ATTACHMENT 10
TOCDF CLOSURE PLAN

TOCDF CLOSURE PLAN

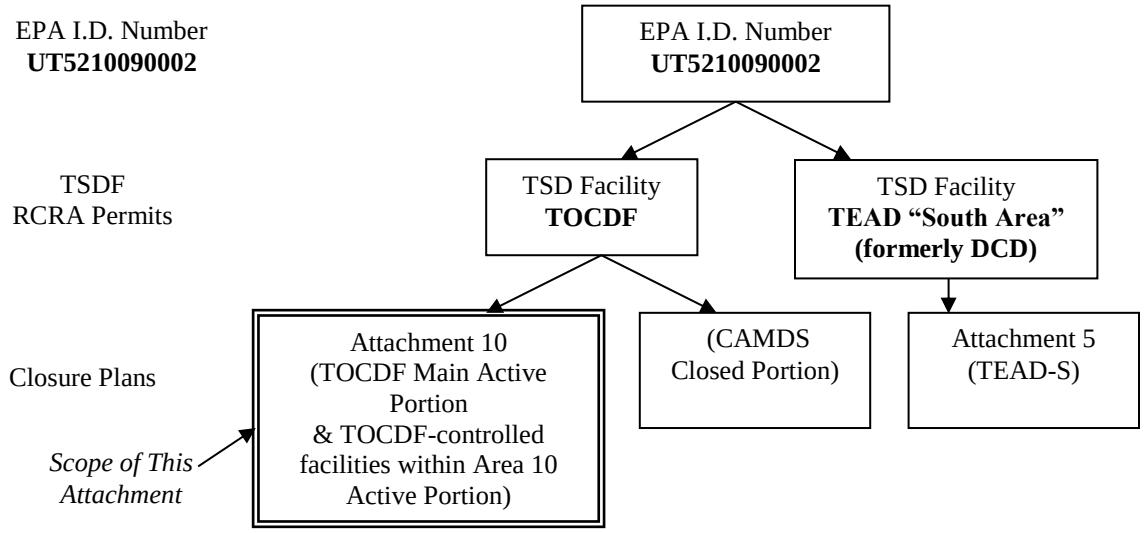
10.1 CLOSURE PLAN OVERVIEW

This plan has been prepared for the closure of the two remaining active portions of the Tooele Chemical Agent Disposal Facility (TOCDF) (i.e., main TOCDF active portion and TEAD-S Area 10 active portion) in accordance with Title 40 of the Code of Federal Regulations, Part 264 and Utah Administrative Code (UAC) R315-8-7.

Owned by the U.S. Army Chemical Materials Activity (CMA), TOCDF is a hazardous waste treatment and storage facility co-operated by the CMA and EG&G Defense Materials, Inc., (a division of URS). In addition to being co-operators, CMA and EG&G are co-permittees of TOCDF.

Although located entirely within the boundaries of the south area of the Tooele Army Depot (TEAD-S), the TOCDF facility operates as an autonomous permitted facility under the authority of its own RCRA Permit. The TEAD-S operates under a separate RCRA Permit even though the TEAD-S and the TOCDF facilities share the same EPA I.D. Number of UT5210090002. Consequently, this closure plan only addresses operations directly associated with the TOCDF main active portion and the TEAD-S Area 10 active portion operated in accordance with this RCRA Permit. In order to complete closure of the entire UT5210090002 installation, TEAD-S closure operations will be addressed within a TEAD-S Closure Plan entirely separate from this TOCDF Closure Plan.

This plan describes general closure requirements for the TOCDF Facility, which includes multiple individual hazardous waste management units (HWMUs) included in this permit (i.e., main TOCDF and Area 10), but does NOT include CAMDS which has heretofore been RCRA-closed.



This closure plan was prepared for all TOCDF-controlled facilities (except the CAMDS closed portion) and will result in conditions protective of human health and the environment during and after closure. The ultimate goal of this plan is to present the processes that will enable the TOCDF Facility main active portion and Area 10 active portion to be closed in a manner that minimizes the need for further maintenance, and minimizes, controls, or eliminates post closure escape of hazardous wastes or their

constituents into the environment.

10.1.1 Closure Status

Since the beginning of chemical agent permitted-treatment operations in 1996, various permitted HWMUs have been removed and RCRA-closed as 1) certain "treatment campaigns" were completed and the equipment became obsolete, or 2) the equipment was no longer useful for its originally-intended purpose.

HWMUs that have heretofore attained and been granted formal "closure" status no longer appear in the RCRA Permit as permitted-HWMUs (e.g., Subpart X Rocket Shear Machine, the Subpart O Dunnage Incinerator, etc.). However, obsolete HWMUs that have NOT been granted formal closure status AND that still appear in the Permit will, for the purposes of this closure plan, be considered active HWMUs regardless of whether they are still in-place or if they have been partially or fully disassembled. Hence, all currently-operating or previously-operated permitted HWMUs are considered "active". Only those previously-operated HWMUs that have been granted formal closure-status by the Utah Department of Environmental Quality (DEQ) Division of Solid and Hazardous Waste (DSHW) will be considered "RCRA-closed".

10.1.2 Closure Plan Document Structure

Contents of the remainder of Attachment 10, TOCDF Closure Plan, include:

10.2: *Closure Performance Standard* provides the performance standards for the closure of hazardous waste management units. This section also provides details for the determination of whether closure performance standards have been met for closed RCRA permitted units.

10.3: *Maximum Waste Inventory* lists the maximum inventory of waste stored at any time at the facility.

10.4: *Facility Closure Methodology* describes the overall approach for closure including the overall closure sequence, a description of the decontamination methods to be utilized, and the overall schedule to complete closure activities.

10.5: *Closure Waste Management* describes the methods which will be utilized for managing the hazardous wastes generated during closure.

10.6: *Ground Water Monitoring and Run-on and Run-off Control* describes the run-on and run-off control that will be employed during closure.

10.7: *Closure Plan Cost Estimate* documents that financial assurance is not applicable to TOCDF.

10.8: *Post Closure* describes the requirements for post-closure care of the facility.

10.9: *Certification of Closure* states that closure will be certified according to the approved Closure Plan by an independent, qualified, registered professional engineer.

10.10: *Corrective Action for Solid Waste Management Units* describes the activities that may need to be taken to comply with 40 CFR 264.101.

10.1.3 Key Definitions

The following terms are used frequently throughout this closure plan. 40 CFR 260.10 is incorporated by Utah Administrative Code (UAC) R315-1-1(b) and 40 CFR 268.2 is incorporated by UAC R315-13-1.

10.1.3.1 *Active Portion* means that portion of a facility where treatment, storage or disposal operations are being or have been conducted…and which is not a closed portion. (§260.10).

10.1.3.2 *Ancillary Equipment* means any device…that is used to distribute, meter, or control the flow of hazardous waste from its point of generation to a storage or treatment tank(s), between hazardous waste storage and treatment tanks to a point of disposal onsite, or to a point of shipment for disposal off-site. (§260.10) For the purposes of this closure plan, secondary containment systems and Subpart CC air emissions control devices/closed-vent systems are included within this definition regardless of the fact that they do not directly contact the hazardous waste being managed by the HWMU.

10.1.3.3 *Clean Closure* means achieving the general and technical closure performance standards by removing hazardous waste from the facility or HWMU and then decontaminating (i.e., contaminants from permitted-operations) the facility or HWMU such that no post-closure care is required. The TOCDF facility, including all of its HWMUs will be RCRA "clean-closed" to residential standards in accordance with this plan (i.e. risk-based residential closure).

10.1.3.4 *Closed Portion* means that portion of a facility which has closed in accordance with the approved facility closure plan or a specific partial closure plan and all applicable closure requirements. (§260.10)

10.1.3.5 *Debris* means solid material exceeding a 60 mm particle size that is intended for disposal and that is
1) a manufactured object, or
2) plant or animal matter, or
3) a natural geologic material (§268.2)

10.1.3.6 *Decontamination* means the act of removing some or all hazardous waste residues or contaminants "contained-in" equipment, buildings or structures by use of one or more of the following technologies: physical extraction, chemical extraction, thermal extraction, biological destruction, thermal destruction, chemical destruction.

10.1.3.7 *Facility* means all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing or disposing of hazardous waste. The TOCDF "facility" includes multiple treatment and storage operational units (i.e., HWMUs), some of which are detached (i.e., Area 10 igloos). (§260.10). "*Approved hazardous waste management facility"* or "*approved facility"* means a hazardous waste TSDF which has received an EPA permit in accordance with federal requirements, has been approved under Section 19-6-108 of the Utah Code and R315-3, or has been permitted or approved under any other EPA authorized hazardous waste state program. [R315-1-1(f)(1)]

10.1.3.8 *Final Closure* means the closure of *all* HWMUs at the facility in accordance with all

applicable closure requirements so that hazardous waste management activities under parts 40 CFR 264 and 265 are no longer conducted, unless subject to the [90-day accumulation] provisions of §262.34. (§260.10)

10.1.3.9 *Generator* means any person, by site, whose act or process produces hazardous waste…or whose act first causes a hazardous waste to become *subject to regulation*. (§260.10). Since manufactured equipment, buildings and structures are "manufactured" and not technically "produced", their point-of-generation as "hazardous debris" is vaguer than for hazardous waste. For the purposes of this closure plan, equipment, buildings and structures undergoing closure will be generally defined as "first becoming subject to hazardous waste generator regulation" as newly generated waste at that point in time that demolition of that part of the building commences. Intact portions of the building or structure undergoing closure will not be considered newly-generated waste. Equipment that is removed during pre-demolition activities will be subject to hazardous waste generator requirements of 40 CFR 262.32 when the equipment is removed from the building that it was contained in. Once "generated", the "hazardous debris" becomes subject to all the pre-transport requirements (e.g., packaging, labeling, marking, placarding, accumulation time, etc.) of 40 CFR 262. The basis of characterizing the newly-generated F999 hazardous debris will generally be 40 CFR 262.11(c)(2) (i.e., "generator knowledge" gained from activities conducted pursuant to this closure plan).

10.1.3.10 *Hazardous Debris* means debris that
1) contains a hazardous waste listed in subpart D of part 261 [including UAC R315-2-10 (F999) and R315-2-11 (P999)], or
2) that exhibits a [characteristic of ignitibility, corrosivity, reactivity or toxicity] (§268.2)

10.1.3.11 *Partial Closure* means the closure of a [single] HWMU in accordance with the applicable closure requirements of 40 CFR 264 and 265 or an approved partial closure plan at a facility that contains other active HWMUs. (§260.10)

10.1.3.12 *Treatment* means any method, technique, or process designed to change the chemical or biological character or composition of any hazardous waste so as to
1) neutralize such waste, or
2) recover energy or material resources from the waste, or
3) to render such waste
   a) non-hazardous, or
   b) less hazardous, or
   c) safer to transport, or
   d) safer to store, or
   e) safer to dispose of, or
   f) amenable for recovery, or
   g) amenable for storage, or
   h) reduced in volume. (§260.10).

10.1.4 Supporting Documents

In addition to the content provided herein, the following separate documents will be generated and will support closure operations at TOCDF:

- Closure Verification Sampling and Analysis Plan (CVSAP). This document provides the required number, type, and location of samples to be collected in support of post-demolition closure verification; the methods and procedures for sample collection; and the analyses to be performed on the

collected samples. Within this document is a Quality Assurance Project Plan (QAPP) that details the quality assurance requirements for the sampling activities and analytical procedures outlined in the CVSAP. The CVSAP has been submitted to the Division of Solid and Hazardous Waste and has been approved. The approved version is EG-122 "Closure Verification Sampling and Analysis Plan, Revision 1, Change 0 dated July 22, 2013. In lieu of sampling after demolition and slab removal, soil samples may be collected "through-slab" prior to demolition (e.g., collecting soil samples by boring through a concrete slab prior to slab removal). In each case, the soil sample will be collected and managed appropriately to ensure its validity.

- Spill Site Cleanup Plans. Cleanup Plans and the resulting Cleanup Reports are required for each of the TOCDF Related Spill Sites identified in Module VII, Table VII.1. Post-cleanup sampling requirements for these spill sites will be addressed in the RCRA Permit, Module VII – Corrective Action for Spill Sites from Permittee or Subcontractor Activities: Spill Resolution, various sampling and analytical plans (as needed), and in written reports submitted to the Director of the Division of Solid and Hazardous Waste.

10.1.5 Comprehensive List of TOCDF and TOCDF-Operated Facility HWMUs

Table 10-1 lists all HWMUs that are subject to this closure plan.

Table 10-1
TOCDF and TOCDF-Operated Facility HWMUs

40 CFR 264…	HWMU Unique Identification	Ancillary Equipment Definition	Location of Primary Element (MDB unless noted)	Vent. Cat. of Primary Element
Subpart I Container Storage Areas	CHB	10.4.4.5	CHB	D
	UPA	10.4.4.4	UPA	C
	ECV[1]	10.4.4.4	ECV	A/B
	TMA[1]	10.4.4.4	TMA	A
	TMA Airlock (TMA-C)	10.4.4.4	TMA Airlock	C
	TMA Decon	10.4.4.4	TMA Decon	A/B
	UPMC[1]	10.4.4.4	UPMC	A
	S-2	10.4.4.5	S-2	D
	Igloo 1632	10.4.4.5	Area 10 Igloo 1632	C[2]
	Igloo 1633	10.4.4.5	Area 10 Igloo 1633	D
	Igloo 1634	10.4.4.5	Area 10 Igloo 1634	D
	Igloo 1635	10.4.4.5	Area 10 Igloo 1635	D
	Igloo 1636	10.4.4.5	Area 10 Igloo 1636	D
	Igloo 1639/ATLIC Room	10.4.4.5	Area 10 Igloo 1639/ATLIC Room	C[2]
Subpart J Tank Systems Conventional	ACS-TANK-101[3]	10.4.4.1	Toxic Cubicle	A
	ACS-TANK-102[3]	10.4.4.1		
	SDS-TANK-101	10.4.4.1	SDS Room	A
	SDS-TANK-102	10.4.4.1		
	SDS-TANK-103	10.4.4.1		
	BRA-TANK-101	10.4.4.1	Outdoors	D
	BRA-TANK-102	10.4.4.1		
	BRA-TANK-201	10.4.4.1		
	BRA-TANK-202	10.4.4.1		
	LCS-TANK-8511[3]	10.4.4.1	Area 10 Igloo 1639	See Note 2
	SDS-TANK-8523	10.4.4.1		
	NSF-TANK-8514	10.4.4.1		
	LCS-TANK-8516	10.4.4.1		
	LCS-TANK-8534	10.4.4.1		
Subpart J Tank Systems ICU Sumps With Secondary Containment	Sump 134	10.4.4.2	111 "A" Airlock	A
	Sump 135	10.4.4.2	TMA "A" Area	A
	Sump 154	10.4.4.2		
	Sump 153	10.4.4.2	TMA "A/B" Area	A/B
	Sump 164	10.4.4.2	Lower Buffer Storage Area	A
	Sump 190	10.4.4.2		
	Sump 179	10.4.4.2	Lower Munitions Corridor	A
	Sump 184	10.4.4.2		
	Sump 125	10.4.4.2	123 "A" Airlock	A
	Sump 106[3]	10.4.4.2	ECR-B	A
	Sump 107[3]	10.4.4.2	ECR-A	A
	Sump 108[3]	10.4.4.2	ECV	B
	Sump 109[3]	10.4.4.2		
	Sump 110[3]	10.4.4.2		
	Sump 112[3]	10.4.4.2	Upper Munitions Corridor	A

Table 10-1
TOCDF and TOCDF-Operated Facility HWMUs

40 CFR 264…	HWMU Unique Identification	Ancillary Equipment Definition	Location of Primary Element (MDB unless noted)	Vent. Cat. of Primary Element
	Sump 113[3]	10.4.4.2		
	Sump 114[3]	10.4.4.2		
	Sump 115[3]	10.4.4.2		
	Sump 116[3]	10.4.4.2		
	Sump 117[3]	10.4.4.2		
	Sump 118[3]	10.4.4.2		
	Sump 169[3]	10.4.4.2		
	Sump 174[3]	10.4.4.2		
	Sump 189[3]	10.4.4.2		
	Sump 145[3]	10.4.4.2		
	Sump 146[3]	10.4.4.2		
	Sump 147[3]	10.4.4.2		
	Sump 148[3]	10.4.4.2	Munitions Processing Bay	A
	Sump 149[3]	10.4.4.2		
	Sump 168[3]	10.4.4.2		
	Sump 175[3]	10.4.4.2		
	Sump 124	10.4.4.2	255 A Airlock	B
	Sump 126	10.4.4.2	265 A Airlock	B
	Sump 130	10.4.4.3	Monitoring Room 457	C
	Sump 131	10.4.4.3	Observation Corridor 451	C
	Sump 132	10.4.4.3	DFS "C" Airlock	C
	Sump 133	10.4.4.3	Observation Corridor 454	C
	Sump 144	10.4.4.3	LIC2 Secondary	C
	Sump 150[3]	10.4.4.3	SDS Room	A
	Sump 151[3]	10.4.4.3	Toxic Cubicle	A
	Sump 156	10.4.4.3	LIC1 Secondary	C
	Sump 157[3]	10.4.4.3	LIC2 Primary	A
	Sump 160	10.4.4.3	111 "B" Airlock	B
	Sump 161	10.4.4.3	DFS "B" Airlock	B
	Sump 167	10.4.4.3	Observation Corridor	C
	Sump 180	10.4.4.3	LIC "A/B" Airlock	A/B
Subpart J	Sump 187	10.4.4.3	MPF "A/B" Airlock	A/B
Tank Systems	Sump 188[3]	10.4.4.3	LIC1 Primary	A
	Sump 193	10.4.4.3	Observation Corridor 359	C
ICU Sumps Without Secondary Containment	Sump 197	10.4.4.3	Laboratory	C
	Sump 173	10.4.4.3	Observation Corridor	C
	Sump 182	10.4.4.3	123 "B" Airlock	B
	Sump 101	10.4.4.3		
	Sump 102	10.4.4.3	Unpack Area	C
	Sump 103	10.4.4.3		
	Sump 104	10.4.4.3		
	Sump 136	10.4.4.3	Observation Corridor	C
	Sump 137	10.4.4.3	Observation Corridor	C
	Sump 138	10.4.4.3	Observation Corridor	C
	Sump 139	10.4.4.3	Observation Corridor	C
	Sump 140	10.4.4.3	Observation Corridor	C
	Sump 141	10.4.4.3	Observation Corridor	C
	Sump 142	10.4.4.3	Observation Corridor	C
	Sump 123	10.4.4.3	255 B Airlock	B

Table 10-1
TOCDF and TOCDF-Operated Facility HWMUs

40 CFR 264…	HWMU Unique Identification	Ancillary Equipment Definition	Location of Primary Element (MDB unless noted)	Vent. Cat. of Primary Element
	Sump 127	10.4.4.3	265 B Airlock	B
	Sump 192	10.4.4.3	Observation Corridor	C
	BST Sump 103	10.4.4.3	Outdoors	D
	BCS Sump 107	10.4.4.3	PUB Bulk Chemical Storage	D
Subpart O Incinerators (includes PAS)	LIC 1	10.4.4.6	LIC 1 Primary and Secondary	A
	LIC 2	10.4.4.6	LIC 2 Primary and Secondary	A
	MPF	10.4.4.6	MPF Primary and Secondary	A
	DFS	10.4.4.6	DFS Room and Outdoors	A
	ATLIC	10.4.4.6	GA/L Env. Enclosure	See Note 2
Subpart X Miscellaneous Units	PMD-101	10.4.4.7	ECR-A	A
	PMD-102	10.4.4.7	ECR-B	A
	MDM-101	10.4.4.7	Munitions Processing Bay	A
	MDM-102	10.4.4.7		
	MDM-103	10.4.4.7		
	BDS-101	10.4.4.7		
	BDS-102	10.4.4.7		
	Projo Cutters	10.4.4.7	ECR-A and B	A
	DVS-101	10.4.4.7	Area 10 Igloo 1632	C
	DVS-102	10.4.4.7		
	DVSSR	10.4.4.7		
	Autoclave	10.4.4.7	Area 10 Igloo 1631	See Note 2
	BRA PAS	10.4.4.7	Outdoors	D
	ATLIC TC Glovebox 1	10.4.4.7	Area 10 Igloo 1639	See Note 2
	ATLIC TC Glovebox 2	10.4.4.7		

Notes

1. Container Storage Areas that are permitted for the storage of liquid chemical agent-bearing munitions and chemical agent-bearing non-DOT containers are required to possess emissions control equipment to satisfy 40 CFR 264 Subpart CC. Hence the carbon adsorption filtration systems that serve these Container Storage Areas (MDB HVAC and ATLIC HVAC) constitute equipment ancillary to these permitted units for the purposes of this closure plan.
2. Although not meeting the technical definition of an MDB ventilation category C area, this HWMU operates under negative pressure engineering controls and will be managed as a ventilation category C area for the purposes of this closure plan.
3. Tanks and sumps that are permitted for the storage of P999 liquid chemical agent per Module IV and Table 4 of the RCRA Permit are required to possess emissions control equipment to satisfy 40 CFR 264 Subpart CC. Hence the carbon adsorption filtration systems that serve these tanks and sumps (MDB HVAC and ATLIC HVAC) constitute equipment ancillary to these tanks and sumps for the purposes of this closure plan.

10.1.6 Inspections, Calibrations and Waste Feed Interlock Function Tests

10.1.6.1 Inspections and Automatic Waste Feed Cut-off (AWFCO) testing may be suspended for HWMUs and support systems identified in Attachment 5 of the TOCDF RCRA Permit when an item is removed from service for closure and after all hazardous waste has been removed (if present) from the item undergoing closure. The Director of the Division of Solid and Hazardous Waste will be notified in writing when any inspection requirement or AWFCO test listed in Attachment 5 is suspended for closure if the suspension is prior to the II.J.7 45-day notification of HWMU closure. In addition, logbooks will no longer be required to be maintained or kept at locations identified in Attachment 5 once the item

is removed from service for closure. A notation will be made in the associated inspection form or logbook that the item is undergoing closure when it is removed from service for closure.

10.1.6.2 Calibrations and Waste Feed Interlock Function Tests may be suspended for equipment and systems identified in Attachment 6 of the TOCDF RCRA Permit when an item is removed from service for closure and after all hazardous waste has been removed (if present) from the item undergoing closure. The Director of the Division of Solid and Hazardous Waste will be notified in writing when any calibration requirement or Waste Feed Interlock Function Test identified in Attachment 6 is suspended for closure if the suspension is prior to the II.J.7 45-day notification of HWMU closure.

10.1.7 Preparedness and Prevention, Contingency Plan

10.1.7.1 Emergency equipment and systems identified in Attachment 8 and Attachment 9 of the TOCDF RCRA Permit may be removed or decommissioned in place as facility closure progresses. Emergency equipment and systems will be maintained by the Permittee during closure until it is determined that the equipment and systems no longer serve their intended purpose. The Director of the Division of Solid and Hazardous Waste will be notified when any emergency equipment or systems are to be removed or decommissioned as the result of facility closure and a permit modification will be submitted in accordance with R315-3.4.3.

10.1.8 Closure Monitoring

As closure of the TOCDF progresses, agent monitoring requirements will change. A key objective for the closure of the TOCDF is to perform unventilated agent monitoring to demonstrate that the < 1.0 VSL criterion has been met. When this criterion has been satisfied, agent monitoring will be terminated and demolition will commence as described in 10.4.1 of this plan..

10.2 CLOSURE PERFORMANCE STANDARD [40 CFR 264.111; 270.14(b)(13); and UAC R315-8-7]

The closure performance standards may be divided into two parts: the ***general*** standards applicable to all TSDFs, and the ***technical*** standards for specific types of HWMUs. This Closure Plan defines the processes that will be followed to close the TOCDF and TOCDF-Operated Facilities such that all of the closure performance standards are met.

10.2.1 General Standards

The general performance standards of 40 CFR 264.111 that are applicable to the overall TOCDF facility are as follows:

The owner or operator must close a permitted hazardous waste facility in a manner that:

- Minimizes the need for further maintenance, and
- Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the surface or groundwater or to the atmosphere.

These general standards will be verified at TOCDF by performing site-wide post-closure sampling and analysis described in 10.2.3.

10.2.2 Technical Standards

The technical performance standards of 40 CFR 264.111, which constitutes the HWMU-specific standards are as follows:

The owner or operator must close a permitted hazardous waste facility in a manner that:

- Complies with the closure requirements of 40 CFR 264, including the requirements of 264.178 (containers), 264.197 (tank systems), 264.351 (incinerators), and 264.601 through 264.603 (miscellaneous units).

10.2.2.1 Container Storage Areas - 40 CFR 264.178 (amended by R315-8-9.9)

At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soil containing or contaminated with hazardous waste or hazardous waste residues must be decontaminated or removed.

This technical standard will be met at TOCDF by 1) removing all HW containers and portable secondary containment devices (e.g., secondary containment pallets, ONCs), and 2) decontaminating the fixed secondary containment (i.e., floors and sumps) to the extent necessary for disposal as F999 hazardous debris in a Subtitle C Hazardous Waste Landfill. Secondary containment pallets and ONCs will be decontaminated by triple-rinsing in accordance with RCRA. All hazardous waste or hazardous waste residues removed during decontamination activities will be characterized and managed as newly-generated hazardous waste. The ancillary equipment (e.g., fixed secondary containment in addition to the Subpart CC closed vent and control device) will then be demolished in their entirety and disposed as newly-generated F999 hazardous debris. No ancillary equipment will remain post-closure.

This technical standard will be verified at TOCDF by performing site-wide post-closure sampling and analysis described in 10.2.3 in addition to verification of disposal of the ancillary equipment.

10.2.2.2 Tank Systems - 40 CFR 264.197

At closure of a tank system, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components, (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste. If not all contaminated soils can be practicably removed or decontaminated, then the owner or operator must perform post-closure care.

This technical standard will be met at TOCDF by surface decontaminating the vessel and ALL ancillary equipment to the extent necessary for disposal as F999 hazardous debris in a Subtitle C Hazardous Waste Landfill. All hazardous waste or hazardous waste residues removed during decontamination activities will be characterized and managed as newly-generated hazardous waste. The vessel and all ancillary equipment will then be demolished in their entirety and disposed as newly-generated F999 hazardous debris. Neither the vessel nor any ancillary equipment will remain post-closure.

In lieu of surface decontamination followed by future demolition/disposal, the permittee may dismantle and decontaminate the vessel and any or all ancillary equipment as newly-generated waste in a duly-permitted thermal treatment unit (e.g. the MPF or Autoclave) followed by disposal as F999 hazardous debris.

This technical standard will be verified at TOCDF by performing site-wide post-closure sampling and analysis described in 10.2.3 in addition to verification of disposal of the vessel and its ancillary equipment. Thus, successful removal of contaminated soils (a requirement for achieving risk-based residential closure) will be verified as well.

10.2.2.3 Incinerators - 40 CFR 264.351 (amended by R315-8-15.8)

At closure, the owner or operator shall remove all hazardous waste and hazardous waste residues, including, but not limited to, ash, scrubber waters, and scrubber sludges, from the incinerator site.

This technical standard will be met at TOCDF by surface decontaminating the incinerator and ALL ancillary equipment (including the PAS) to the extent necessary for disposal as F999 hazardous debris in a Subtitle C Hazardous Waste Landfill. All hazardous waste or hazardous waste residues removed during decontamination activities will be characterized and managed as newly-generated hazardous waste. The incinerator and all ancillary equipment will then be demolished in their entirety and disposed as newly-generated F999 hazardous debris. Neither the incinerator nor any ancillary equipment will remain post-closure.

In lieu of surface decontamination followed by future demolition/disposal, the permittee may dismantle and decontaminate the incinerator and any or all ancillary equipment as newly-generated waste in a duly-permitted thermal treatment unit (e.g. the MPF or Autoclave) followed by disposal as F999 hazardous debris.

This technical standard will be verified at TOCDF by performing site-wide post-closure sampling and analysis described in 10.2.3 in addition to verification of disposal of the incinerator and its ancillary equipment.

10.2.2.4 Miscellaneous Units - 40 CFR 264.601

A miscellaneous unit must be closed in a manner that will ensure protection of human health and the environment.

This technical standard will be met at TOCDF by surface decontaminating the miscellaneous unit and ALL ancillary equipment to the extent necessary for disposal as F999 hazardous debris in a Subtitle C Hazardous Waste Landfill. All hazardous waste or hazardous waste residues removed during decontamination activities will be characterized and managed as newly-generated hazardous waste. The miscellaneous unit and all ancillary equipment will then be demolished in their entirety and disposed as newly-generated F999 hazardous debris. Neither the miscellaneous unit nor any ancillary equipment will remain post-closure.

In lieu of surface decontamination followed by future demolition/disposal, the permittee may dismantle and decontaminate the miscellaneous unit and any or all ancillary equipment as newly-generated waste in a duly-permitted thermal treatment unit (e.g. the MPF or Autoclave) followed by disposal as F999 hazardous debris.

This technical standard will be verified at TOCDF by performing site-wide post-closure sampling and analysis described in 10.2.3 in addition to verification of disposal of the miscellaneous unit and its ancillary equipment.

10.2.3 Closure Sampling and Analysis (Closure Verification)

In order to reach the final post-closure configuration of the TOCDF facility, the building that houses the majority of the HWMUs (the MDB) will be removed in accordance with the Facility Closure Methodology described in section 10.4 of this Plan. With the exception of those specific buildings or structures that will remain under the non-RCRA

use of a future tenant, outlying building superstructures that housed any HWMU ancillary equipment (e.g., the PAS, and the MDB HVAC System), and all portions of concrete, asphalt and soil identified in Module VII as still-contaminated from spills (i.e., unsuccessfully decontaminated during previous spill clean-up attempts) will be removed.

Once demolition and disposal of demolition debris is complete, the final post-closure configuration of the TOCDF will have been achieved and the soils underlying the removed HWMUs, HWMU ancillary equipment and spill sites will be sampled for CVSAP-defined hazardous constituents. In addition, concrete and asphalt pavement that will remain post-closure will be subject to closure verification sampling if specified in the CVSAP. The buildings that will remain under non-RCRA use by future tenants, which *housed* permitted HWMUs, but were not themselves ancillary to those units (i.e., did not provide secondary containment) will be verified decontaminated and returned to custody of TEAD-S. Area 10 igloos subject to the TEAD-S RCRA Permit will be subject to the final closure provisions of the TEAD-S Permit, separate from TOCDF closure.

10.2.4 Final Closure Performance Standard Values

A final closure performance standard value is an analytical value for a chemical of potential concern (COPC) that indicates a level of contamination that is allowed to remain in place at final closure after demolition and disposal is complete. The values, which are protective of human health and the environment, are presented in Table 10-2 which contains closure performance standard values for several COPCs that have been identified for one or more HWMUs at TOCDF, consisting of agent degradation products (ADPs).

TABLE 10-2
FINAL CLOSURE RISK PERFORMANCE STANDARD VALUES

Chemical of Potential Concern COPC	Health Based Environmental Screening Level (HBESL)[1] (mg/kg)
EA-2192	0.047
DIMP (diisopropyl methylphosphonate)	6,300
EMPA (ethyl methylphosphonate)	1,700
IMPA (isopropyl methylphosphonate)	6,100
MPA (methylphosphonate)	1,200
Thiodiglycol	24,000

1 "Reevaluation of 1999 Health Based Environmental Screening Levels for Chemical Warfare Agents", Oak Ridge National Laboratory, May 2007.

10.3 MAXIMUM WASTE INVENTORY ESTIMATE [40 CFR 264.112(b)(3); 270.14(b)(13); and UAC R315-8-7]

The inventory of hazardous wastes will be managed in accordance with the requirements of the Utah Hazardous Waste Management Regulations (the Rules) for storage facilities and other HWMUs undergoing closure. At the time a HWMU is closed, there will be no residual inventory of hazardous waste present. However, 40 CFR 264.112(b)(3) requires that a closure plan provide an "estimate of the maximum inventory of hazardous wastes ever on-site over the active life of the facility". As such, Tables 10-3, 10-4 and 10-5 provide the maximum permitted-storage capacity of hazardous waste in Subpart J Tanks, Subpart J Intermittent Collection Unit (ICU) Tanks and Subpart I Container Storage Areas at TOCDF. Table 10-5 provides the total aggregate storage capacity at the TOCDF Facility subject to this closure plan. All volumes are reported in U.S. liquid gallons (231 in^3).

This maximum inventory estimate is prepared using the conservative strategy of summing the maximum permitted capacity of all units regardless of whether they were ever operated in that manner. This is particularly conservative considering that, unlike the permitted tanks; the sumps are explicitly limited to storage duration of 24-hours maximum. As a result of this extreme conservatism, the volume of ancillary piping is not considered in the total. In addition, throughout the operating history of TOCDF, newly-generated hazardous wastes were accumulated onsite in multiple container storage areas and tanks. However, the volume of hazardous wastes that temporarily resided in these 90-day areas are not included this estimate.

TABLE 10-3
SUBPART J PERMITTED STORAGE TANKS

Tank Description	Location	Capacity (Gallons)
Agent Storage System (ACS) Tanks:		**1712**
ACS-TANK-101	MDB First Floor Toxic Cubicle	582
ACS-TANK-102		1130
Spent Decon System (SDS) Tanks:		**6600**
SDS-TANK-101	MDB First Floor SDS Room	2200
SDS-TANK-102		2200
SDS-TANK-103		2200
Brine Surge Tanks (BSTs):		**171,600**
BRA-TANK-101	Outdoors, West of Brine Reduction Area (BRA)	42,900
BRA-TANK-102		42,900
BRA-TANK-201		42,900
BRA-TANK-202		42,900
ATLIC Tanks :		**5330**
LCS-TANK-8511	Area 10 Igloo 1639	1066
SDS-TANK-8523		1066
NSF-TANK-8514		1066
LCS-TANK-8516		1066
LCS-TANK-8534		1066
Total Storage Capacity of Subpart J Permitted Conventional Storage Tanks		**185,242**

TABLE 10-4
SUBPART J PERMITTED ICU TANKS[1] (SUMPS)

General Location	Specific Location	Sump ID[2]	Capacity (Gallons)
MDB First Floor	Monitoring Room 457	130	89
	Observation Corridor	131	89
	DFS "C" Airlock	132	89
	Observation Corridor	133	89
	111 "A" Airlock	134	89
	TMA "A" Area	135	89
		154	89
	LIC2 Secondary	144	89
	SDS Room	150	85
	Toxic Cubicle	151	512
	TMA "A/B" Area	153	89
	LIC1 Secondary	156	89
	LIC2 Primary	157	89
	111 "B" Airlock	160	89
	DFS "B" Airlock	161	89
	Lower Buffer Storage Area	164	89
		190	89
	Lower Munitions Corridor	179	89
		184	89
	LIC "A/B" Airlock	180	89
	MPF "A/B" Airlock	187	89
	LIC1 Primary	188	89
	Observation Corridor	193	89
	Laboratory	197	89

TABLE 10-4
SUBPART J PERMITTED ICU TANKS[1] (SUMPS)

General Location	Specific Location	Sump ID[2]	Capacity (Gallons)
MDB First Floor Platform	123 "A" Airlock	125	89
	Observation Corridor	173	89
	123 "B" Airlock	182	89
MDB Second Floor	Unpack Area	101	89
		102	89
		103	89
		104	89
	ECR-B	106	89
	ECR-A	107	59
	ECV	108	89
		109	89
		110	89
	Upper Munitions Corridor	112	89
		113	89
		114	89
		115	89
		116	89
		117	89
		118	89
		169	89
		174	89
		189	89
	Observation Corridor	136	89
	Observation Corridor	137	89
	Observation Corridor	138	89
	Observation Corridor	139	89
	Observation Corridor	140	89
	Observation Corridor	141	89
	Observation Corridor	142	89
	Munitions Processing Bay	145	89
		146	69
		147	69
		148	89
		149	59
		168	69
		175	89
	Observation Corridor	167	89
MDB Second Floor Platform	255 B Airlock	123	89
	255 A Airlock	124	89
	265 A Airlock	126	89
	265 B Airlock	127	89
	Observation Corridor	192	89
Total Storage Capacity of Subpart J Permitted ICU Sumps			**6173**

Notes
1 ICU sumps are permitted as Subpart J Tank systems because they may be used as *primary* containment of hazardous waste for a permit-imposed maximum period of 24-hours. Sumps that serve ONLY as *secondary* containment for nearby tanks or containers are not included in this list.
2 Sumps are identified by their corresponding sump pump number [e.g., sump 130

TABLE 10-4 SUBPART J PERMITTED ICU TANKS[1] (SUMPS)			
General Location	**Specific Location**	**Sump ID[2]**	**Capacity (Gallons)**
corresponds to the sump's pump equipment piece number (EPN) SDS-PUMP-130].			

TABLE 10-5 SUBPART I CONTAINER PERMITTED STORAGE AREAS	
Container Storage HWMU	**Maximum Inventory (Gallons)**
Container Handling Building (CHB)	36,555
S-2 Warehouse	38,720
Area 10 Igloo 1632	14,520
Area 10 Igloo 1633	14,520
Area 10 Igloo 1634	14,520
Area 10 Igloo 1635	14,520
Area 10 Igloo 1636	14,520
Area 10 Igloo 1639	3575
ATLIC Room	1760
Unpack Area (UPA)	3424
Explosive Containment Room Vestibule (ECV)	833
Upper Munitions Corridor (UPMC)	4366
Toxic Maintenance Area (TMA) Container Storage Area	2200
TMA –C Airlock	2145
TMA –A/B Decon Area	761
Total Storage Capacity of Subpart I Container Permitted Storage Areas	**166,939**

TABLE 10-6 Aggregate Total Storage Capacity, All Permitted HW Storage Units	
HW Storage Unit Type	**Maximum Inventory**
Subpart J Tank Systems	185,242 Gallons
Subpart J ICU Sumps	6,173 Gallons
Subpart I Container Storage Areas	166,939 Gallons
Total Capacity, All Permitted Storage, F999 & P999 (1 ft^3 = 7.481 gallons)	**358,354 Gallons (47,902 ft^3)**

10.4 FACILITY CLOSURE METHODOLOGY [40 CFR 264.112(b)(1) & (2)

This section summarizes the processes which will be used to close HWMUs at TOCDF. This section is broken up into four subsections. The first subsection (10.4.1) provides the sequence of events for decontamination and equipment removal. The second subsection (10.4.2) provides the methods to decontaminate the HWMUs. The third subsection (10.4.3) provides the overall closure schedule. The fourth and final subsection (10.4.4) provides a specific definition of what equipment pieces associated with a HWMU are considered "ancillary equipment" and thus constitute a part of the HWMU subject to closure.

Since disassembly of a HWMU pursuant to closure does not constitute modification of the HWMU with the intent to commence storage, treatment, or disposal of hazardous waste within the HWMU, Facility Construction Certifications (FCCs) will not be

required. Hence, Permit Condition I.S will not apply when modifying the configuration of any HWMU pursuant to closure unless the HWMU is intended for continued hazardous waste storage or treatment.

It should be noted that the applicable safety regulations for chemical agents described in Department of the Army Pamphlet 385-61 and TOCDF procedures that outline specific methods/codes for dress or operating procedures will be followed during closure.

10.4.1 Decontamination and Equipment Removal Sequence

The sequence for proceeding through decontamination and equipment removal is a series of steps that will be performed at each area/unit within the TOCDF to ensure they have been decontaminated to a level protective of workers and the environment. The sequence begins with the management, control, and monitoring of hazardous exposures, proceeds through decontamination, and any appropriate equipment and material removal.

The sequence of events for each area is as follows:

1. ***Establish Engineering Controls/Monitoring*** – For areas normally under ventilation engineering controls (e.g., category A, A/B, B and C), engineering controls will be verified established and functioning before initiating HWMU disassembly activities within a previously agent-contaminated area (liquid or vapor). For TOCDF operations, the controls will address agent vapor management through ventilation control as well as workspace monitoring for agent vapor.

2. ***Preliminary Survey*** – After ventilation engineering controls are verified established, the workers will perform a preliminary survey, which will serve to verify existing conditions within the area (e.g., general arrangement of installed equipment, presence of occluded spaces, workspace hazards requiring mitigation before work execution). The survey will be conducted by closed-circuit television, observation through windows, or direct personnel entry as necessary. The steps associated with the performance of an occluded space survey are described in section 10.4.1.1.

3. ***Preparation for Work Execution*** – The readiness of the area for intended work is evaluated in this step. Energized systems in the work area that could affect the safety of the workers will be isolated and the ability to properly collect and manage newly-generated quantities of spent decon and wash water (e.g., integrity of the floor, sumps, storage containers) will be verified before gross decontamination activities are undertaken. Supporting utilities such as fire suppression system water, plant air, process water will be isolated to areas as needed. The impact of these system isolations will be evaluated in order to maintain the safety of personnel and the facility.

4. ***Decontamination and Equipment Disposition*** – The approach to work in each area will differ depending upon existing conditions, installed equipment, and contamination history. The decision to decontaminate, and to what degree, will be evaluated throughout the closure process. Agent-contaminated equipment, buildings and structures will be decontaminated and monitored such that worker exposure/release levels do not exceed the WPL for reuse/disposal scenarios. . Work activities in a selected area will include the following as appropriate and generated waste will be managed in accordance with 10.5, Closure Waste Management:

a. Elimination of fluids
b. Removal of components and equipment deemed too complex for thorough disassembly and revealing of occluded spaces, for thermal treatment as declared P999 hazardous waste.
c. Exposure (revealing) of occluded spaces
d. Surface decontamination for chemical agent and other hazardous waste constituents
e. *In situ* thermal decontamination of specific components and structures in accordance with a specific formal *in situ* thermal destruction plan prepared in accordance with site procedures and submitted to the Director of the Division of Solid and Hazardous Waste for review and approval.
f. Removal of components and equipment that pose a personnel tripping hazard or area congestion hazard.
g. Removal of floor coatings for underlying concrete sampling as described in section 10.4.1.2.
h. Removal of sump protective liners.
i. Removal of universal wastes that may adversely impact disposal during demolition (e.g., introduce additional waste codes to roll-off containers).

5. ***Post Disposition Survey*** – At the conclusion of decontamination and equipment removal activities in each work area, a post-work survey will be performed to verify that work objectives have been achieved. This survey will confirm the following conditions to verify that a safe configuration has been achieved:

   a. Occluded spaces (as described in 10.4.1.1) that have not otherwise been adequately treated (e.g., thermally) have been exposed or eliminated;
   b. Explosives have been removed to levels below industrial clean-up standards; and
   c. Non-agent waste materials (e.g., lead-based paint, asbestos, mercury, universal wastes) have been removed, or if left in place, have been identified for proper disposal during demolition.

6. ***Perform Final Unventilated Monitoring Test (UMT)*** – Areas normally under ventilation engineering controls and which have been determined via risk assessment to require monitoring under isolated and homogenized headspace conditions, will be subject to a final Unventilated Monitoring Test (UMT). Final verification (prior to demolition) includes the performance of an UMT for areas identified via risk assessment, the goal of which is to measure an agent off-gas rate. This off-gas rate will be determined by holding the unventilated area test volume for a four-hour period of time to allow for agent, if present on building and equipment surfaces, to off-gas into the test volume airspace. The test volume airspace will be monitored throughout the entire four-hour hold time by use of near-real time (NRT) monitoring (e.g., ACAMS) for each agent of concern (e.g., GB and/or VX and/or HD. After the test volume's hold time has expired, the final agent concentration in the test volume airspace will be measured via a post-hold-time NRT cycle for each agent of concern. The UMT success criterion will be < 1.0 VSL for the NRT reading post-hold-time. < 1.0 VSL provides evidence that the agent off-gas rate for an area is such that workers will not be exposed to a work environment at or above the WPL post-UMT (e.g., during demolition). If the measured off-gas rate does not meet this criterion, evaluation of areas will be

performed with point-source ACAMS to identify hot spots. Contaminated surfaces will be further decontaminated and the UMT process will be repeated until the UMT success criterion is met.

In areas subject to the UMT, a successful UMT in addition to the performance of activities described in 10.4.1 steps 1 through 7 constitute evidence of

1) successful decontamination of building, equipment and structures such that the buildings, equipment and structures can be safely demolished, transported and disposed at a Subtitle C Hazardous Waste facility as F999 Hazardous Debris or Hazardous Waste, and

2) the non-applicability of the P999 hazardous waste code to the demolition debris via the contained-in policy.

7. ***Final Isolation*** – For areas subject to the UMT (i.e., category A, A/B, B and additional areas determined by risk assessment), upon successful completion of the final UMT, remaining monitoring will be removed. Access to the buildings/areas will be restricted until such time that demolition of the building begins.

8. ***Demolition*** – After the MDB and all other buildings housing HWMUs are decontaminated and verified to meet the minimum "action level criteria for disposal" (< 1.0 VSL generated off-gas rates determined through a successful UMT or completed decontamination for areas not subject to the UMT), the buildings and their contents will be demolished, with the exception of those specifically requested by TEAD-S to remain for future non-RCRA use. Demolition will include the removal of the MDB concrete slabs and the removal of any HWMU-ancillary underground piping. With the exception of those specifically-requested by TEAD-S to remain for future non-RCRA use, buildings and structures not associated with HWMUs will be removed to the floor slab, which will remain. At the conclusion of the demolition step:

   a. All HWMUs will have been removed from the TOCDF site including the TEAD-S Area 10 treatment units,

   b. With the exception of buildings that will remain under non-RCRA use by future tenants, all buildings that *housed* HWMUs, will have been removed from the TOCDF site, including the MDB floor slabs,

   c. Buildings that will remain under non-RCRA use by future tenants by specific request that housed HWMUs and their ancillary equipment will have been decontaminated of TOCDF-related operations potential contaminants,

   d. Module VII Spill Sites will have had contamination removed, including contaminated soil and pavement where decontamination efforts have been unsuccessful,

   e. With the exception of specific non-HWMU buildings and their support utilities buildings and structures (e.g., sewage treatment, security, and electrical/water structures) that will remain in non-RCRA use by other tenants, all buildings will have been removed down to the grade slabs, which will remain in-place,

   f. Paved roads, parking lots and other concrete surfaces, light poles and fixtures, sewage/water/gas/electric utilities, and other infrastructure will remain in place for non-RCRA use by other tenants.

9. ***Conduct Final Closure Verification Sampling*** – In addition to soil samples collected through-slab pre-demolition, a combination of random and judgmental samples will be collected post demolition for the purpose of closure verification. As stated in Section 10.1.4, a separate Closure Verification Sampling and Analysis Plan (CVSAP) has been submitted to the Director of the Division of Solid and Hazardous Waste for approval.

10.4.1.1 Occluded Space Survey

An Occluded Space is defined as a confined or restricted access volume within a system, structure, or component that was exposed to liquid agent and has the potential to contain any quantity of agent or agent-exposed or contaminated liquid and therefore poses an unacceptable agent risk to personnel during general demolition. The location and position of such spaces may prevent or limit contact with decontamination solutions. Occluded space surveys do not apply to materials that are removed from the facility prior to demolition provided the materials are managed appropriately as newly-generated waste/debris.

Prior to performing air monitoring per 10.4.1, all potential sources of residual liquid agent (occluded spaces) must be identified and decontaminated. Revealing (exposing) the occluded space to enable effective penetration of decontamination solution is the primary method of ensuring agent decontamination of an occluded space. In lieu of surface decontamination, thermal decontamination may be used in certain circumstances provided the rigors of the in situ thermal destruction technology are met as described in 10.4.2.2.9.

Following decontamination/decommissioning activities but before unventilated monitoring begins, a final survey will be performed to validate that all occluded spaces have been addressed and also to ensure that no other occluded spaces have been missed in the assessment and work process.

10.4.1.2 Liquid Agent-Exposed Floors

In areas where coated concrete floors have been exposed to liquid agent, the approach will be to perform statistical chip sampling in combination with judgmental samples (i.e. locations where stains/suspect areas based on observations, process knowledge and professional judgment). Agent-contamination within the underlying concrete indicates failure of the floor coating to perform as an impermeable barrier. In order to access the underlying concrete, the floor coating will be removed in these areas where samples are to be collected. If the concrete chip sample indicates agent contamination above the waste control limit (WCL), 20 ppb for GA/GB/VX and 200 ppb for Mustard/Lewisite, further sampling will be performed to assess the lateral extent of concrete contamination. Once the extent of concrete contamination has been determined, the agent-contaminated concrete within the defined area will be decontaminated by application of one of the following technologies:

1) Physical Extraction to meet the applicable performance standard (e.g., removal of at least 0.6 centimeters of the surface layer and achievement of a clean debris surface). The removed contaminated layer material will be removed, treated and disposed as hazardous waste in accordance with the generator requirements of 40 CFR 262.11. Successfully decontaminated concrete (uncontaminated underlying concrete) sampling below the WCL will be performed to verify concrete decontamination.

2) Thermal Destruction in accordance with a formal *ad hoc in situ* thermal destruction plan prepared in accordance with site procedures and submitted to the Director of the Division of Solid and Hazardous Waste for review and approval. Successfully decontaminated concrete sampling below the WCL will be performed to verify concrete decontamination.

10.4.1.3 Early Partial Closure – Individual HWMUs

This section pertains to the partial closure of an individual HWMU or any part thereof that is performed anytime after the HWMU has fulfilled its purpose, but prior to TOCDF entering the site-wide demolition phase.

TOCDF may, when the opportunity arises, perform partial closure of individual HWMUs, wholly or in-part, provided that the individual HWMU and/or its ancillary equipment can be 1) disassembled, decontaminated, treated and disposed in a manner that is consistent with the generator requirements of 40 CFR 262.11 or, 2) thermally-decontaminated in accordance with a formal *ad hoc in situ* thermal destruction plan prepared in accordance with site procedures and submitted to the Director of the Division of Solid and Hazardous Waste for review and approval.

Because early partial closure directly impacts the planned sequence and duration of closure activities as described in this Closure Plan, the Permittee will notify the Director of the Division of Solid and Hazardous Waste of the intent to perform, either whole or in-part, early partial closure prior to commencement of disassembly.

HWMU components undergoing early partial closure can be decontaminated, treated and disposed in a Subtitle C HW landfill (e.g., thermally treated in a duly-permitted treatment unitor decontaminated and disposed as F999 hazardous waste/debris based on generator knowledge of decontamination effectiveness). HWMU components thermally decontaminated pursuant to early partial closure in accordance with a formal in situ thermal destruction plan will be 1) left in-place for removal during demolition, or 2) removed, declared F999 hazardous debris, and disposed in a Subtitle C hazardous waste landfill.

Because closure of the HWMU must ultimately be certified by an independent registered professional engineer at the conclusion of final closure activities, all records pertaining to the disassembly, decontamination, treatment and disposal of the HWMU, including each piece of ancillary equipment, will be retained for future retrieval.

Metal components may be recycled by reclamation in lieu of being disposed in a landfill as hazardous debris/waste provided the requirements of 10.5.4.5 are met.

10.4.2 Equipment and Facilities Decontamination

The decision to decontaminate, and to what degree, will be evaluated throughout the closure process. Agent-contaminated equipment, areas, and facilities will be decontaminated and headspace-monitored to < 1.0 VSL prior to being left in-place for demolition and disposal without additional decontamination.

Within each of the buildings/structures, selected rooms and equipment will require decontamination to reduce residual agent levels prior to disassembly and removal in accordance with the closure sequence (Section 10.4.1). The decontamination methods

will be compatible with the individual systems and will not cause imminent failure or breach of the system's primary containment.

Decontamination of non agent-contaminated areas addresses hazardous waste and hazardous material residue other than agent. For areas/systems that are also contaminated with agent, the non-hazardous waste/material may be completely or partially removed with the same decontamination technique(s) used for agent.

Many support buildings at TOCDF were never used for or exposed to chemical agents, hazardous materials, or hazardous wastes. These areas include the CON, modular office "T" buildings, some stationary "S" buildings, the Entry Control Facility, etc. Gross decontamination of these facilities will be limited to collection and removal of loose debris, as necessary. No further decontamination is anticipated prior to bulk demolition.

Non-agent contamination existing outside facility buildings is assumed to be minimal and to require limited decontamination effort, if any. Decontamination of non agent-contaminated areas will be conducted to support removal of the protective containment boundaries and allow demolition of the equipment and structures, and to support the various disposal options for the generated waste streams. Additionally, coatings, insulation, and building materials will be evaluated for presence of lead-based paint, asbestos-containing material, and other regulated materials. Stripping and segregation of these regulated materials, if necessary to ensure proper debris disposal, will take place prior to building demolition. Regulated materials and associated demolition debris will be shipped offsite for disposal in accordance with applicable regulations.

10.4.2.1 General Decontamination Approach

Equipment, buildings and structures will ultimately be declared hazardous debris upon demolition, characterized based on generator knowledge, and disposed as hazardous debris. Therefore, decontamination of equipment, buildings and structures will be conservatively based on methods listed in 40 CFR 268.45, Table 1 Alternative Treatment Standards for Hazardous Debris.

Decontamination will proceed in a specific sequence/order, based on conditions at each area, to allow the most effective, easiest and safest decontamination and/or disassembly. Equipment and material may be disassembled and thermally decontaminated in the MPF or Autoclave permitted units in accordance with the WAP. Alternatively, surfaces that have been in contact with liquid agent may first be decontaminated using mechanical means, such as wiping the surface to remove particulates, grease, and other surface debris, or by scarifying to remove surface coatings that may have been contaminated with agent. Following mechanical decontamination, equipment and surfaces may be chemically decontaminated with a neutralization solution or may be size reduced, packaged as appropriate, and sent to permitted storage awaiting further treatment. If chemical decontamination occurs, decontamination solution will be used in such a manner as to prevent the spread of contamination. Newly generated residual decontamination solution will be managed in accordance with the generator requirements of 40 CFR 262.11.

After chemical decontamination is complete, decontaminated surfaces will be air dried and equipment and areas will be tented and air monitored to determine if the "unventilated monitoring criterion" of <1.0 VSL for chemical agent has been achieved. Equipment that meets the agent screening criterion of <1.0 VSL may be packaged

appropriately and shipped offsite in accordance with its planned disposition or may be left in place for future removal during site-wide demolition. Equipment and areas failing the "action level criterion for disposal" of < 1.0 VSL will be evaluated to determine whether additional chemical, mechanical or in situ thermal decontamination is viable to achieve the criterion, or whether formal HW treatment in an active HWMU is necessary.

10.4.2.2 Decontamination Techniques

This section describes the various methods that will be employed for decontamination. The methods may be employed, either singularly or in combination, to decontaminate the equipment, building or structure. Any wastes newly-generated from decontamination activities (e.g., rinsate, DPE, etc.) will be managed in accordance with the generator requirements of 40 CFR 262.11.

10.4.2.2.1 Water/Steam Flushing

Water and/or steam flushing has both chemical and mechanical decontamination properties. This technique involves flooding a surface with water (typically hot) or steam. The water or steam removes the contaminants and the resulting wastewater is collected for treatment or disposal. This technique may be used with detergents or other chemicals that enhance the effectiveness of the technique. The flushing action may also erode and remove loose debris from the exposed surface area. Steam cleaning may be used to physically extract contamination from building and equipment surfaces. This technique combines the solvent action of water with the kinetic energy effect of blasting and elevated temperature. Effectiveness of steam cleaning as a decontamination method for agent is further increased by localized hydrolysis of the residual agent. The steam may be applied using hand-held wands or automated systems, and the condensate is collected in room sumps for treatment and/or disposal.

10.4.2.2.2 Chemical Decontamination Solutions

Sodium hydroxide (NaOH, caustic) and bleach solution (calcium hypochlorite, sodium hypochlorite) are recognized as effective decontamination solutions for the chemical destruction of agent contamination. The chemical decontamination technique involves the application of caustic, bleach, or other similar solutions to the contaminated surface. The surface may be scrubbed with the solutions and/or allowed to stand for a period of time, and then flushed thoroughly with water. These solutions may also be used in combination with detergents and surfactants.

10.4.2.2.3 Detergents and Surfactants

Most commercial detergents are formulations of a detergent (sodium laurel sulfate, sodium oleate, alkyl aryl sulphonate) that also acts as a wetting agent or surfactant, a phosphorous or carbonate salt (Na_3PO_4, Na_2CO_3), a thickening agent (carboxyl methyl cellulose), and other fillers. Unlike the decontamination solutions described above that effectively destroy the agent contamination, detergents are used in decontamination to physically remove surface contaminants (e.g., agent) and capture them in the resulting spent solution. Surfactants work by lowering liquid surface tension and providing better contact between the surface and the liquid. Detergents are effective, mild, all-purpose cleaners for all facility surfaces and equipment. They can be used to increase the effect of water, steam, and solvents, and their effectiveness is increased by mechanical agitation. Detergents may not be effective on metal corrosion and long standing

contamination. Commercial all-purpose cleaner/surfactants (e.g., CFB-1551, Whistle®) have been used successfully to decontaminate items during TOCDF plant operations.

10.4.2.2.4 Foam Decontamination

Foam, such as that produced by detergents and wetting agents, can be used as a carrier mechanism for chemical decontamination agents. They can be applied in different depths and surface orientations. The foam decontamination method can effectively decontaminate metallic walls and parts of complex components. Surfactants in the foaming agent can enhance the effect by increasing contact with the surface. The primary mode of action of the decontaminant is based on oxidizing properties of hydrogen peroxide. A surfactant and an accelerant increase the rate of peroxide activity and allow the decontaminant to be applied as stable foam.

10.4.2.2.5 Physical / Mechanical Scrubbing

Physical/mechanical scrubbing with brushes or other devices was found to be extremely beneficial and most likely necessary, in the decontamination of other demilitarization sites. Combining scrubbing of surfaces with the appropriate decontamination solution increases the efficiency of the decontamination solution in removing and destroying residual agent by enhancing contact between the solution and the agents.

10.4.2.2.6 CO_2 Blasting

CO_2 blasting (also known as dry ice blasting) is a decontamination technique used to physically remove contaminated surfaces. The method utilizes compressed air to accelerate frozen carbon dioxide (CO_2) pellets, at supersonic speeds, towards a surface. The impact of the CO_2 pellets creates mini-explosions on the surface and results in the lifting/removal of the topmost layer of a substrate. CO_2 blasting is a non-abrasive, nonflammable and nonconductive cleaning method which is environmentally-friendly and contains no secondary contaminants such as solvents or grit media. The method allows most items to be cleaned in place and can be used without damaging active electrical or mechanical parts or creating fire hazards. Additionally, CO_2 blasting can be used to remove production residues, release agents, contaminants, paints, oils and biofilms from surfaces.

10.4.2.2.7 Mechanical Surface Removal

Mechanical surface removal, such as grinding, scraping, or scarifying, is a decontamination option to physically remove contaminated surfaces. These techniques may be used to decontaminate areas intended for reuse or to achieve a prerequisite condition to support removal of protective containment boundaries. Surface removal may also be used to reduce the volume of hazardous waste by removing only the contaminated fraction and allowing disposal of the uncontaminated substrate as non-hazardous waste or leaving the uncontaminated substrate in place. Grinding with grinding wheels or surfacing discs removes thin layers of surface contamination from concrete where contamination is limited to the coating or sealant finish. Scarifiers physically abrade both coated and uncoated concrete and steel surfaces. The scarification process removes the top layers of contaminated surfaces down to the depth of sound, uncontaminated surfaces. Scabbling is a scarification process used to remove concrete surfaces. Needle scaling is a scarification process for both concrete and steel surface

removal. The removed surface material is then collected by sweeping or use of a vacuum system for treatment and/or disposal.

10.4.2.2.8 Surface Coating (Encapsulation)

Coatings may be used on contaminated surfaces to fix or stabilize the contamination in place. The intent is to decrease or eliminate the exposure hazard, and reduce the potential spread of contamination. Although no removal of contamination occurs, the stabilized contaminants can be left in place and removed with the substrate for further treatment or disposal. This may be used to achieve a condition that allows removal of the protective containment boundaries if the substrate can be safely removed later without those boundaries in place.

10.4.2.2.9 In-Situ Thermal Destruction

Chemical warfare agents GB, VX and Mustard are susceptible to molecular destruction at elevated temperatures. At TOCDF, thermal destruction in subpart O incinerators is the prescribed method for permitted-treatment of liquid chemical agents, as described in Module V and VI of this permit. The residence time necessary to destroy agent at the elevated temperature is generally an inverse function of the temperature. Hence, the 1000+ °F temperatures in the *incinerators* results in a very rapid destruction of agent (e.g., seconds). In contrast, lower temperatures used during *in situ* thermal destruction results in a relatively long residence time (e.g.,minutes or hours).

Although more complex to perform than surface decontamination, the *in situ* thermal destruction of chemical agent contaminants on equipment greatly reduces the need to disassemble complex equipment in order to reveal agent-harboring crevices. This is due to the ability of heat to effectively penetrate by conduction into crevices and drive the local temperature up.

Based on the "Alternative Treatment Standard for Hazardous Debris" B.3, *in situ* thermal destruction, when utilized for hazardous debris, is subject to verification of localized temperature and residence time. Only with verified localized temperature and verified residence time can *in situ* thermal destruction be reliably effective. Hence, the use of this technology as a means to decontaminate potentially agent-bearing crevices, occluded spaces, complex equipment or concrete requires

1) the performance of a "treatability study" as defined in 40 CFR 260.10 wherein optimal process conditions or minimum effective process conditions (i.e., minimum residence time as a function of local temperature, or minimum local temperature as a function of residence time) are determined in order to achieve the desired agent destruction effectiveness, and

2) a rigorous situational-specific engineering application combined with objective data collection *during actual thermal treatment* (e.g., conservative thermocouple placement, conservative thermal dosimeter, or the use of spiked samples) in order to verify that the optimal or minimum effective process conditions were met or exceeded.

10.4.2.2.10 Natural Attenuation/Volatilization

Analogous to the "Alternative Treatment Standard for Hazardous Debris" A.3.b "Thermal Desorption", Natural Attenuation represents the extraction of volatile hazardous contaminants (e.g., agent) from the debris surfaces and subsequent capture of the contaminants from the exhaust gas (e.g., the carbon adsorption HVAC filtration

system). Natural Attenuation occurs at ambient temperatures within the normal HVAC airflow. Natural attenuation is the result of mass transfer by evaporation of agent from debris surfaces to the surrounding air, and is not necessarily effective for materials such as bare concrete, wood or materials possessing occluded spaces. Hence, natural attenuation as a means of decontamination will only be effective for non-porous or painted surfaces and only upon verification by headspace monitoring to <1.0 VSL.

10.4.3 Schedule for Closure, Time Allowed for Closure, and Extension of Closure [40 CFR 270.14(b)(13); 264.112(b)(6); 264.112(b)(2); 264.113(a) and (b)]

The anticipated TOCDF facility closure schedule is presented in Figure 10-1. Decommissioning within the MDB, which houses the vast majority of HWMUs, will proceed in an area-by-area manner based primarily on ventilation category. Hence, a *specific* sequence of HWMU decommissioning is not provided since a given HWMU's ancillary equipment is oftentimes spread throughout multiple areas of the MDB. However, the *general* decommissioning sequence of the HWMUs' primary elements is provided in Figure 10-2.

The closure of TOCDF will occur in four distinct phases:

Phase 0, *Pre Closure Planning and Early Opportunity Work*

This phase occurs prior to the completion of munitions processing and official commencement of closure operations. Along with administrative planning and preparations, other activities to take advantage of time and resource availability and to prepare the plant for closure after the end of munitions processing will be planned and executed. Early Partial Closure, in accordance with conditions described in 10.4.1.3, will occur during this phase.

Phase 1, *Decommissioning and Decontamination*

During this phase, equipment, buildings and structures are decontaminated, dismantled, verified decontaminated and characterized as necessary to prepare the facility for demolition and disposal, or turnover to other tenants. For agent contaminated facilities, this includes successfully completing Unventilated Monitoring Testing (UMT) and final isolation of utilities and systems for demolition. The objective of the D&D phase is to decontaminate the facility to a level that is protective of the demolition crew, the HW transporter, the disposal facility workers and the environment, and meets the regulatory requirements for disposal.

Phase 2, *Demolition and Facilities Disposition*

During this phase a demolition subcontractor will demolish, package, offer for transport and offer for disposal of equipment, buildings and structures in order to achieve the physical end-state of the facility in accordance with regulatory plans and permits.

Phase 3, *Administrative Closeout*

During this phase, the risk-based residential closure end-state of the facility will be verified through completion of the CVSAP. In addition, completion of facility closure will be certified by an independent registered Professional Engineer. Accordingly, the TOCDF RCRA TSDF Permit will be terminated.

Figure 10-1 TOCDF Closure Planning Schedule

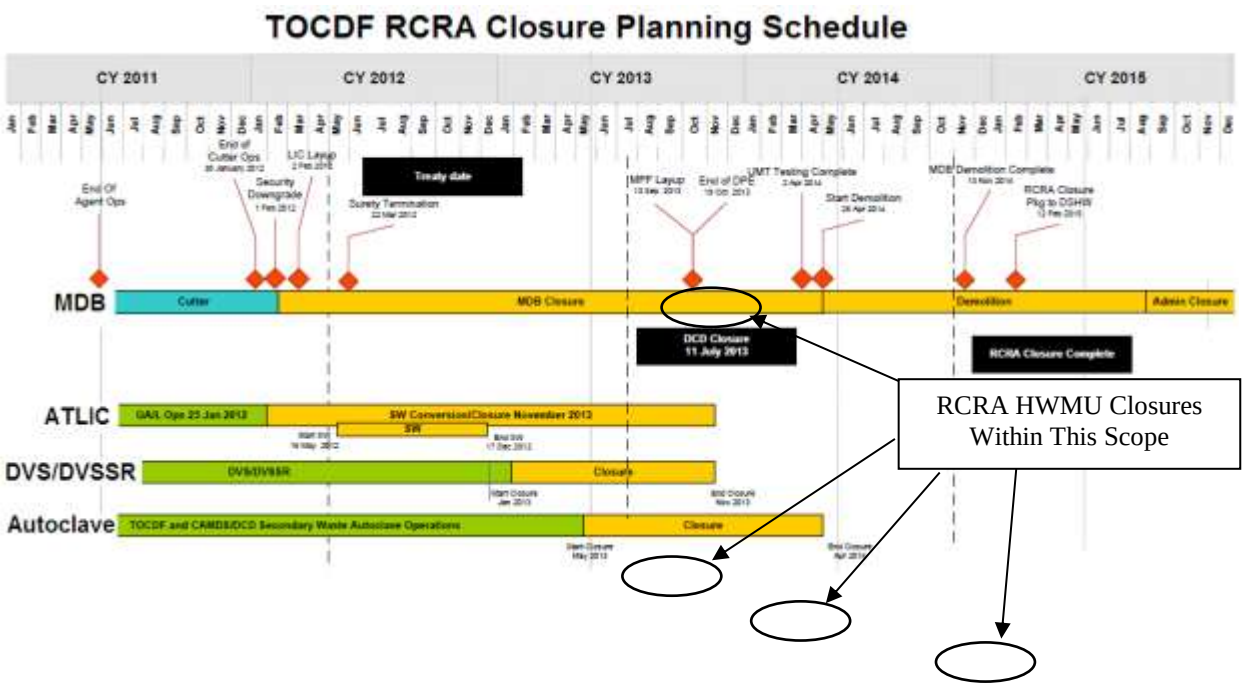

TOCDF RCRA Closure Planning Schedule
CY 2011
CY 2012
CY 2013
CY 2014
CY 2015
End Of Agent Ops
End of Cutter Ops
Security Downgrade
LIC Layup
Treaty date
Surety Termination
MPF Layup
End of DPE
UMT Testing Complete
Start Demolition
MDB Demolition Complete
RCRA Closure Pkg to DSHW
MDB
Cutter
MDB Closure
Demolition
Admin Closure
DCD Closure 11 July 2013
RCRA Closure Complete
ATLIC
GA/L Ops 23 Jan 2013
SW Conversion/Closure November 2012
DVS/DVSSR
DVS/DVSSR
Closure
Autoclave
TOCDF and CAMDS/DCD Secondary Waste Autoclave Operations
Closure
RCRA HWMU Closures Within This Scope

Figure 10-2 General Sequence of HWMU Decommissioning

General Area		HWMUs				
		Container Storage	Tank	Sump	Incinerator	Miscellaneous Unit
MDB and Vicinity, June 2011 – October 2013						
1	Container Handling Building	CHB				
2	Munitions Processing Bay			145, 146, 147, 148, 149, 168, 175		MDM-101, MDM-102, MDM-103, BDS-101, BDS-102
3	Toxic Cubicle		ACS-TANK-101, ACS-TANK-102	151		
4	ECR A			107		PMD-101, Projo Cutters
5	Category C Observation Corridors, Laboratory, and Monitoring Room			167, 131, 133, 193, 173, 192, 136, 137, 138, 139, 140, 141, 142, 130, 197		
6	LIC 1			156, 180, 188	LIC 1	
7	ECR B			106		PMD-102 Projo Cutters
8	LIC 2			144, 157	LIC 2	
9	Spent Decon System Room		SDS-TANK-101, SDS-TANK-102, SDS-TANK-103,	150		
10	Explosive Containment Vestibule	ECV		108, 109, 110		
11	DFS Primary Room			132, 161	DFS	
12	Upper Munitions Corridor	UPMC		112, 113, 114, 115, 116, 117, 118, 169, 174, 189		
13	Toxic Maintenance Area	TMA-A		135, 154		
14	255 Airlocks			123, 124		
15	Toxic Maintenance Area Airlock	TMA-A/B & TMA-C (as well as Sec. Containment Sump 152)		153		
16	Lower Buffer Storage			164, 190		
17	265 Airlocks			126, 127		
18	Unpack Area	UPA		101, 102, 103, 104		
19	123 Airlocks			125, 182		
20	HVAC Structure	Major Ancillary Equipment (Subpart CC) of ACS-101, ACS-102 and Cat A Sumps				
21	Lower Munitions Corridor			179, 184		
22	111 Airlocks			134, 160		
23	Metal Parts Furnace			187	MPF	
24	Pollution Abatement	Major Ancillary Equipment of MPF, LIC 1, LIC 2, and DFS Incinerators				

General Area		HWMUs				
		Container Storage	Tank	Sump	Incinerator	Miscellaneous Unit
	System Building					
25	S-2 Warehouse	S-2				
26	Brine Surge Tank Farm		BRA-TANK-101, BRA-TANK-102, BRA-TANK-201, BRA-TANK-202			
27	BRA PAS					BRA (Remnants)
Area 10 DVS/DVSSR, December 2012 – April 2013						
1	Secondary Waste Sorting Operations Igloo 1632	Igloo 1632				DVS-101, DVS-102, DVSSR
Area 10 Autoclave, November 2013 – April 2014						
1	Secondary Waste Autoclave Operations Igloo 1631, 1633, 1634, 1635 and 1636	Igloos 1633, 1634, 1635, 1636				Autoclave
Area 10 ATLIC, February 2012 – December 2012						
1	GA/L ATLIC Operations	Igloo 1639/ATLIC Room	LCS-TANK-8511 SDS-TANK-8523 NSF-TANK-8514 LCS-TANK-8516 LCS-TANK-8534		ATLIC	ATLIC TC Glovebox 1 ATLIC TC Glovebox 2

10.4.4 Scope of Ancillary Equipment

This section describes the minimum extent of what is considered "ancillary equipment" for the purposes of this closure plan. Hence, a HWMU will be defined as the primary HWMU element (e.g., wetted tank vessel, incinerator combustion chambers) in addition to all of its ancillary equipment.

10.4.4.1 Conventional Tank Systems

Table 10-7
Equipment Constituting Subpart J Tank Systems (Brine Surge Tanks, ACS Tanks, SDS Tanks, ATLIC Tanks)

Portion	Sub-Portion	Boundaries/Extent
Primary Containment	Vessel	Entire vessel including nozzles, lids, manhole covers, vent pipe, conservation vent
Secondary Containment	Floor and walls/berms/dikes	Entire floor and wall/berm within the credited required secondary containment volume calculation.
	Sump system *(BSTs Only)*	Entire sump internal surface
		All piping, fittings, flanges, valves, filters and pumps *from* pump suction *to* vessel connection.
Hazardous Waste Conveyance	Supply (Inflow)	All piping, fittings, flanges, valves, filters and pumps *from* boundary with upstream conterminous HWMU or collection points (e.g., sumps) *to* vessel connection

Table 10-7
Equipment Constituting Subpart J Tank Systems (Brine Surge Tanks, ACS Tanks, SDS Tanks, ATLIC Tanks)

Portion	Sub-Portion	Boundaries/Extent
	Discharge (Outflow)	All piping, fittings, flanges, valves, filters and pumps *from* vessel connection *to* boundary with conterminous downstream HWMU or unload station.
	Recirculation	All piping, fittings, flanges, valves, filters and pumps *from* vessel discharge connection *to* vessel input connection.
Subpart CC Air Pollutant Emissions System *(ACS and ATLIC Tanks Only)*	Closed vent	*(ACS Only)* MDB HVAC ducting *from* MDB exit to connection *to* each of nine carbon adsorption filter housings. *(ATLIC Only)* HVAC ducting from LCS-TANK-8511 enclosure to each of three carbon adsorption filter housings
	Emissions control device	HVAC carbon adsorption filter housings from incoming ducting connections to discharge ducting connections.

10.4.4.2 Sump Systems With Secondary Containment

Table 10-8
Equipment Constituting Subpart J ICU Tank Systems Possessing a Steel Liner

Portion	Sub-Portion	Boundaries/Extent
Primary Containment	Sump liner	Entire steel liner
Secondary Containment	Concrete vault	Entire concrete vault internal surface
Hazardous Waste Conveyance	Supply (Inflow)	Floor surfaces that channel liquid toward the primary containment.
	Discharge (Outflow)	All piping, fittings, flanges, valves, filters and pumps *from* sump pump suction *to* boundary with conterminous downstream HWMU (e.g., SDS Tank System).
Subpart CC Air Pollutant Emissions System *(P999 Sumps Only)*	Closed vent	MDB HVAC ducting *from* MDB exit to connection *to* each of nine carbon adsorption filter housings.
	Emissions control device	HVAC carbon adsorption filter housings from incoming ducting connections to discharge ducting connections.

10.4.4.3 Sump Systems Without Secondary Containment

Table 10-9
Equipment Constituting Subpart J ICU Tank Systems with No Liner

Portion	Sub-Portion	Boundaries/Extent
Primary Containment	Concrete vault	Entire concrete vault internal surface
Hazardous Waste Conveyance	Discharge (Outflow)	All piping, fittings, flanges, valves, filters and pumps *from* sump pump suction *to* boundary with conterminous downstream HWMU (e.g.,SDS Tank System).
Subpart CC Air Pollutant Emissions	Closed vent	MDB HVAC ducting *from* MDB exit to connection *to* each of nine carbon adsorption filter housings.

System *(P999 Sumps Only)*	Emissions control device	HVAC carbon adsorption filter housings from incoming ducting connections to discharge ducting connections.

10.4.4.4 Container Storage Areas with Fixed Secondary Containment

Table 10-10
Equipment Constituting Subpart I Container Storage Areas)

Portion	Sub-Portion	Boundaries/Extent
Primary Containment	Containers	All containers will have been removed from the storage unit prior to closure.
Secondary Containment	Floor and walls/berms/dikes	Entire floor and wall/berm within the credited required secondary containment volume calculation.
Subpart CC Air Pollutant Emissions System	Closed vent	MDB HVAC ducting *from* MDB exit to connection *to* each of nine carbon adsorption filter housings.
	Emissions control device	HVAC carbon adsorption filter housings from incoming ducting connections to discharge ducting connections.

10.4.4.5 Container Storage Areas Without Fixed Secondary Containment

Table 10-11
Equipment Constituting Subpart I Container Storage Areas without Fixed Secondary Containment)

Portion	Sub-Portion	Boundaries/Extent
Primary Containment	Containers	All containers will have been removed from the storage unit prior to closure.
Secondary Containment	Containment Pallets/Devices	All secondary containment pallets and devices (e.g., ONCs) will have been removed from the storage unit prior to closure.

10.4.4.6 Incinerator Systems

Table 10-12
Equipment Constituting Subpart O Incinerator

Portion	Sub-Portion	Boundaries/Extent
Combustion Chambers	Primary Chamber	*(LICs Only)* Entire primary chamber vessel from combustion fan inlet to secondary chamber inlet.
		(MPF Only) Entire primary chamber furnace from combustion chamber blowers to secondary chamber inlet.
		(DFS Only) Entire kiln to connection with secondary chamber (includes BLAD).
		(ATLIC Only) Entire primary chamber vessel from combustion fan inlet to secondary chamber inlet.
	Secondary Chamber	*(LICs Only)* Entire secondary chamber vessel from flue gas inlet to flue gas outlet.
		(MPF Only) Entire secondary chamber from primary chamber to PAS gas train.
		(*DFS Only)* Entire secondary chamber.
		(ATLIC Only) Entire secondary chamber vessel from flue

Table 10-12 Equipment Constituting Subpart O Incinerator		
Portion	**Sub-Portion**	**Boundaries/Extent**
		gas inlet to flue gas outlet.
Hazardous Waste Conveyance	Supply (Inflow)	*(LICs Only)* All piping, fittings, flanges, valves, filters and pumps *from* ACS tanks to primary injection nozzles.
		(MPF Only) Immediate feed conveyor.
		(DFS Only) Feed chutes from slide gates to kiln.
		(ATLIC Only) All piping, fittings, flanges, valves, filters and pumps *from* connections with ACS-TANK-8511, Glovebox 1 and Glovebox 2 to primary injection nozzle.
	Discharge (Outflow)	*(MPF Only)* Immediate discharge conveyor.
		(*DFS Only)* Entire heated discharge conveyor.
Pollution Abatement System	PAS Flue Gas Train	*(LICs Only)* Entire gas train from LIC secondary chamber to common stack (includes quench tower, venturi scrubber, scrubber, demisters and induction fans).
		(MPF Only) Entire gas train from secondary chamber exhaust to common stack (includes quench tower, venturi scrubber, scrubber, demisters and induction fans).
		(DFS Only) Entire gas train from secondary chamber exhaust to common stack (cyclone, quench tower, venturi scrubber, scrubber, demisters and induction fans).
		(ATLIC Only) Entire gas train from ATLIC secondary chamber to discharge stack (includes quench tower, venturi scrubber, scrubbers, demisters, carbon filter unit, baghouse and induction fan).
	PAS Liquid Train	*(LICs, MPF and DFS)*All piping, fittings, flanges, valves, filters and pumps comprising the quench brine system and scrubber brine system, including brine piping to the BST inlets and PAS condensate lines to PAS-TANK-103.
		(ATLIC Only) All piping, fittings, flanges, valves, filters and pumps comprising the scrubber brine system, including scrubber blowdown piping to the spent brine accumulation tank inlet.

10.4.4.7 Miscellaneous Units

Table 10-13 Equipment Constituting Subpart X Miscellaneous Units		
Portion	**Sub-Portion**	**Boundaries/Extent**
PMD	PMD Machine	Entire machine (not including electrical and hydraulic support systems)
	Supply (Munition)	Immediate conveyor
	Discharge (Munition)	Immediate conveyor
	Discharge (Energetics)	None
MDM	MDM Machine	Entire machine(not including electrical and hydraulic support systems)
	Supply (Munition)	Pick and Place Machine
	Discharge (Munition)	Pick and Place Machine

Table 10-13
Equipment Constituting Subpart X Miscellaneous Units

Portion	Sub-Portion	Boundaries/Extent
	Discharge (Burster Well)	BWIC Assembly
	Discharge (Agent)	All piping, fittings, flanges, valves, filters and pumps from agent pump suction to boundary with conterminous downstream HWMU (ACS Tank System)
BDS	BDS Machine	Entire machine (not including electrical and hydraulic support systems) including the Heel Transfer System and all its associated piping, fittings, flanges, valves, filters and pumps.
	Supply (Bulk Container)	Immediate conveyor
	Discharge (Bulk Container)	Immediate conveyor
	Discharge (Agent)	All piping, fittings, flanges, valves, filters and pumps from agent pump suction to boundary with conterminous downstream HWMU (ACS Tank System))
Projo Cutter	Entire Assembly	Entire Projo Cutter Machine
DVS	Multi-Compartment Enclosure	Entire structure including spent decon collection and transfer system up to but not including the receiving <90-day accumulation tank.
	Subpart CC Air Pollutant Emissions System	Entire ductwork system from enclosure compartments, through carbon filter system and discharge of the ID fans.
DVSSR	Multi-Compartment Enclosure	Entire structure including spent decon collection and transfer system up to but not including the receiving <90-day accumulation tank.
	Subpart CC Air Pollutant Emissions System	Entire ductwork system from enclosure compartments, through carbon filter system and discharge of the ID fans.
Autoclave	Pressure/Vacuum Vessel	Entire vessel (not including electrical and hydraulic support systems).
	Condensate Collection System	From condenser discharges up to but not including the receiving <90-day accumulation tank.
	Subpart CC Air Pollutant Emissions System	Entire ductwork system from vessel, through ejector, condensers, carbon filter system and discharge of the ID fans.
BRA PAS	Remaining Equipment	All equipment remaining in place.
ATLIC TC Glovebox 1 & 2	Entire Enclosure	Entire glovebox structure including transfer piping to downstream connection to HWMU (e.g., tank or incinerator)

10.5 CLOSURE WASTE MANAGEMENT

This section describes the methods which will be utilized during closure for

1) removing, transporting, treating, storing or disposing of the hazardous waste inventory,
2) determining the agent-exposure status of newly-generated wastes and debris, and
3) determining the agent-exposure status of equipment, buildings and structures that will be subject to general demolition.

10.5.1 Wastes Generated During Closure

Hazardous waste and hazardous debris generated during closure decommissioning, dismantling and decontamination activities that is not intended to be left in place for demolition will be managed and disposed of as prescribed for that applicable waste stream in accordance with R315-5-1.11 [40 CFR 262.11] for newly-generated waste. Any remaining inventory of hazardous waste in the permitted storage will also be removed and managed in accordance with the generator requirements of 40 CFR 262.11. Equipment, structures and building materials that are left in place for demolition will not be declared as F999 hazardous waste/debris until demolition of that part of the applicable building area or structure begins and the material has been containerized for transportation.

Table 10-14 summarizes the most common types of wastes that will be generated while performing decommissioning, dismantling and decontamination activities, but is not intended to be all inclusive. Waste and debris generated during closure decontamination and decommissioning, prior to demolition, will be initially divided into three major categories: liquid agent-exposed, vapor agent-exposed and non agent-exposed. The methodology for the evaluation and determination of agent exposure status is presented in Section 10.5.2.

Although equipment, buildings and structures will not have been declared hazardous debris prior to demolition provided the building and structure are intact, the status of the equipment, buildings and structures will be determined using the same methodology presented in Section 10.5.2.

Newly-generated wastes and debris will be categorized based on their agent-exposure status as determined in Section 10.5.2 and will be in accordance with Section 10.5.3.

TABLE 10-14
TYPES OF WASTE GENERATED DURING CLOSURE DECONTAMINATION AND DECOMMISSIONING (PRIOR TO DEMOLITION)

Spent decontaminant/rinsate
Residue sludges
Housekeeping waste
Spent hydraulic fluid
Electrical sensors not intended for reuse
Concrete chips and residue resulting from scabbling, scarification, coring
Tools, contaminated or no longer useful

TABLE 10-14 TYPES OF WASTE GENERATED DURING CLOSURE DECONTAMINATION AND DECOMMISSIONING (PRIOR TO DEMOLITION)
DPE suits
TAP gear not reusable
Paint and coating residue removed pursuant to concrete sampling
Conveyors, hydraulic components, cranes removed from building, contaminated or not intended for reuse (debris)
HWMU piping, valves, fittings removed from building
Non-HWMU piping, valves, fittings removed from building, contaminated or not intended for reuse
Concrete chunks removed from building

10.5.2 Evaluation and Determination of Agent-Exposure Status

Equipment and areas exposed to chemical agent will not automatically be considered agent-contaminated. The decision making process to determine whether equipment or waste (i.e., "material") is agent-contaminated is based on generator knowledge of the process, operational history, contamination and exposure history, agent monitoring and/or sampling and analysis results. Wastes generated outside the buildings that house HWMUs (e.g., miscellaneous support buildings) are unlikely to be agent contaminated; however, these wastes will undergo the process described in this section. The following steps will be used in the contamination assessment.

1. ***Step 1, Determination of Liquid Agent or Agent Aerosol Exposure*** – The first step in the contamination assessment will be to determine whether the material has historically been exposed to liquid agent or agent aerosol. Any material exposed to liquid agent or agent aerosol will be assumed to be liquid agent exposed and will be managed in accordance with Section 10.5.3.1. Rooms that are known to have specific areas that have been exposed to liquid agent or agent arerosol include the TOX, TMA-A, LIC-1 Primary Room, LIC-2 Primary Room, MPB, UMC, UPA, ECR-A, ECR-B and the ECV. Otherwise, materials will be evaluated in Step 2.

2. ***Step 2, Determination of Agent Vapor Exposure*** – In step two, materials that have not been exposed to liquid agent or agent aerosol will be assessed for historical exposure to agent vapor. Materials with adequate historical monitoring records that have been historically exposed to agent vapors less than 1.0 VSL will be assumed to be currently agent-uncontaminated and will be managed in accordance with Section 10.5.3.3. Materials exposed to agent vapors ≥ 1.0 VSL will be evaluated in Step 3. A qualitative evaluation, as described in Step 4, will be required for materials that lack adequate historical monitoring data.

3. ***Step 3, Determination of Agent Vapor Exposure ≥ 1.0 VSL*** – In step three, a determination of whether the material has been exposed to agent vapors ≥ 1.0 VSL must be made. If the material has been exposed to agent vapors ≥ 1.0 VSL, and reliable and thorough historical monitoring records are available, then the material will be considered vapor-agent exposed and will

be managed in accordance with 10.5.3.2. Otherwise, the material will be evaluated in Step 4.

4. ***Step 4, Conduct Qualitative Evaluation*** – In step four, materials for which historical monitoring records do not exist will undergo a qualitative evaluation. The qualitative evaluation will be used to determine the possibility of existing agent contamination on surfaces. The assessment considers the following:

   - Utilization of the equipment, unit, and/or area (i.e., type of process, operation, or risk)
   - Historical documentation for similar operations
   - Concentration of agent and duration of exposure
   - Confidence in the monitoring data and in past management practices
   - Material of composition (porosity, density, etc.)
   - Temperature of the environment
   - Location of equipment or item considering the source of the agent vapor and the air flow direction

   Materials determined to be potentially liquid agent-exposed through the qualitative evaluation will be managed as liquid agent-exposed. All wastes will be managed in accordance with their agent exposure determination, as specified in Section 10.5.3.

10.5.3 Decontamination & Decommissioning of Equipment, Buildings and Structures

The strategy for decontamination and decommissioning of equipment, buildings and structures is based primarily upon their agent-exposure status.

10.5.3.1 Management of Aerosol and Liquid Agent-Exposed Surfaces

One of the initial steps in the management of liquid agent-exposed equipment, buildings and structures is to conduct an occluded space survey. The occluded space survey will be used in order to identify confined areas within equipment, building surfaces and structures that were exposed, or potentially exposed, to liquid or aerosol agent and that have (or have had) the potential to contain liquid agent. The survey will consider operational knowledge as well as information gathered through site walkovers and/or facility drawing reviews. If the survey reveals that occluded spaces exist, steps such as equipment disassembly may be taken to reveal these spaces for decontamination.

Upon completion of the occluded space survey, a determination will be made whether to 1) decontaminate liquid or aerosol agent-exposed items or 2) declare them as P999 hazardous waste/debris and treat them in a permitted treatment unit. These liquid or aerosol agent-exposed materials will not remain in-place for general demolition unless they are *effectively* decontaminated and demonstrated to meet the < 1.0 VSL screening criteria.

Materials that will remain in-place for general demolition may have been decontaminated in the past (e.g., during agent operations) or may be decontaminated during closure. During demolition, the resulting newly-generated demolition debris will have been air monitored (prior to commencement of demolition) as described in 10.4.1 in order to be disposed at a permitted TSDF as F999 hazardous waste/debris.

Rooms within the MDB that are known to have been exposed to liquid agent or agent aerosol include the TOX, TMA-A, LIC-1 Primary Room, LIC-2 Primary Room, MPB, UMC, ECR-A, ECR-B and the ECV. At a minimum, the liquid or aerosol-exposed areas within these rooms will be pressure washed or sprayed with the appropriate decontamination solution identified in 10.4.2 in order to decontaminate any residual liquid or aerosol agent contamination resulting from agent destruction operations. Successful surface headspace monitoring below the VSL or sample analysis for the rinseate below 20 ppb for agents GB and VX and 200 ppb for mustard will indicate successful surface decontamination.

Concrete Consideration - Liquid agent-exposed concrete that underlies an applied coating (e.g., Epoloid) is subject to augmented direct sampling and analysis to verify that the coating successfully performed its function as an impervious layer. Only with this verification of the coating (to include cracks) will surface decontamination be deemed effective. Otherwise, the agent-contaminated concrete will be subject to additional decontamination techniques as described in section 10.4.1.2.

10.5.3.2 Management of Vapor Agent-Exposed Surfaces

Buildings, structures and equipment that were only exposed to vapor agent < IDLH which can be demonstrated to meet the unventilated monitoring screening criteria of < 1.0 VSL do not require additional decontamination prior to demolition and disposal.

If it is determined that vapor agent-exposed materials will likely be difficult to decontaminate to the < 1.0 VSL criterion, the materials may 1) be assumed to be agent-contaminated, removed, declared P999 hazardous waste/debris, treated in a permitted treatment unit and disposed, or 2) undergo decontamination in accordance with 10.4.2 along with additional air monitoring. Additionally, vapor agent-exposed materials destined for thermal treatment as P999 hazardous waste/debris must meet waste acceptance criteria of the treating TSDF. Materials that are assumed to be vapor agent-exposed which will be removed for treatment at TOCDF will be declared as P999 hazardous waste and will be treated in a permitted treatment unit or placed in TOCDF permitted storage until permitted-treatment is possible.

10.5.3.3 Management of Non Agent-Exposed Surfaces

Prior to final disposition of non agent-exposed equipment, buildings, and structures (i.e., not subject to P999 and F999 waste codes), a determination of whether the material contains any other listed or characteristic RCRA hazardous waste must be made. Those materials that do not contain any listed or characteristic hazardous waste may be removed and shipped offsite for reuse or recycling, may be removed and shipped to a solid waste landfill (i.e., Subtitle D Landfill), or may be left in place for future demolition. This will not include any TOCDF facilities where agent was stored or treated, or housed any HWMUs.

10.5.4 Special Handling of Waste During Site-Wide Demolition Phase

10.5.4.1 Demolition Waste Strategy

During in-process demolition and preparation-for-shipment activities (e.g., size reduction), the resultant debris will be segregated to remove large and odd shaped solid materials such as steel structure and sheeting, equipment, rebar, concrete, asphalt and the like ("hard materials") leaving materials such as wood, insulation and the like in a separate pile ("soft materials"). Hard and soft materials will be recombined during container-loading as necessary to minimize void spaces within the loaded container. Should size reduction of the hard materials be unnecessary, they may be loaded for shipment directly without segregation. Relocation of debris materials within the site will be permissible provided dust control and wind-driven material mitigation measures are employed, as described in 10.5.4.2.

All newly-generated F999 hazardous demolition waste will be containerized and accumulated onsite in accordance with the "generator" requirements of 40 CFR 262.34. until such time within 90 days that the containers are transported to an offsite Permitted Hazardous Waste facility.

10.5.4.2 Dust Suppression and Mitigation of Wind-driven Materials

Dust abatement during demolition and size-reduction activities will be accomplished through the use of water sprays sparingly applied so as to avoid run-off out of the HWMU-building footprint. Any resulting run-off of dust suppression water from the debris pile to surrounding soil will be recorded. Judgmental closure verification samples will be subsequently collected in areas where dust suppression water run-off may have accumulated in order to verify that the activity did not contaminate the soil.

The "soft materials" will be dampened with water as necessary during the work day and off-shift to prevent them from becoming wind-driven insofar as practicable. Efforts will be made during in-process segregation to shake soft materials from hard materials such that hard materials can undergo size reduction without dampening.

10.5.4.3 Building Component and Equipment Temporary Laydown

Large building components and equipment in need of size reduction (to fit into roll-off containers) may be placed upon:

1) concrete slabs that are themselves destined for disposal under TOCDF closure, and
2) concrete slabs, asphalt, or soil, provided the location is recorded and subsequent additional judgmental closure verification sampling is performed in order to verify that the activity did not contaminate the concrete, asphalt, or soil.

10.5.4.4 Timely Containerization of Demolition Waste

Once demolition has commenced, placement of the resulting debris into approved DOT containers (e.g., roll-offs, end-dumps) will be accomplished in as timely a manner as demolition and size reduction activities allow. All soft materials susceptible to becoming wind-driven in spite of dampening will be containerized prior to the end-of-shift each day.

10.5.4.5 Recycling/Reclamation of Metal Components in Lieu of Disposal

Metal equipment and building pieces that are recyclable by reclamation (i.e., recovery of the metal content) are exempted from RCRA Subtitle C hazardous waste regulation per 40 CFR 261.6(a)(3)(ii). In order for the scrap metal to be recycled by reclamation in lieu of disposed as hazardous debris, all of the following requirements will be met:

10.5.4.5.1 The scrap metal shall have met the requirements of this closure plan for disposal.

10.5.4.5.2 The permittee shall evaluate the potential for any agent hazards to demolition, transportation, and recycler personnel.

10.5.4.5.3 The permittee shall be able to demonstrate a known market for the scrap metal.

10.5.4.5.4 The permittee shall possess a contract with a legitimate recycler for receipt of the scrap metal including provisions for assurance of reclamation.

10.6 GROUND-WATER MONITORING AND RUN-ON & RUN-OFF CONTROL

There are no disposal units associated with the TOCDF RCRA permit. No ground-water contamination is expected as a result of the TOCDF operations. Hence, although ground-water monitoring may be performed by TEAD-S as a result of TEAD-S operations, this closure plan does not address ground-water monitoring or any other long-term monitoring associated with the TEAD-S Permit and previously identified SWMUs.

During the closure period, precipitation run-on and run-off control will continue to be accomplished through the maintenance of site grading and containment structures. During the demolition phase, run-off of demolition personnel-applied dust-suppression water and precipitation out of HWMU buildings and structures will be managed as described in 10.5.4.

10.7 CLOSURE PLAN COST ESTIMATE

A closure cost estimate is not required for this RCRA Permit. State and federal governments are exempt from the financial requirements of 40 CFR 264 Subpart H in accordance with 40 CFR 264.140(c).

10.8 POST CLOSURE

The closure plan is designed to accomplish a safe, risk-based residential closure of the site. Further post-closure actions at the site are not anticipated. Any post-closure care resulting from activities not conducted pursuant to the TOCDF TSDF Permit will be addressed under the TEAD-S Environmental Restoration Program.

10.9 CERTIFICATION OF CLOSURE [40 CFR 264.115 and UAC R315-8-7]

Within 60 calendar days of completion of TOCDF final closure, the Permittee will submit to the Director of the Division of Solid and Hazardous Waste, by registered mail, a certification that the TOCDF facility has been closed in accordance with the specifications in this closure plan. The certification will be signed by the Permittee and by an independent registered professional engineer. Documentation supporting the independent registered professional engineer's certification will be furnished to the Director of the Division of Solid and Hazardous Waste upon request.

10.10 CORRECTIVE ACTION FOR SWMUS [40 CFR 264.101]

Other than the TEAD-S solid waste management units (SWMUs) associated with CAMDS, no SWMUs have been identified at the TOCDF site. All SWMUs within the TEAD-S boundaries and corrective actions associated with them are incorporated in the TEAD-S RCRA TSDF Permit. Ten (10) specific spill sites associated with TOCDF operations have been identified and are listed in Module VII. These spill sites will be verified "risk-based residential closed" in accordance with this closure plan so that no post-closure corrective action will be necessary.