural
Oxalic Acid Feed Tank (non-rad)	200	1	No	2% H <sub>2</sub> C <sub>2</sub> O <sub>4</sub>	natural
Caustic Feed Tank (non-rad)	500	1	No	1M NaOH	100
Caustic Storage Tank (non-rad)	500	1	No	50% NaOH	natural
Alpha Sorption Tank	100,000	1	Yes	Feed	100
Sludge Solids Receipt Tank	10,000	1	Yes	MST Slurry	100
Cleaning Solution Dump Tank	1,000	1	Yes	(a)	100
Salt Solution Hold Tank	100,000	1	Yes	CSS	100
Flush Water Receipt Tank	10,000	1	Yes	CSS <sup>b</sup>	100
Saltstone Hold Tank	500	1	Yes	CSS with gout	100

CSS = Clarified Salt Solution; MST = Monosodium Titanate; cfm = cubic feet per minute.

a. Cleaning solution used to clear cross flow filters may be contaminated with MST slurry. Stream chosen to be 0.01 times concentration for MST slurry.

b. Flush water receipt tank holds water used to flush process lines at the mixer and saltstone hold tank, thus, will contain a diluted form of CSS. This stream is conservatively chosen to be 0.01 times the concentrations for CSS.

**Table A-11.** New transfer facilities.

Facility	Small Tank Tetraphenylborate Precipitation	Crystalline Silicotitanate Ion Exchange	Caustic Side Solvent Extraction	Direct Disposal in Grout
	Processing facility at Site B <sup>a</sup>	Processing facility at Site B <sup>a</sup>	Processing facility at Site B <sup>a</sup>	Processing facility in Z Area <sup>a</sup>
Interarea feed line from H-Area Tank Farm to new processing facility	Extension of interarea feed line from the H-Area Tank Farm to the processing facility, consisting of a 150-foot-long double-walled pipe <sup>b</sup> , installed 6 feet underground	Same as Small Tank Tetraphenylborate Precipitation Alternative	Same as Small Tank Tetraphenylborate Precipitation Alternative	A feed line from the interarea feed line to the processing facility, consisting of a double-walled pipe <sup>b</sup> , approximately 500 feet long, installed 6 feet underground
Saltstone feed line	A pipe line from the processing facility to the feed line from H-Area Tank Farm to Saltstone Manufacturing and Disposal Facility, connecting at a valve box. Line is a double-walled pipe <sup>b</sup> , approximately 150 feet long, installed 6 feet underground	Same as Small Tank Tetraphenylborate Precipitation Alternative	Same as Small Tank Tetraphenylborate Precipitation Alternative	NA
Vault feed line	A feed line from the Saltstone Manufacturing and Disposal Facility to the vaults consisting of a galvanized carbon steel pipe, 300 feet long, laid in a concrete trench 5 feet deep, 3 feet wide, with 1.5-foot-thick sides and top	Same as Small Tank Tetraphenylborate Precipitation Alternative	Same as Small Tank Tetraphenylborate Precipitation Alternative	A feed line identical in specifications to the Small Tank Tetraphenylborate Precipitation vault feed line that would run from the new grout processing facility to the saltstone vaults
ETF Bottoms Holding Tank	A 50,000-gallon ETF Bottoms Holding Tank constructed between ETF and the Saltstone Manufacturing and Disposal Facility	Same as Small Tank Tetraphenylborate Precipitation Alternative	Same as Small Tank Tetraphenylborate Precipitation Alternative	A 50,000-gallon Bottoms Holding Tank constructed between ETF and the H-Area Tank Farm
Precipitate Hydrolysis Aqueous transfer line	A pipe line from the processing facility to the existing Low Point Pump Pit, connecting with existing feed line to DWPF. Line is a double-walled pipe 2,300 feet long, buried 6 feet below grade	NA	NA	NA

**Table A-11.** (Continued).

Facility	Small Tank Tetraphenylborate Precipitation	Crystalline Silicotitanate Ion Exchange	Caustic Side Solvent Extraction	Direct Disposal in Grout
Valve box	A valve box constructed between the processing facility and the Saltstone Manufacturing and Disposal Facility, providing tie-in for feed lines from processing facility and ETF	Same as Small Tank Tetraphenylborate Precipitation Alternative	Same as Small Tank Tetraphenylborate Precipitation Alternative	NA
Feed line from ETF to valve box	A feed line from the ETF Bottoms Holding Tank to the new valve box, consisting of a double-walled pipe <sup>b</sup> , approximately 1 mile long, installed 6 feet underground	Same as Small Tank Tetraphenylborate Precipitation Alternative	Same as Small Tank Tetraphenylborate Precipitation Alternative	NA
Low Point Pump Pit	NA	A new Low Point Pump Pit to transfer resin between the processing facility and DWPF	A new Low Point Pump Pit between the processing facility and DWPF to transfer monosodium titanate/sludge slurry	NA
Resin transfer line	NA	A feed line from the processing facility through the new Low Point Pump Pit to the DWPF, consisting of a double-walled pipe <sup>b</sup> , 2,300 feet long, installed 6 feet underground	NA	NA
Monosodium Titanate/Sludge Slurry transfer line	NA	A pipe line from the processing facility to the existing Low Point Pump Pit, connecting with existing feed line to DWPF. Line is a double-walled pipe 2,300 feet long, buried 6 feet below grade	A pipeline from the processing facility through the new Low Point Pump Pit to the DWPF Line is a double-walled pipe, 2,300 feet long, buried 6 feet below grade	NA

**Table A-11.** (Continued).

Facility	Small Tank Tetraphenylborate Precipitation	Crystalline Silicotitanate Ion Exchange	Caustic Side Solvent Extraction	Direct Disposal in Grout
Monosodium Titanate/Sludge Receipt Tank in DWPF	NA	A 15,000-gallon tank installed in the DWPF	Same as Crystalline Silicotitanate Ion Exchange	Same as Crystalline Silicotitanate Ion Exchange
Resin Hold tank in DWPF	NA	A 10,000-gallon tank installed in the DWPF	NA	NA
Cesium Strip Effluent transfer line	NA	NA	A pipe line from the processing facility to the existing Low Point Pump Pit connecting with the existing feed line to the DWPF	NA
Cesium Strip Effluent Hold Tank in DWPF	NA	NA	A 10,000-gallon tank installed in the DWPF	NA
Low Point Drain Tank facility	NA	NA	NA	A Low Point Drain Tank Facility to serve transfer lines between the H-Area Tank Farm and the processing facility and between the processing facility and DWPF. It would be used to transfer salt solution to the grout facility and monosodium titanate/sludge slurry to DWPF
Monosodium Titanate/Slurry feed line to DWPF	NA	NA	NA	A feed line from the processing facility through the Low Point Drain Tank Facility to DWPF, consisting of a doubled-walled pipe 1 mile long, installed 6 feet underground

a. See text for description of the proposed facilities.

b. All double-walled transfer lines, comprised of 3-in.-diameter, schedule 40 (or 80), Type 304L stainless steel inner pipe and 6-in.-diameter, schedule 40, carbon steel outer pipe.

NA = not applicable.











demonstrate required decontamination factors (DF), as follows:

- Cs-137 DF 40,000
- Sr-90 DF 100 or greater
- Pu-238 DF 10 or greater

Capability for appropriate waste disposal would be required in the pilot plant.

Installation of pilot plant process equipment in the existing Late Wash Facility provided for ITP is projected. The Late Wash Facility has three highly shielded cells designed to contain up to 5,000 gallons of concentrated precipitate slurry, into which salt processing equipment mounted in frames could be installed. If additional shielded space was required, the filter cell previously provided to support ITP operations would be considered.

Test runs designed to demonstrate the process flowsheet for the selected salt processing alternative would be conducted in the pilot plant. Functional process flows would parallel those for the full-scale facility. Major equipment would be tested to confirm vessel sizing and design constraints, and process parameters would be evaluated to ensure satisfactory resolution of problems encountered during process development.

Process demonstrations would be designed to meet the following objectives:

Small Tank Precipitation – Validity of design parameters, as determined by kinetics of cesium precipitation by tetraphenylborate, and strontium and actinide sorption on monosodium titanate; feed stream mixing rates; and excess tetraphenylborate recovery. Resolve processing uncertainties related to the activation of tetraphenylborate decomposition catalysts at operating temperatures, and foam formation.

Major equipment would include:

- Process Feed Tank

- Precipitation Tanks (Continuous Stirred Tank Reactors 1 and 2)
- Concentrate Tanks
- Concentrate Filter and Cleaning System
- Filtrate Hold Tank
- Wash Tank
- Wash Filter and Cleaning System
- Precipitate Surge Tank
- Recycle Wash Hold Tank
- Cold Feeds and Facilities
- Laboratory Facilities

Ion Exchange – Resolve key issues, including the kinetics of strontium and actinide sorption onto monosodium titanate; filtration of monosodium titanate solids; the kinetics of cesium removal on crystalline silicotitanate as function of temperature and waste composition; and design parameters for the ion-exchange columns. Resolve processing uncertainties relating to hydrogen generation in the ion-exchange columns at high cesium loadings; desorption of cesium from the crystalline silicotitanate ion exchange resin; resin stability; and extraneous solids formation.

Major equipment would include:

- Alpha Sorption Tank
- Alpha/Sludge Filter and Cleaning System
- Sludge Solids Receipt Tank
- Recycle Blend Tank
- Crystalline Silicotitanate Columns in series (1 ft diam × 16 ft length)
- Loaded Resin Hold Tank
- Decontaminated Salt Solution Hold Tank
- Cold Feeds and Facilities
- Laboratory Facilities

Solvent Extraction – Demonstrate or confirm the kinetics of strontium and actinide sorption onto monosodium titanate with removal by filtration; cesium separation and concentration in centrifugal contactor operation with minimal long-term chemical and radiolytic degradation of solvent; solvent cleanup and recycle capabilities, in-

cluding self purification by back extraction to aqueous phase; and final separation of organics from aqueous raffinate and strip effluent product streams.

Major equipment would include:

- Alpha Sorption Tank
- Alpha/Sludge Filter and Cleaning System
- Sludge Solids Receipt Tank
- Salt Solution Feed Tank
- Solvent Extraction Contactors in Series
- Solvent Hold Tank and Cleaning System
- Raffinate Stilling Tank
- Strip Effluent Stilling Tank
- Decontaminated Salt Solution Hold Tank

Direct Disposal in Grout – A requirement for the demonstration of the Direct Disposal in Grout alternative has not been confirmed. Because this technology is better developed than the other alternatives and has been thoroughly demonstrated by the existing Saltstone Manufacturing and Disposal Facility, it is not anticipated that any further demonstration of this technology would be necessary.

#### **A.5.7 DECONTAMINATION AND DECOMMISSIONING**

Any new facility would be designed and constructed to limit the generation and dispersion of radioactive and hazardous materials and to facilitate its ultimate decontami-

nation and decommissioning or reuse. Areas of the facility that might become contaminated with radioactive or other hazardous materials under normal or off-normal operating conditions would incorporate design features to simplify their decontamination. Items such as service piping, conduits, and ductwork would be minimized in these areas and arranged to facilitate decontamination. Facility design would include a dedicated area for decontamination of tools and some equipment. Design features that would be incorporated into any of the facilities are described below.

- Modular confinement would be used for radioactive and hazardous materials to preclude contamination of fixed portions of the structure.
- Long runs of buried piping that would carry radioactive or hazardous materials would be minimized to the extent possible, and provisions would be included in the design to allow the inspection of the integrity of joints in buried pipelines. The facility would be designed to facilitate dismantlement, removal, and packaging of contaminated equipment.
- Modular shielding would be used in interior areas to permit modification to larger shielded areas for future use.
- Lifting lugs would be used on equipment to facilitate remote removal from the contaminated process cells.
- The piping systems that would carry hazardous products would be fully drainable.

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