

CLOSURE PLAN

ATTACHMENT 6

**Pueblo Chemical Depot
Pueblo, Colorado**

ATTACHMENT 6
CLOSURE PLAN

[6 CCR 1007-3 § 264 Subpart G]

6-1 INTRODUCTION

This Closure Plan describes performance standards and procedures to clean close the following hazardous waste management units:

- G203
- G1009
- G1107
- G1109
- G1110
- Building 540
- Two Explosive Destruction Systems (EDSs) units (EDS units, containers, tanks and ancillary equipment and Environmental Enclosures)
- Container Storage Unit (CSU) H1102
- CSU H1103
- Hazardous Waste Roll-off Container Storage Area adjacent to CSU H1103.

Section 6-2 of this Closure Plan applies to Pueblo Chemical Depot (PCD) Hazardous Waste Container Storage Facilities G203, G1009, G1107, G1109, G1110, and Building 540, whereas Section 6-3 applies to

the PCAPP EDS site hazardous waste treatment and storage units. Upon completion of operational hazardous waste management activities, PCD hazardous waste management units (including the PCAPP EDS Site hazardous waste treatment and storage units) will be clean closed in accordance with the requirements of 6 Colorado Code of Regulations (CCR) 1007-3 Part 264 Subpart G and this Closure Plan. This Closure Plan describes performance standards and procedures to clean-close the permitted hazardous waste management units. This plan presents methods to dispose of all (agent-related and nonagent-related) hazardous wastes and contaminated materials; to identify nature and extent of areas contaminated with hazardous waste constituents of concern; perform decontamination; perform verification sampling to confirm successful decontamination; and document clean closure certification. In addition to clean closure, this Closure Plan describes the strategy to perform “temporary closeout” of the EDS unit(s) and CSUs that will be located at the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) EDS site. This plan also presents methods to identify contaminated equipment and decontaminate contaminated equipment associated with the EDS units and CSUs located at the PCAPP EDS site.

6-2 CLOSURE PLAN FOR PCD CONTAINER STORAGE FACILITIES (G203, G1009, G1107, G1109, G1110, AND BUILDING 540)

6-2a General Description

PCD stores and manages mustard agent-related wastes in permitted hazardous waste management units G203, G1009, G1107, G1109, and G1110. PCD stores and manages nonagent-related hazardous wastes in Building 540. Waste chemical munitions stored at PCD contain the chemical mustard agent (distilled sulfur mustard [HD]/mustard-T mixture [HT]). If an HD or HT chemical munition is suspected of leaking or known to be leaking, the munition is overpacked and stored in one of the five Resource Conservation and Recovery Act (RCRA)-permitted agent-related hazardous waste management units, G203, G1009, G1107, G1109, and G1110. Material such as personal protective equipment (PPE) or dunnage contaminated from handling leaking munitions is stored in RCRA hazardous waste management unit G203 or G1110. Hazardous wastes that are not agent-related, such as wastes from PCD administrative and warehouse areas as well as wastes from remediation activities, are containerized and

stored in Building 540 for up to 1 year. The specific agent-related and nonagent-related wastes in PCD RCRA-permitted hazardous waste management units include:

- *RCRA-Permitted Hazardous Waste Management Units G203, G1009, G1107, G1109, and G1110.* Mustard agent-related waste such as overpacked, leaking 105mm, 155mm projectiles, and 4.2-inch mortars are stored in G203, G1009, G1107, G1109, and G1110. Agent-contaminated material, including PPE, dunnage, contaminated pallets, and other agent-contaminated materials such as spent activated carbon adsorbers are stored in G203 or G1110.
- *Building 540 (Container Storage Area).* Building 540 is used to store nonagent-related hazardous wastes until they can be transferred to an approved treatment, storage, and disposal facility. These wastes include waste paint and thinners; PCD Analytical Laboratory wastes (various solvents, acids, bases, and alcohols used for analyses); waste batteries and battery acid; contaminated soils, sediment, or water from the remediation of Solid Waste Management Units (SWMUs); used Interim Corrective Action Groundwater Remediation System (ICAGRS) filters; waste starter fluids; used PPE (associated with remediation activities); universal wastes such as fluorescent bulbs; and spent carbon from groundwater treatment systems.

Figure 6-1¹ presents an example of a RCRA-permitted hazardous waste management unit (similar to G203, G1009, G1107, G1109, and G1110) at PCD. **Figure 6-2** provides an illustration of the RCRA-permitted Building 540 floor plan. The closure activities for each unit reflect the requirements and considerations appropriate to the types of wastes stored in the unit.

6-2b Closure Strategy

This section describes the closure strategy for the agent-related and nonagent-related RCRA-permitted hazardous waste management units.

¹ All figures are located at the end of this attachment.

6-2b(1) RCRA-Permitted Agent-Related Hazardous Waste Management Units G203, G1009, G1107, G1109, and G1110 Closure Strategy

Prior to beginning closure activities, all wastes will have been removed from the storage units and properly disposed per Colorado Hazardous Waste Regulations. Decontamination of the hazardous waste management units and associated equipment will begin after all waste process activities have been completed. Identifying nature and extent of contamination, performing decontamination, and verifying adequate decontamination will be performed in a phased approach that involves:

- Identifying the extent of areas contaminated with hazardous constituents of concern. This identification will be based at a minimum on: air monitoring analytical results, known/recorded spills, surface sampling and analysis (concrete chips), review of the inspection and operating records, visual inspection to look for possible/likely waste migration areas including but not limited to cracks, gaps, and joints, plus indicators such as stains and discolorations of the storage unit floor and adjoining berms/walls. **Table 6-1**² presents the decision-making process that will be used to identify constituents of concern for hazardous waste management units G203, G1009, G1107, G1109, and G1110. If constituents of concern are identified that are not included in **Table 6-2**, the Permittee shall submit a permit modification request to add the constituents to **Table 6-2** following the procedures for a permit modification in 6 CCR 1007-3 §100.63.
- Sampling of the concrete floor and the soil beneath any cracks will be conducted using statistical random sampling techniques in accordance with *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Chapter 9, SW-846* (most current edition) to determine the number and location of samples based on a 95% confidence interval. EPA endorsed statistical sampling software may also be used in conjunction with methods listed in SW-846.

² All tables are located at the end of this attachment.

- Performing decontamination using suitable decontamination methods and techniques³ based on the chemicals of concern that were identified. Surface decontamination will be performed followed by air monitoring to verify adequate decontamination for mustard agent. Containment berms and temporary containment systems will be maintained during decontamination activities. Removal of containment berms will not take place until all hazardous wastes have been removed. These measures should prevent contamination from being inadvertently spread to the surrounding environment during closure.
- Performing chemical decontamination with bleach, water, detergents and/or surfactants may be employed to aid in removing contamination. Decontamination solutions may be sprayed on using high pressure sprayers or steam cleaners, poured on, brushed on or wiped onto surfaces where potential contamination exists. Spent decontamination solution, and residual decontamination solution will be rinsed off using water. The final rinse of the entire surface (using the minimum amount of water necessary to contact the surface and provide an adequate sample volume) will be collected separately. Used decontamination solutions and water will be collected and characterized for the constituents in **Table 6-3** and for hazardous waste metal constituents per Appendix VIII of Part 261 of 6 CCR 1007-3. A separate sample of the final rinse will be analyzed for the constituents in **Table 6-3** and for hazardous waste metal constituents per Appendix VIII of Part 261. Spent decontamination solution generated during closure activities will be collected using suction or absorbents, and managed and disposed as a hazardous waste. Decontamination operations using water and bleach solutions are outlined in **PCD SOP 486**, Operation 10. If the analysis of the final rinse demonstrates no detectable levels of thioglycol and any hazardous waste constituents per Appendix VIII of Part 261 of 6 CCR 1007-3, then the concrete floor is considered to meet clean closure.
- Where chemical decontamination proves inadequate, more aggressive techniques may be required. One technique used previously in the chemical demilitarization program is

³ Based on visual inspection of the storage units, appropriate decontamination methods and techniques used are based on 6 CCR 1007-3 § 268.45, Table 1.

scabbling. Scabbling is a technique used to remove a surface layer from contaminated concrete surfaces. The surface layer is removed by either a series of cutter blades or impact hammers that break up the material. Scabbling typically removes about 1/4 inch (0.6 centimeters [cm]) of material in a single pass. Multiple passes may be necessary to remove all contamination in heavily contaminated areas. Scabbling requires specialized equipment including vacuum systems, collection hoppers and dust collection systems to ensure worker safety and to prevent the spread of possible contamination. The scabbled concrete will be collected for analysis according to criteria in **Table 6-3**. Waste solids will be collected, managed and disposed as a hazardous waste. The concrete surface is considered decontaminated when analysis of concrete samples demonstrate no detectable levels of the hazardous waste constituents on **Tables 6-2** and **6-3**.

- During all decontamination operations, personnel will be required to wear appropriate PPE as specified within applicable guidance including Department of the Army Pamphlet (DA Pam) 385-61, local Standing Operating Procedures (SOPs) and project work plans. The RCRA-permitted hazardous waste management unit Air Filtration Systems (AFSS) will remain operating and monitoring will be conducted until air monitoring results are received and verified. It is not anticipated that soil removal will be necessary during closure because any incidents involving chemical agent release (or other hazardous waste) during the operations life of the structure will be addressed under the Permit Contingency Plan.
- Performing air monitoring to the GPL in accordance with a method approved by the Division, to confirm decontamination of agent-contaminated surfaces. A method for GPL air monitoring will be developed by PCD prior to closure of permitted structures. If closure is required prior to development of a GPL method, air samples will be sent off-site for analysis to a certified analytical laboratory that utilizes a method approved by the Division. Additionally, the Permittee will conduct a final rinse or solid sampling to confirm decontamination for areas where contamination or potential contamination with hazardous waste constituents has been identified. The final rinse-water volume used for each decontaminated area must not exceed the minimum amount necessary to collect an adequate sample volume for analysis and to completely contact the decontaminated area. Air monitoring and rinse-water or solid sample analytical results will be compared against the decontamination verification criteria listed in **Table 6-2**. If results do not

meet the closure performance standards (**Table 6-2**), decontamination will be repeated until closure performance standards are met.

- Sampling and analyzing air and concrete chip samples for chemicals of concern to verify clean closure details of which will be included as an item in the compliance section. If analytical results do not meet the closure performance standards (**Table 6-2**), the RCRA-permitted hazardous waste management units G203, G1009, G1107, G1109, and G1110 will be decontaminated until closure performance standards are met or the materials will be disposed of as RCRA hazardous wastes.
- Collecting, characterizing, and managing wastes generated from closure activities.
- Certifying clean closure of the hazardous waste management units.

Once air monitoring results meet the decontamination verification criteria, final sampling will be conducted. This final sample will be segregated from previous samples to verify adequate decontamination. Sampling results will be compared against the closure performance standards listed in **Table 6-2**.

The RCRA-permitted hazardous waste management unit AFS will remain operating and monitoring will be conducted until air monitoring results are received and verified. For closure verification purposes, the vents and doors to the unit will be kept closed from at least 4 hours prior to the start of air monitoring until closure verification air monitoring is complete for the unit.

The units will be deemed clean closed when air monitoring results and any other required analytical results meet the closure performance standards in **Table 6-2**.

6-2b(1)(a) Sampling to Confirm Decontamination and Determine Clean Closure – G203, G1009, G1107, G1109, and G1110

Air monitoring will be conducted to confirm adequate decontamination and will be used to determine clean closure in conjunction with any other required analytical results demonstrating that no other hazardous waste constituents remain above human health risk-based levels. Air samples for mustard agent will be collected using MINICAMS[®] or Depot Area Air Monitoring System (DAAMS). Confirmation monitoring for mustard agent will be performed using DAAMS or other confirmatory method approved by the Colorado Department of Public Health and Environment (CDPHE), Hazardous Materials and Waste Management Division (the “Division”) that can detect to the concentration required for closure. Samples will be collected as identified in **Table 6-3**, which summarizes the sampling and analysis methods that will be used to identify contamination and confirm decontamination.

6-2b(1)(b) Air Sampling of Structures or Equipment – G203, G1009, G1107, G1109, and G1110

Air sampling of the interior air of the RCRA-permitted hazardous waste management units G203, G1009, G1107, G1109, and G1110 will be performed. **Table 6-4** summarizes the air sampling requirements.

During closure activities, personnel will use appropriate personal protective clothing and equipment as determined by the PCD Site Safety and Health Officer. In general, DA Pam 385-61, *Toxic Chemical Agent Safety Standards*, will be followed, as well as Occupational Safety and Health Administration (OSHA) safety standards.

6-2b(2) Nonagent-Related Hazardous Waste Storage Unit Building 540 Closure Strategy

Prior to beginning closure activities, all wastes will have been removed from Building 540. Decontamination of the hazardous waste management units and associated equipment will begin after all waste process activities have been completed. Identifying contamination, performing decontamination, and verifying adequate decontamination will be performed in a phased approach that involves:

- Identifying areas contaminated with hazardous constituents of concern. This identification will be based on known/recorded spills, a review of the inspection and operating records as well as a visual inspection to look for cracks, gaps, stains, and

discoloration of the storage unit floor and adjoining berms. **Table 6-1** presents the decision-making process that will be used to identify constituents of concern for Building 540. The Permittee shall submit a permit modification request to add the identified constituents of concern to **Table 6-5** following the procedures for a permit modification in 6 CCR 1007-3 §100.63.

- Performing decontamination using suitable decontamination methods and techniques⁴ based on the chemicals of concern that were identified. All spent decontamination solutions and materials will be collected, contained and managed appropriately as hazardous waste. Surface decontamination will be performed followed by clean water rinses based on the constituents of concern that were identified to verify adequate decontamination.
- Sampling and analyzing rinsewaters and concrete chip samples for chemicals of concern to verify clean closure. If analytical results do not meet the closure performance standards in **Table 6-5**, Building 540 will be decontaminated until closure performance standards are met or the contaminated areas will be disposed of as RCRA hazardous wastes.
- Collecting, characterizing, and managing wastes generated from closure activities.
- Certifying clean closure of the hazardous waste management units.

When decontamination verification criteria have been satisfied, a final rinsewater sampling will be conducted. The final rinsewater volume used for each bermed hazardous waste segregation area in Building 540 must not exceed the minimum amount necessary to collect an adequate sample volume for analysis and to completely contact the floor of the bermed area. This final sample will be segregated from previous samples to verify adequate decontamination. Rinsewater sampling results will be compared against the closure performance standard values listed in **Table 6-5**.

⁴ Based on visual inspection of the storage units, appropriate decontamination methods and techniques used are based on 6 CCR 1007-3 § 268.45, Table 1.

Building 540 will be deemed clean closed when rinsewater and concrete chip sampling results meet the closure performance standards in **Table 6-5** or the contaminated areas are disposed of as RCRA hazardous wastes.

6-2b(2)(a) Sampling to Confirm Decontamination and Determine Clean Closure – Building 540

Rinsewater and/or concrete chip sampling will be conducted to confirm decontamination and determine clean closure. Rinsewaters and/or concrete chip samples will be collected in appropriate containers, depending on the volume or location of the rinsewater and/or concrete chip sample collection. Samples for Building 540 will be collected as identified in **Table 6-6**.

6-2b(2)(b) Air Sampling of Structures or Equipment – Building 540

Based on an assessment of Building 540 at the time of closure, air monitoring will be conducted, if necessary.

6-2c Closure Performance Standard [6 CCR 1007-3 § 264.111]

For the agent-related hazardous waste management units G203, G1009, G1107, G1109, and G1110, the closure performance standard for air monitoring of mustard agent is based on the RCRA-permitted hazardous waste management unit interior air sampling and analysis and is established as the GPL as shown in **Table 6-2**.

During closure activities, personnel will use appropriate personal protective clothing and equipment as determined by the PCD Site Safety and Health Officer. In general, DA Pam 385-61, *Toxic Chemical Agent Safety Standards*, will be followed, as well as OSHA safety standards.

6-2d Partial Closure and Final Closure Activities [6 CCR 1007-3 § 264 Subpart G]

The decontamination of individual RCRA-permitted hazardous waste management units may be performed if the storage capacity is deemed unnecessary for the continued management of hazardous waste. These partial closure activities are subject to completion in accordance with the provisions of this closure plan.

6-2e Maximum Waste Inventory [6 CCR 1007-3 § 264 Subpart G]

The maximum inventory of wastes that may be stored onsite at any time during the active life of PCD hazardous waste units in accordance with 6 CCR 1007-3 § 264.112(b)(3) is provided in **Table 6-7**.

6-2f Disposal or Decontamination of Equipment, Structures, and Soils [6 CCR 1007-3 § 264 Subpart G]

PCD hazardous waste management unit structures will be decontaminated, and equipment will be decontaminated to a level that permits safe disposal. Decontamination will be accomplished according to the strategy described in Section 6-2b of this plan. The selected decontaminant and decontamination technique will depend on the contaminant of concern. For example, the use of bleach (sodium hypochlorite) is a standard decontamination technique for chemical agent-contaminated non-porous surfaces (metal, glass, plastic, etc.) and is identified as a suitable decontaminant under chemical destruction technology in 6 CCR 1007-3 § 268.45, Table 1. Similarly, detergent and water washing is identified as an appropriate chemical extraction technique for heavy metals and steam cleaning is identified as an appropriate extraction technology in 6 CCR 1007-3 § 268.45, Table 1, for most contaminants. The decontamination/cleaning solutions are generally applied manually through use of a spray device or by wiping down with cloth or paper towels and wipes. Other decontamination methods as described in 6 CCR 1007-3 § 268.45, Table 1, such as physical extraction (spalling, high pressure steam and water sprayers), may also be used if appropriate.

Should it be determined at the time of closure that soil removal or remediation is required; the Closure Plan will be modified in accordance with 6 CCR 1007-3 § 100.63 to address such issues. If, after removing or decontaminating residual materials and making all reasonable efforts to effect removal or decontamination of contaminated components, subsoils, structures, and equipment, as required in 6 CCR 1007-3 § 264.178 and 264.112, PCD finds that not all contaminated subsoils can be practicably

removed or decontaminated, PCD will close the facility and perform post-closure care in accordance with the Closure and Post-Closure Plans, in accordance with the closure and post-closure care requirements that apply to landfills (§ 264.310). The Permittee must submit a post-closure plan to the Division within 90 days from the date that the owner or operator or Division determines that the hazardous waste management unit must be closed as a landfill, subject to the requirements of §§ 264.117 through 264.120.

6-2f(1) Closure of Containers [6 CCR 1007-3 § 264 Subpart G]

All hazardous wastes will be removed from the storage units before beginning closure. Closure strategy is described in Section 6-2b.

6-2f(2) Ancillary Closure Activities [6 CCR 1007-3 § 264 Subpart G]

The closure of the hazardous waste management units and associated equipment will be completed according to the closure strategy outlined in Section 6-2b.

6-2g Schedule for Closure [6 CCR 1007-3 § 264 Subpart G]

According to 6 CCR 1007-3 § 264.112(e), PCD personnel may remove hazardous wastes and decontaminate or dismantle equipment in accordance with the approved Closure Plan at any time before notification of final closure. Such activities will be considered a partial closure.

PCD shall notify the CDPHE in writing at least 45 days prior to the date on which final closure activities of PCD hazardous waste management units are expected to commence. The anticipated notification date is no later than 30 days after the date on which a PCD hazardous waste management unit receives the known final volume of hazardous waste.

No shipments of hazardous waste will be received at a specific PCD hazardous waste management unit after the first day of the unit-specific closure period. Within 90 days of receiving the final hazardous waste volume, all hazardous waste stored in the hazardous waste management unit undergoing closure will be transferred to a treatment, storage, and disposal facility. Partial and final closure activities will be completed within 180 days of receiving the final volume of hazardous waste. Residual materials identified in storage facilities will be sampled and analyzed within 30 days of the initiation of closure, and will be disposed of within 90 days. The storage units will be sampled and samples will be analyzed

within 30 days. Samples will be disposed of in 90 days. If necessary, the concrete pads and buildings will be tested and disposed of within 180 days.

Within 160, but not later than 240, days after initiating final closure activities, PCD shall submit to CDPHE an independent, qualified, Colorado-registered Professional Engineer's certification of completion of closure in accordance with the final, unit-specific Closure Plan. The certification will be signed by the PCD Facility Commander and the Professional Engineer.

6-2h Extension for Closure Time [6 CCR 1007-3 § 264 Subpart G]

If activities associated with removal of all hazardous waste require more than 90 days, a request for an extension to complete this activity will be made at least 30 days before the initial 90-day time period expires. If partial and final closure activities cannot be completed within 180 days following receipt of the final hazardous waste volume, a request for an extension to complete the activities will be made at least 30 days before expiration of the initial 180 days.

6-2i Certification of Closure [6 CCR 1007-3 § 264 Subpart G]

Within 240 days of initiating final closure activities, the U.S. Army will submit a certification signed by the PCD Commander and an independent Colorado-registered Professional Engineer, that the hazardous waste management units have been closed in accordance with the approved Closure Plan and all applicable regulations. Documentation of closure activities will be maintained by the certifying independent registered Professional Engineer and the Army. Documentation and information supporting the closure status of PCD hazardous waste management units will be maintained and provided to CDPHE upon request, which includes:

- All field notes related to closure activities
- A description of any minor deviations from the approved Closure Plan and justification for these deviations
- Documentation of the final disposition of all hazardous wastes and residual hazardous wastes, including contaminated media, debris, and all treatment residues

- All laboratory and/or field data, including quality assurance/quality control data, for all samples and measurements
- A summary report that itemizes the data reviewed by the certifying engineer and tabulates the analytical results of samples taken to determine and/or confirm clean closure.

6-3 CLOSURE PLAN FOR PCAPP EDS SITE HAZARDOUS WASTE UNITS

6-3a General Description

Two EDS units and three CSUs will be located at the PCAPP EDS site. **Figure 6-3** presents the general layout of the PCAPP EDS site. Each EDS unit will be operated in an Environmental Enclosure as shown in **Figure 6-4**. CSU H1102 is depicted in **Figure 6-1**; CSU H1103 and the adjacent H1103 Hazardous Waste Roll-off Container Storage Area are shown in **Figure 6-5**.

The EDS units will treat/destroy overpacked munitions, Department of Transportation (DOT) bottles, and other energetic components (ignition cartridges, propellant) stored at PCD that contain or are contaminated with mustard agents (HD/ HT), as well as to treat/destroy any reject mustard agent munitions or contaminated bursters generated from PCAPP operations.

The CSUs are existing earth-covered concrete storage igloos specifically designed to store energetic munitions. CSU H1102 will be used to store items pending treatment in an EDS unit. CSU H1103 and the adjacent Hazardous Waste Roll-off Container Storage Area will be used to store wastes generated from PCAPP EDS treatment operations and support activities.

Wastes generated from the EDS treatment operations and support activities include, but are not limited to, neutralent and rinsates, decontaminated metal parts and fragments, liquid and solid laboratory wastes, used PPE, spent carbon, spent prefilters, high efficiency particulate air (HEPA) filters, and Grayloc® seal and O-rings. These wastes will be stored pending shipment offsite to a permitted treatment, storage, and disposal facility for further management.

6-3b Closure Strategy

This section describes the process for performing a temporary closeout and a clean closure at the PCAPP EDS site. At the time of initiating temporary closeout or clean closure, procedures dealing with servicing, cleaning, and preparing EDS equipment for departure will be implemented; and headspace monitoring and/or rinsate sampling and analysis will be conducted and the results (as applicable) will be recorded; reagent supply containers and reagent transfer pumps will be verified to be disconnected; all EDS process and cleaning wastes will have been collected, containerized, and removed from the Environmental Enclosures.

All wastes stored in CSU H1102 pending treatment in an EDS and those wastes stored in CSU H1103 generated from the EDS treatment operations will have been removed from the PCAPP EDS site. On completing a temporary closeout or clean closure activities, no hazardous waste residues will remain within any hazardous waste management unit and associated equipment or in the Environmental Enclosures above the applicable levels per **Table 6-8** of this Closure Plan. Details regarding the decontamination and disposition of the secondary containment pallets are described in Annex I of the EDS Phase 2 Steam Series Units, Attachment 9 of this Permit.

6.-3b(1) Temporary Closeout

The EDS units and CSUs will be operated intermittently at PCD. As such, there will be periods when EDS treatment and CSU storage operations may temporarily cease at PCD; however, the absence of operations does not mean that closure is imminent. Between periods of operation, the EDS units and CSUs will undergo a “temporary closeout.” The temporary closeout will follow established EDS SOPs and decontamination/cleaning procedures for the CSUs, according to the Decontamination Plan, **Appendix 6-1** of this attachment, that ensure removal of any residual chemicals from the hazardous waste management units. The EDS Environmental Enclosures and CSUs will remain in place during a temporary closeout. During a temporary closeout, all support structures and utilities will remain at the

PCAPP EDS site but may be placed in standby or layaway mode. As the EDS units are transportable treatment units, if one is needed for temporary deployment, then the unit must undergo decontamination and meet the temporary closeout levels specified in **Table 6-8** prior to leaving the site.

Each temporary closeout process will be documented. This documentation shall be maintained in the operating record and shall include the period(s) of time that a hazardous waste unit is in temporary closeout status. The Permittee will notify the Division in writing 45 days before a temporary closeout is to occur. The Permittee will also notify the Division in writing 45 days before an EDS unit is returned to the site and shall provide documentation demonstrating that the EDS unit is clean (i.e., the unit meets the worker population limit (WPL) for mustard and GPL for any other chemical agents and has been otherwise decontaminated to remove all other hazardous waste constituents.) Professional Engineer certification will not be necessary for temporary closeout.

6-3b(2) Clean Closure

The EDS units and CSUs will undergo final clean closure when EDS operations are no longer needed at PCD. EDS units must undergo clean closure prior to being removed from the PCD facility. CDPHE will be notified in writing at least 45 days prior to the date the EDS units and CSUs are expected to begin final clean closure. Chemical agent decontamination (as necessary) will be conducted according to the Decontamination Plan, **Appendix 6-1** of this attachment pertaining to chemical agent decontamination of tools, supplies, equipment, and facilities. This plan establishes standards and procedures for identifying and decontaminating equipment.

The Environmental Enclosures will be decontaminated or verified to be uncontaminated, then may be reused to support projects located elsewhere at other U.S. Department of Defense (DoD) facilities or may be discarded if repairs or relocation are not cost effective.

6-3b(3) Actions Applicable to Temporary Closeout and Clean Closure Activities

Personnel involved in PCAPP EDS closeout and closure activities will be trained in applicable health and safety procedures, use of decontamination and sampling equipment, proper decontamination techniques, and sample collection, handling, and management. Personnel will use appropriate personal protective clothing and equipment as determined by the site-specific Health and Safety Plan. In general, DA Pam 385-61, *Toxic Chemical Agent Safety Standards*, will be followed, as well as OSHA safety standards.

Wastes generated during temporary closeout and clean closure activities will be properly characterized as described per waste stream type in the Waste Analysis Plan in **Attachment 3** of this Permit and will be containerized and managed in a less than 90-day hazardous waste storage area, pending shipment to a permitted treatment, storage, and disposal facility. The types of wastes expected to be generated from temporary closeout and clean closure activities include decontamination/cleaning solutions; rinsewaters; used PPE; wipes, rags, and other absorbent and cleaning materials used in decontamination or cleaning activities.

For temporary closeout or clean closure, once the CSUs and EDS units are deemed clean to acceptable levels in **Table 6-8** of this Closure Plan, the units can be placed in layaway mode or demobilized for reuse (EDS units only, but must be certified as clean closed). A hazardous waste unit in temporary closeout status must be kept closed and locked (except when performing hazardous waste inspections) to prevent the possibility of waste or other materials being placed in the unit and to keep unauthorized personnel from coming into contact with the unit. If an EDS unit is slated for temporary use elsewhere, it will first be certified as clean closed and then be demobilized from the PCAPP EDS site then brought back when the temporary assignment is completed.

If during temporary closeout or demobilization, process areas or equipment are discovered that may be contaminated, these areas or equipment will be decontaminated and decontamination verified. If results do not meet the acceptable levels in **Table 6-8** of this Closure Plan, then decontamination will be repeated until the levels are met.

An Environmental Enclosure AFS and the CSU Igloo Containment System (ICS) will remain operating and chemical agent monitoring conducted until headspace monitoring sample results are received and results show that the acceptable levels are met. During a closeout, the Environmental Enclosure AFS

sulfur-impregnated carbon filters will be turned off, and the carbon filter banks will be removed and managed as hazardous waste.

6-3c Closure Performance Standard [6 CCR 1007-3 § 264.111]

Closure performance standards are identified as acceptable levels for decontamination and reuse and clean closure and are shown in **Table 6-8**.

Per 6 CCR 1007-3 Part 264 Subpart G, Closure and Post-Closure, an owner or operator must close a permitted hazardous waste management unit 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, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the groundwater, surface waters, or the atmosphere.

Release Prevention Controls and Procedures

The EDS treatment/destruction and CSU waste storage operations will be performed in a manner designed to control and eliminate escape of hazardous waste and hazardous constituents into the environment. Engineering and administrative controls will be in place for both the EDS units and CSUs that contribute to controlling, minimizing, or eliminating the possibility of contamination to groundwater, surface waters, or the atmosphere from EDS and CSU operations. These controls are described in the following text.

EDS

The EDS units include the trailer/skid that holds the Containment Vessel, waste handling subsystems, and associated equipment for each unit. EDS operations will take place inside an Environmental Enclosure comprised of a ceiling, sides, and impermeable flooring that will protect the hazardous waste management unit from precipitation and run-on as well as prevent the creation of any contaminated runoff.

Each EDS trailer/skid secondary containment pan is capable of containing the contents of a full Containment Vessel; secondary containment for liquid waste containers and chemical reagents is provided; each enclosure AFS unit is equipped with sulfur-impregnated carbon filtration; trained explosive handling and chemical operators will perform operations using approved work procedures;

appropriate PPE will be used; and prohibition of open flames, cutting, welding, smoking, and radiant heat inside the Environmental Enclosure will be employed. Additionally, at the conclusion of every EDS treatment operation, procedures are followed for servicing, cleaning, disassembly, and decontaminating (if necessary) EDS components to acceptable levels so that the EDS may be reused for subsequent or future operations at the same location.

These procedures involve the following:

- Cleaning/decontaminating the Containment Vessel and Containment Vessel door
- Disassembling components of the Containment Vessel and Containment Vessel door, decontaminating components (O-ring, Grayloc seal, protector plate, blast shield, and covers, etc.), and manually cleaning/decontaminating the components
- Scrubbing the interior of the Containment Vessel
- Following all cleaning/decontamination with clean water rinses
- Clearing sample and drain lines on the Containment Vessel door
- Cleaning EDS trailer/skid contact surfaces (electrical panels, debris pan, spill containment trays, railings, and other operator-contacted surfaces)
- Cleaning the EDS trailer/skid secondary containment pan and platform secondary containment pan
- Collecting all cleaning solutions and rinsewaters and managing them appropriately, based on sampling and analysis results according to the Waste Analysis Plan
- Collecting components/parts that are not reused (e.g., O-ring, Grayloc seal) and placing the items in waste containers for disposal

- Performing headspace monitoring and/or other means (such as rinsate sampling) when chemical agent has been processed to confirm cleaning/decontamination to acceptable levels for equipment reuse
- Reassembling EDS components, such as the Containment Vessel door, and securing the EDS and associated equipment for standby mode.

CSUs H1102, H1103, and the Hazardous Waste Roll-off Container Storage Area

CSUs H1102 and H1103 are existing earth-covered storage igloos specifically designed to store energetic munitions and are constructed of concrete with flooring, walls, and ceiling. CSU H1102 will store items pending treatment in an EDS unit; CSU H1103 and the adjacent Hazardous Waste Roll-off Container Storage Area will store hazardous wastes generated from the EDS treatment operations and site support activities.

A passive carbon filtration system known as the ICS is attached to CSU H1102 to collect any agent vapors, if emitted, as this unit will store overpacked munitions, DOT bottles, and other miscellaneous items that contain or are contaminated with mustard agent (wastes with a headspace that may exhibit greater than 1 vapor screening level [VSL] for mustard agent). CSU H1103 does not require an ICS as the wastes to be stored in this unit have a headspace of less than 1 VSL for mustard agent or are not contaminated with or contain mustard agent.

All hazardous wastes (liquid and solid) in storage will be in closed containers placed on secondary containment pallets. When handling wastes with energetic components, trained explosive handling operators will perform work under approved work procedures using appropriate PPE as specified in the written health and safety plan for the site. Open flames, cutting, welding, smoking, and radiant heat will be prohibited inside the storage units. Wastes stored in each CSU will be known, and no containers will be opened during storage at CSU H1102. For CSU H1103 and the adjacent Hazardous Waste Roll-off Container Storage Area, no containers will be opened during storage except when adding or removing wastes or for sampling purposes.

For each CSU, closure and decontamination verification will be performed in a phased approach that involves the following:

- A review of storage operations to identify hazardous constituents of concern and areas or equipment items contaminated with hazardous constituents of concern. This identification will be based on headspace monitoring analytical results (CSU H1102 only), a review of each CSU operating log and inspection records, and any known/recorded spill reports as well as a visual inspection to look for cracks, gaps, stains, and discoloration of each CSU floor, which will identify the likelihood of chemical agent or hazardous waste contamination.
- Performing cleaning/decontamination per the Decontamination Plan, **Appendix 6-1** of this attachment. Surface cleaning/decontamination will be followed by headspace monitoring for CSU H1102 and rinsate sampling for all CSUs to verify adequate decontamination (including H1102). If spills occur in the interior of a CSU or at the Hazardous Waste Roll-off Container Storage Area, concrete sampling will be conducted to verify adequate decontamination of the spill area(s).

Clean Closure

The EDS units and CSUs will be deemed clean closed when EDS operations will no longer occur at PCD and the qualified, independent registered Colorado professional engineer has observed closure activities at the EDS units and CSUs and reviewed the EDS and CSUs H1102, H1103, and the adjacent Hazardous Waste Roll-off Container Storage Area operating records to:

- Confirm and evaluate any spills, releases, and cleanup activities
- Confirm that the procedures for EDS closeout (servicing, cleaning/decontaminating, and preparing the EDS and associated equipment for subsequent use or demobilization) were followed
- Confirm that a CSU was cleaned/decontaminated with appropriate cleaning/decontaminant methods and techniques in accordance with the Decontamination Plan, **Appendix 6-1** of this attachment, and documented

- Confirm the EDS units and each CSU were monitored (via headspace monitoring and/or other means such as rinsate or concrete sampling) to verify adequacy of cleaning/decontamination (if decontamination conducted)
- Confirm monitoring results were documented and that values met the acceptable levels established for EDS and CSU closure (See **Table 6-8**)
- Confirm that wastes generated from EDS and CSU closeout and closure activities were transferred to a less than 90-day hazardous waste storage area established for closure purposes pending shipment to an approved treatment, storage, and disposal facility, or were shipped directly to a treatment, storage, and disposal facility.

Figure 6-6 depicts the general decision process for clean closure. Closure of the EDS units and CSUs will be deemed complete when headspace monitoring (EDS and CSU H1102) and rinsewater sampling (EDS and CSUs H1102, H1103, and the H1103 Roll-off Container Storage Area) results and concrete sampling results meet the acceptable levels identified in **Table 6-8**. Headspace monitoring will be conducted for specific periods at or above 70°F as detailed in **Table 6-9**.

Headspace sampling will consist of using MINICAMS units or collection and analysis of DAAMS tubes for HD. Confirmational sampling for chemical agent will be performed using DAAMS.

Rinsewaters (including any waste waters generated during steam cleaning, if steam cleaning is used for decontamination) will be sampled and analyzed for mustard agent and other hazardous waste constituents (Appendix VIII of 6 CCR 1007-3 Part 260) known to have been managed in the unit. **Table 6-10** summarizes the sampling and analysis methods that will be used to identify contamination and confirm satisfactory decontamination for the EDS units and CSU H1102. Decontamination will be performed until the acceptable levels in **Table 6-8** are met. **Table 6-11** summarizes the sampling and analysis methods that will be used to identify contamination and confirm satisfactory decontamination at CSU H1103 and the adjacent Hazardous Waste Roll-off Container Storage Area.

6-3d Partial Closure and Final Closure Activities [6 CCR 1007-3 § 264.112(b)(3)]

The closure strategy described in this Closure Plan is a final closure activity for the CSUs and EDS units at PCD. However, a partial closure of an EDS unit may take place and will be conducted in the same

manner as previously described for clean closure activities. Note however, that a temporary closeout is not a partial closure as the EDS will continue a planned operation. Treatment of munitions and other items containing mustard agent in the EDS units and storage of items in CSU H1102 pending EDS treatment and storage of generated wastes in CSU H1103 is expected to continue until the EDS is no longer needed at PCD.

No partial closure of a CSU is expected to occur.

6-3e Maximum Waste Inventory [6 CCR 1007-3 § 264.112(b)(3)]

The estimated maximum inventory of wastes that may be present at the EDS units and CSUs at any time during operations is provided in **Table 6-12**.

6-3f Disposal or Decontamination of Equipment, Structures, and Soils [6 CCR 1007-3 § 264.112(b)(4)]

Hazardous wastes generated during temporary closeout and clean closure activities will be containerized, characterized, and transported to a permitted treatment, storage, and disposal facility. If contaminated, the CSUs and EDS units will be decontaminated to acceptable levels in **Table 6-8**.

Based on the Decontamination Plan, **Appendix 6-1** of this attachment, when determining potential agent contamination and path forward for equipment reuse and/or ultimate disposition, the following will be considered:

- a. Items can be considered clean and available for unrestricted use if the item never contacted liquid chemical agent or chemical agent aerosol and meets one of the following criteria:
 - (1) If in a continuously controlled environment where the environment is documented to never have exceeded the short-term exposure limit (STEL) concentration when the item is present
 - (2) If in a continuously-controlled environment where the environment is documented to be greater than the STEL but less than immediately dangerous to life and health (IDLH); and a risk assessment is performed that takes into account factors identified in DA Pam 385-61, Chapter 5-2d.(2).
- b. Tools, supplies, equipment, and facilities require decontamination or disposal if the items have contacted liquid chemical agent; were present in a chemical agent aerosol environment; were in a continuously-controlled environment and exposed above the IDLH concentration for any period of time; were in an uncontrolled environment where monitoring indicated the environment exceeded the STEL concentration (i.e., VSL); or were in an uncontrolled environment involving storage, use, or presence of chemical agent and where physical factors (such as discoloration, stains, etc.) indicate possible exposure to chemical agent. If an item is determined to be contaminated, it may be decontaminated in accordance with the Decontamination Plan, **Appendix 6-1** of this attachment.

Cleaning/decontaminant solutions may be general household bleach and/or general detergent in accordance with the Decontamination Plan, **Appendix 6-1** of this attachment.

The decontamination/cleaning solutions are generally applied manually through use of a spray device, high pressure wash or other mechanical means or by wiping down with cloth or paper towels and wipes or other cleaning apparatus such as a scrub brush.

Soil removal should not be necessary during closure because any incidents involving chemical agent or hazardous waste release during the operational life will have been managed under the PCAPP EDS site Contingency Plan (see **Attachment 4** of this Permit) and will be known.

6-3f(1) Closure of Containers [6 CCR 1007-3 § 264.114]

Three permitted CSUs, CSU H1102, CSU H1103, and the Hazardous Waste Roll-off Container Storage Area adjacent to CSU H1103, will be located at the PCAPP EDS site. All wastes will have been removed from each CSU prior to initiating closure. Each CSU will be cleaned of loose dirt and debris using a vacuum device and the dirt/debris collected and placed in waste containers and characterized. A visual inspection will be conducted and areas showing gaps, cracks, stains, and discoloration on the floor will be noted. CSU H1102 will then be headspace monitored.

If contamination of a CSU is suspected or known, the interior walls and flooring where contamination is suspected or present will be cleaned/decontaminated in accordance with the Decontamination Plan, **Appendix 6-1** of this attachment. Headspace monitoring for mustard agent will be conducted inside CSU H1102; concrete sampling will only be conducted in either CSU if operation record review or the visual inspection identify potential contamination; sampling results will be compared to the acceptable levels. Decontamination will be conducted until headspace monitoring (CSU H1102) and concrete and rinsate sampling (if conducted) results meet the acceptable levels presented in **Table 6-8**. A CSU will be deemed clean closed when headspace monitoring (CSU H1102 only), concrete sample (if conducted), and rinsate sampling (CSUs H1102, H1103 and H1103 Roll-off Container Storage Area) results meet the acceptable levels in **Table 6-8**. The used decontamination solutions and concrete will be collected and placed in containers, characterized, and accumulated in a 90-day accumulation area pending shipment to a permitted treatment, storage, and disposal facility.

6-3f(2) Closure of Miscellaneous Units [6 CCR 1007-3 § 264.601]

The miscellaneous treatment units that will be closed are two EDS units. The EDS units and associated equipment will be serviced, cleaned, disassembled, and decontaminated according to normal procedures for closeout operations. The EDS units will then be air monitored and the clean water rinsates sampled to verify adequate decontamination.

Decontamination will be conducted in accordance with the Decontamination Plan, **Appendix 6-1** of this attachment using an appropriate bleach, detergent, bleach/detergent mix or water, followed by a clean water rinse, or steam cleaning (if conducted). The decontamination solution and clean water rinses may be applied manually (for example, manual wipe down using cloths, rags, wipes) or by mechanical means (for example, spray wash, steam clean, flush through, or wet vacuum, depending on the component). If headspace monitoring and rinsewater analytical results meet the acceptable levels in **Table 6-8**, then the units (or equipment item) will be deemed clean. Decontamination will be repeated until the levels in **Table 6-8** are met.

6-3g Ancillary Closure Activities [6 CCR 1007-3 § 264 Subpart G]

Closure of the hazardous waste management units and associated equipment will be completed according to the procedures in this section.

6-3g(1) Decontamination Verification

Where contamination is suspected, based on operating history or monitoring, decontamination will be conducted and verified according to the following subsections.

6-3g(1)(a) Sampling to Confirm Decontamination

EDS

Following each treatment operation, the EDS is serviced, disassembled, cleaned, and decontaminated (if necessary) to acceptable levels for closeout and reuse. Headspace monitoring and/or rinsewater sampling and analysis are conducted to confirm chemical agent decontamination to acceptable levels. Air samples for mustard agent will be monitored using MINICAMS. Confirmation monitoring will be performed

using DAAMS. Rinsewaters will be collected in appropriate containers, depending on the volume or location of the rinsewater collection. For example, some rinsates may be collected in spill pans and placed in 55-gallon containers. Others may be retained in wet-vac or steam cleaning units. Rinsewater samples will be collected as identified in **Table 6-10** and analyzed for the constituents of concern identified in **Table 6-8**.

CSU H1102

If CSU H1102 is contaminated and decontamination is performed, adequate decontamination will be confirmed by monitoring the interior of the storage igloo for mustard agent using MINICAMS and rinsed. Confirmation monitoring will be performed using DAAMS. Decontamination will be verified by rinsate sampling and/or concrete chip sampling and analysis for the hazardous constituents of concern. Samples will be collected as identified in **Tables 6-10** and **6-11**.

CSU H1103 and the Adjacent Hazardous Waste Roll-off Container Storage Area

If CSU H1103 or the adjacent Hazardous Waste Roll-off Container Storage Area is contaminated, decontamination will be verified by rinsate sampling and/or concrete chip sampling and analysis for the hazardous constituents of concern. Samples will be collected as identified in **Table 6-11**.

6-3g(1)(b) Structures or Equipment Monitoring

All associated equipment, Environmental Enclosures and CSU H1102 workspace air will be sampled for mustard agent. Potentially contaminated EDS equipment (either entire piece of equipment or component) will be enclosed in plastic and the headspace in the enclosed space will be sampled. **Table 6-9** summarizes the monitoring requirements.

Headspace sampling will be conducted using MINICAMS units or collection and analysis of DAAMS tubes for mustard. Confirmational sampling for mustard agent will be performed using DAAMS. Headspace monitoring results will be compared to the acceptable levels in **Table 6-8**. If results do not meet the acceptable levels in **Table 6-8**, confirmatory samples will be collected to determine if decontamination is required. **Figure 6-7** shows the process for monitoring to meet temporary closeout and clean closure.

6-3h Schedule for Closure [6 CCR 1007-3 § 264.112(b)(6)]

Although no specific date has been established for closing the PCAPP EDS site operation, an end date will coincide with the end of operations at PCAPP and is expected sometime at the end of 2020.

Table 6-13 presents the typical sequence of activities for a temporary closeout. **Table 6-14** presents the clean closure sequence for an EDS unit and **Table 6-15** is the closure schedule and activity sequence for a CSU. As previously indicated, hazardous wastes generated from normal EDS cleaning/decontamination and closeout procedures would have been removed at the end of each EDS treatment operation, and therefore, would not be present at time of closure.

6-3i Extension for Closure Time [6 CCR 1007-3 § 264.113(a)(1)]

Closure of each hazardous waste management unit is not expected to exceed the 180 days allowed. No extension is requested at this time.

6-3j Certification of Closure [6 CCR 1007-3 § 264.115]

Within 60 days of completing closure activities, the U.S. Army will submit a certification, signed by the owner/operator and an independent Colorado registered professional engineer, that the hazardous waste management units have been closed in accordance with the approved closure plan and all applicable regulations. Documentation of closure activities will be maintained by the certifying independent registered professional engineer and the Army and will be submitted to CDPHE upon request.

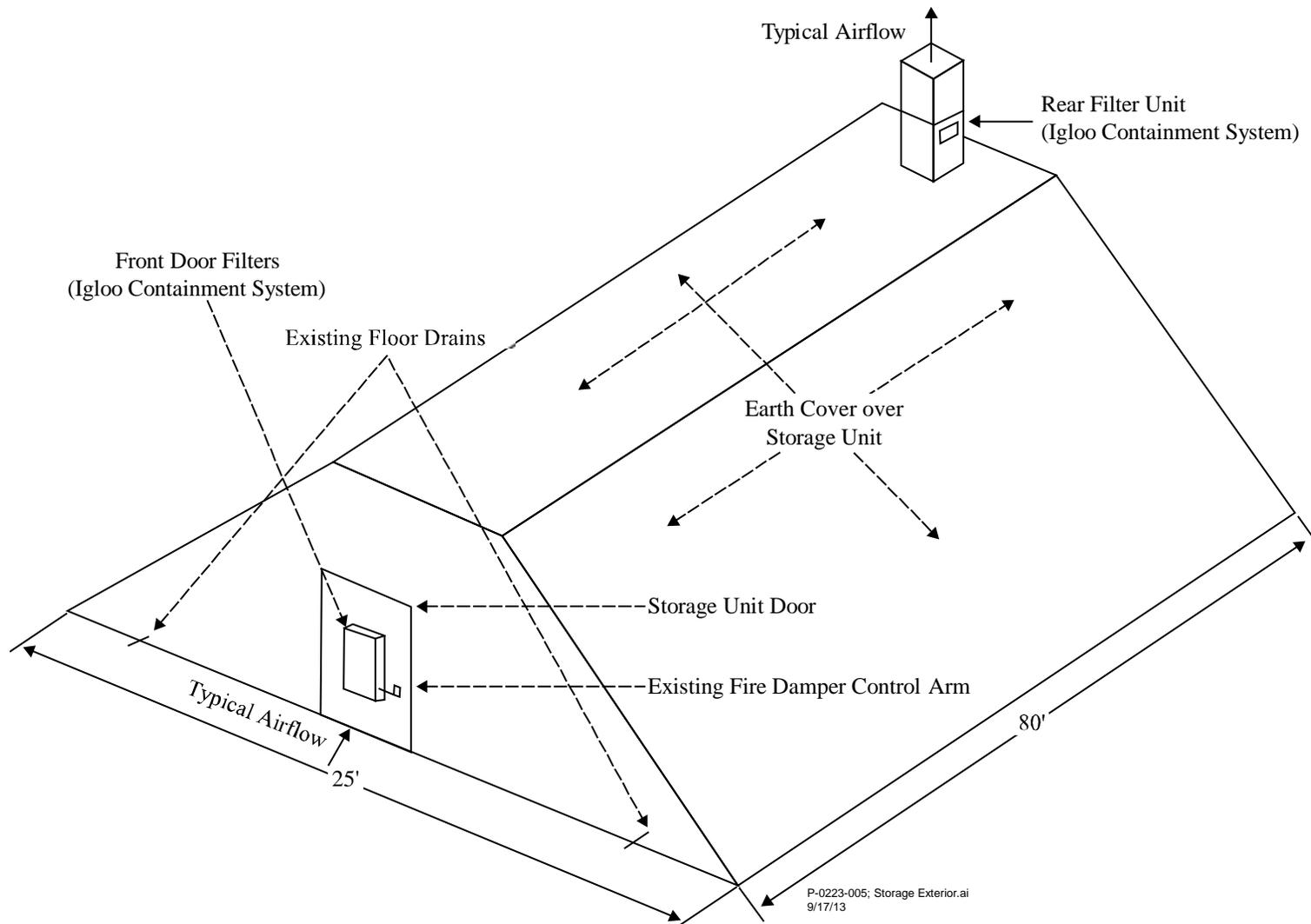


Figure 6-1. Example Exterior View of a Permitted Hazardous Waste Storage Unit
 (Similar to G203, G1009, G1107, G1109, G1110, & CSU H1102. NOTE: This drawing is not to scale.)

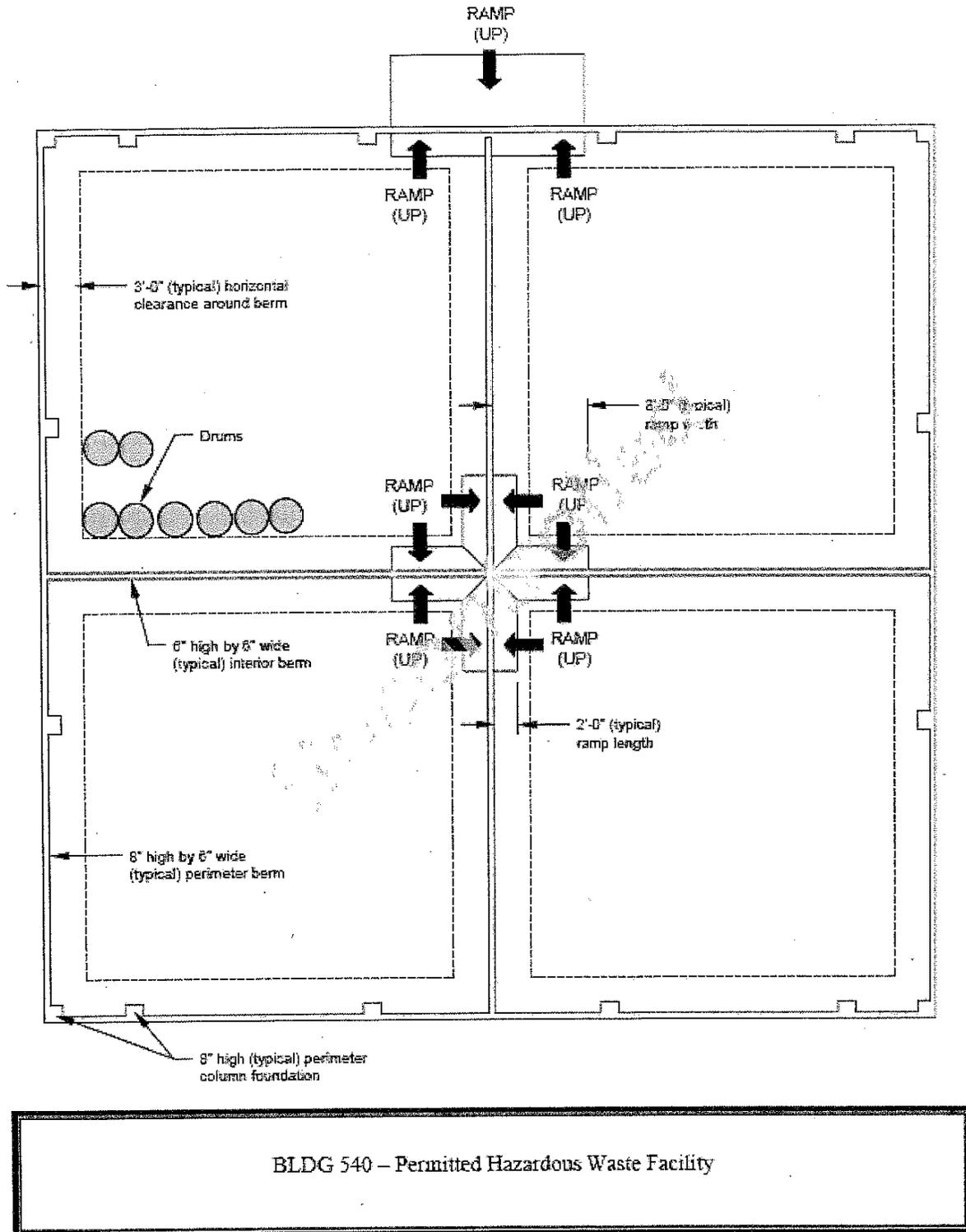
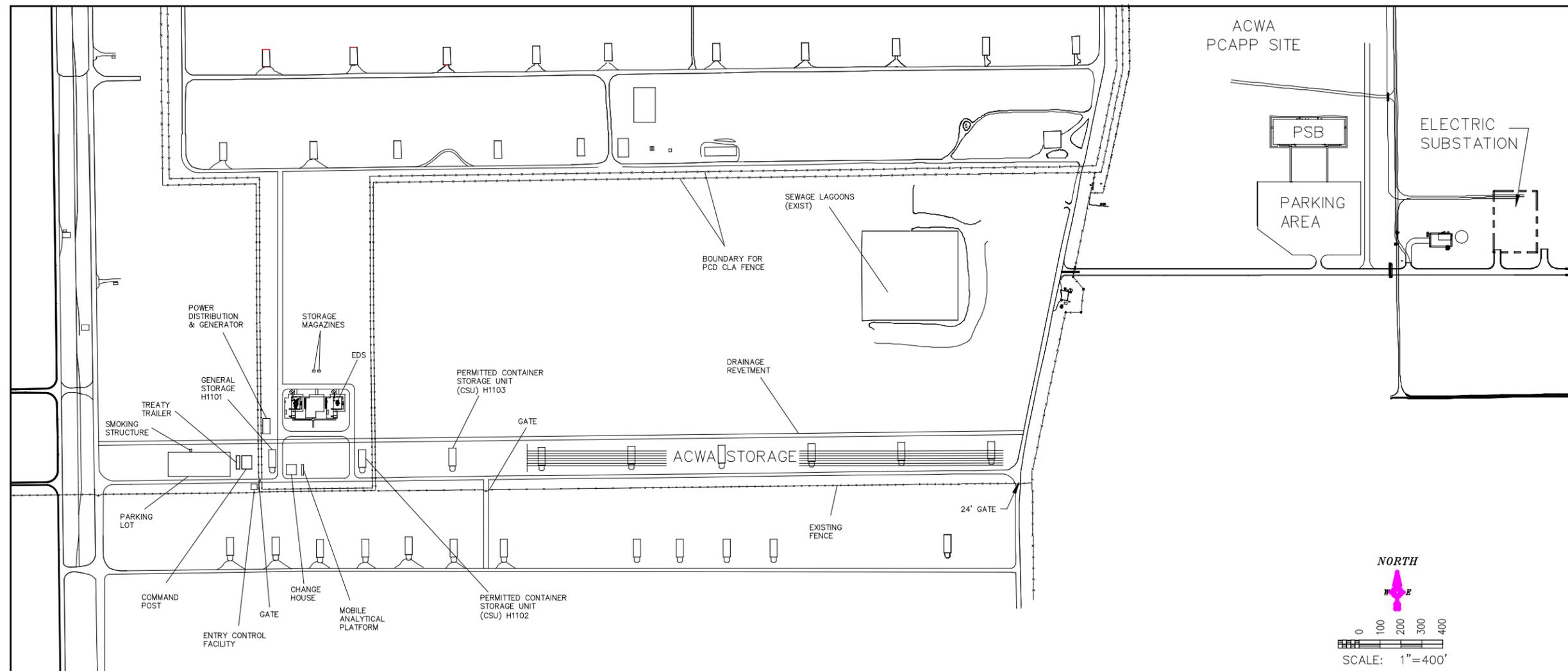


Figure 6-2. PCD Building 540



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Figure 6-3. PCAPP EDS Site Layout

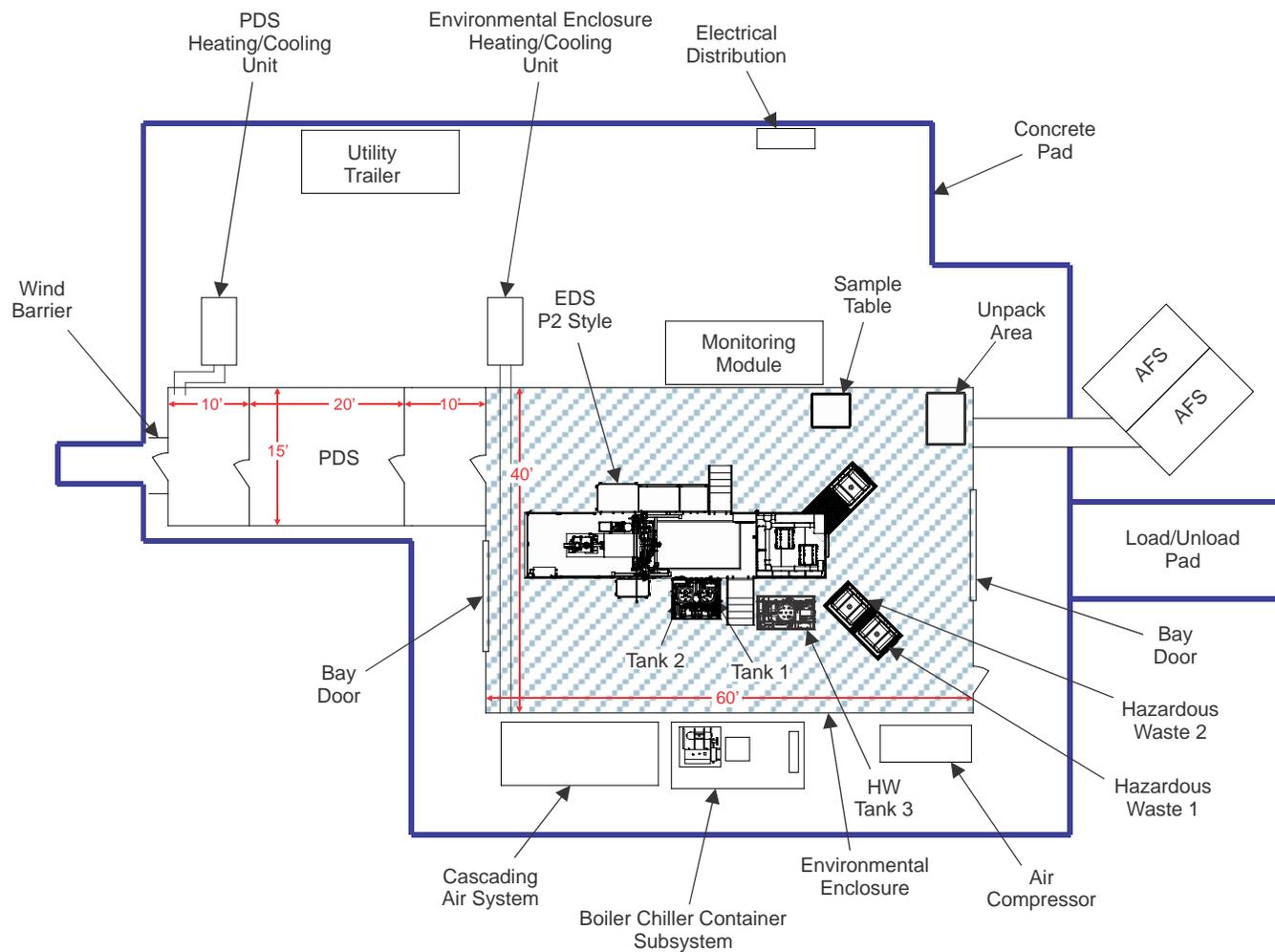


Figure 6-4. Example of an EDS Inside Environmental Enclosure

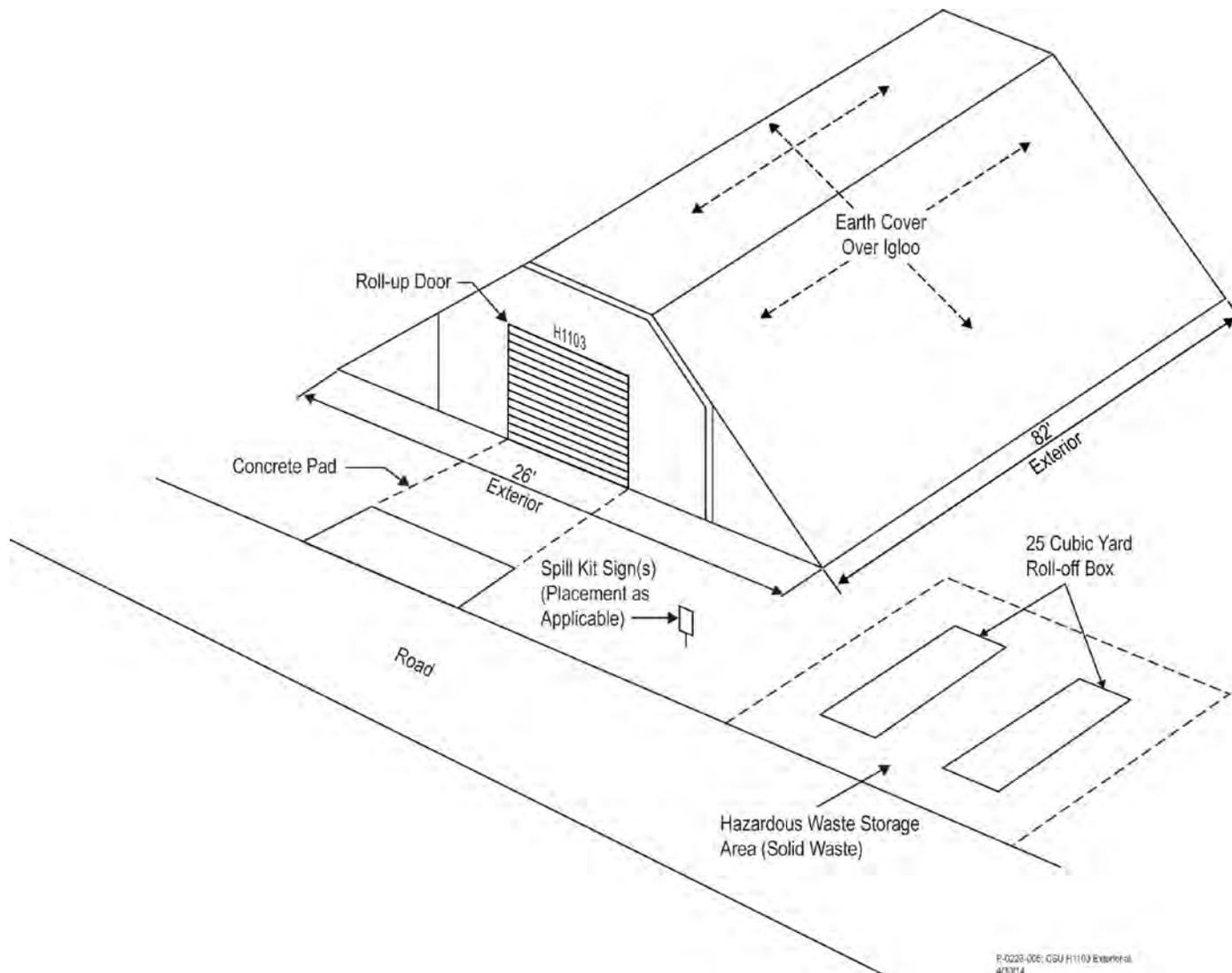
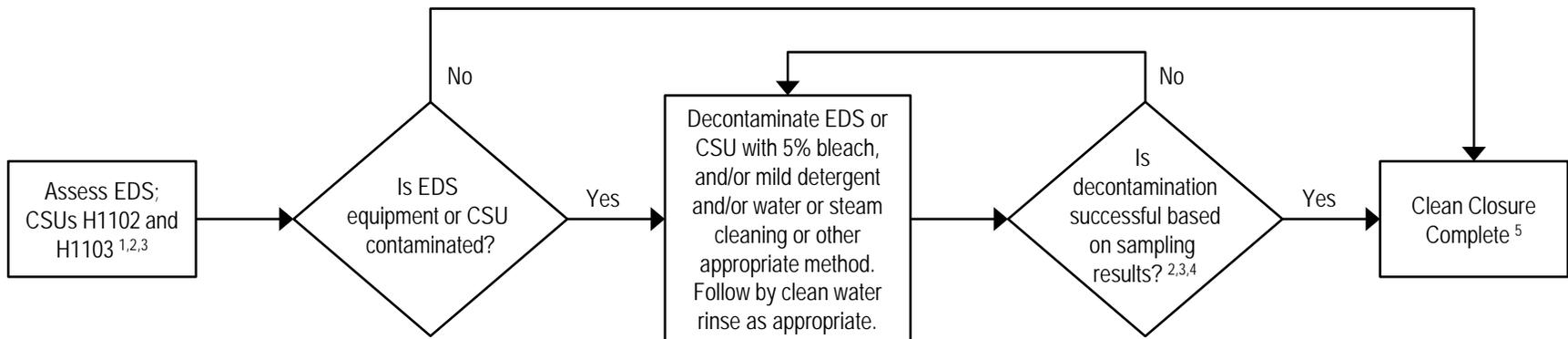


Figure 6-5. Example CSU H1103 Exterior View and the Hazardous Waste Roll-off Container Storage Area



Notes:

- ¹ Contamination of EDS equipment will be determined by air monitoring analytical results, review of the operating log, inspection records and process knowledge.
- ² Air monitoring for chemical agent will be performed inside the Environmental Enclosures for the EDS equipment contained therein and for CSU H1102 using MINICAMS® DAAMS for chemical agent. MINICAMS alarms will be confirmed by DAAMS. Compare results against acceptable levels standards for air monitoring (see Table 6-8).
- ³ For CSU H1103, sample and analyze rinsewaters for RCRA hazardous waste constituents of concern. Compare results to acceptable levels for rinsewaters (see Table 6-8).
- ⁴ If concrete chip sampling is necessary, sample and analyze for chemicals of concern per Table 6-8. Compare results to acceptable levels in Table 6-8.
- ⁵ The EDS unit or component can be removed from enclosure structure; enclosure structure deemed clean; CSU deemed clean.

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Figure 6-6. General Decision Process for Clean Closure of PCAPP EDS Site Hazardous Waste Treatment and Storage Units
NOTE: General decision process for clean closure of the Hazardous Waste Roll-off Container Storage Area is the same process as for CSU H1103

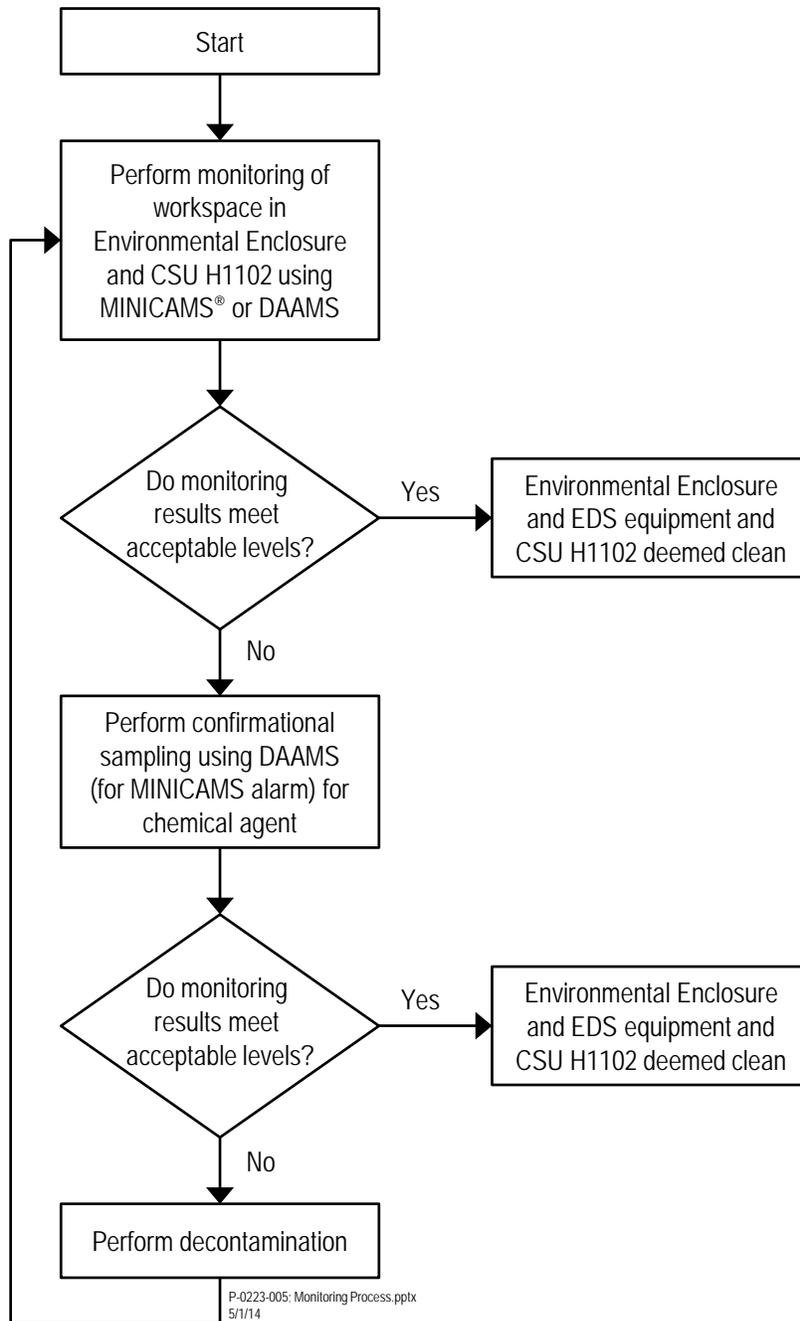


Figure 6-7. Monitoring Process for Meeting Temporary Closeout and Clean Closure

**Table 6-1. Decision-Making Process to Determine Hazardous Constituents of Concern for PCD RCRA
Hazardous Waste Management Units (G203, G1009, G1107, G1109, G1110, and Building 540)**

Questions to Aid in Decision-Making	Answers to Aid in Decision-Making
1. What was stored in this Hazardous Waste Management Unit?	
2. What hazardous waste codes were associated with the material/waste stored in this Hazardous Waste Management Unit?	
3. What are the monitoring analytical results for this Hazardous Waste Management Unit?	
4. Have there been any known/recorded spills for this Hazardous Waste Management Unit?	
a. If so,	
i. What was spilled?	
ii. How was spill decontaminated?	
iii. What CO or EPA waste codes were associated with the material that was spilled?	
iv. What waste codes were associated with wastes generated as a result of spill decontamination?	
v. How many known/recorded spills? (if more than one spill, answer questions for i, ii, and iii above)?	
5. Have inspection records been reviewed for this Hazardous Waste Management Unit?	
a. If so,	
i. What did the records reveal about what was stored?	

**Table 6-1. Decision-Making Process to Determine Hazardous Constituents of Concern for PCD RCRA
Hazardous Waste Management Units (G203, G1009, G1107, G1109, G1110, and Building 540) (Continued)**

Questions to Aid in Decision-Making	Answers to Aid in Decision-Making
6. Have operating records been reviewed for this Hazardous Waste Management Unit?	
a. If so,	
i. What did the operating records reveal about what was handled for this Hazardous Waste Management Unit?	
7. Has a visual inspection been conducted to look for cracks, joints, gaps, stains, and discoloration of Hazardous Waste Management Unit floor and adjoining berms/walls?	
a. If so,	
i. Were there any cracks? If so, where?	
ii. Were there any gaps or joints? If so, where?	
iii. Were there any stains? If so, where? What caused the stain?	
iv. Were there any discolorations of the Hazardous Waste Management Unit floor? If so, where? What caused the discoloration(s)?	
8. Is there any other historical or known information regarding this Hazardous Waste Management Unit that would help discern the constituents of concern?	
9. Based on the answers to questions in the previous rows, what are the constituents of concern?	

Table 6-2. RCRA-Permitted Hazardous Waste Management Units G203, G1009, G1107, G1109, and G1110 Closure Performance Criteria

Media and Parameters ^a	Decontamination/Closure Verification Criteria
<u>Air Samples</u>	
Mustard Agent (HD, HT)	GPL (0.00002 mg/m ³ HD)
<u>Concrete Chip Samples (Following Spalling)^b</u>	
Mustard Agent (HD, HT)	Non-detectable
Thiodiglycol (TDG)	Non-detectable ^c

Notes:

- ^a Additional Parameters may be added based on constituents of concern identified at the time of closure, based on **Table 6-1** decision-making process. Additional constituents of concern will be subject to approval by CDPHE.
- ^b If the option of spalling is selected or top 1/4-inch of flooring is removed, PCD will achieve the amount needed for solid sampling results.
- ^c TDG is not a common commercial or industrial chemical. TDG can be used to screen for the approximate concentration of other constituents when a numerical relation exists with one or more other compounds. TDG can be used as a marker compound when a non-numerical relation exists with one or more compounds. The following properties make TDG a good candidate for use as a mustard agent screening compound for the organic constituents of concern and a marker compound for metals: it is easy to detect; the analytical reporting limit is relatively low; and it is relatively persistent in the environment due to its low volatility. Regarding TDG, USACHPPM states: "Its presence in soil or water can be used as an indicator of past contamination with agent HD, although it is not unique to HD degradation due to the possible commercial application of thiodiglycol in the manufacture of soap products and polymers" (USACHPPM, 1999, pg. F-2). As an alternative to using thiodiglycol as a closure performance standard, the Permittee may instead demonstrate that all hazardous waste constituents associated with mustard agent are not present above detectable levels using Division approved methods.

GPL = general population limit
 mg/m³ = milligrams per cubic meter

**Table 6-3. RCRA-Permitted Hazardous Waste Management Units G203, G1009, G1107, G1109, and G1110
Confirmatory Sampling and Analysis Methods**

Sample Source ^a	No. of Samples	Sampling Method	Analytical Parameters	Sample Container	Sample Collection Preservative	Analytical Method	Sample Holding Time
RCRA-Permitted Hazardous Waste Management Unit Interior Air Sample	Two sampling cycles for each unit	Continuous low-level air monitor	Mustard	N/A	N/A	Method to be developed IAW EPA methods and procedures ^d	N/A
Solids ^b	Number of samples will be based on size of storage area sample grid created ^c	Bias sampling	Mustard	Glass	4°C	SW-846 Method 8271 or 8170	30 days
			Thiodiglycol	Glass	4°C	SW-846 Method 8271 or 8170	30 days
			SVOCs	Amber glass	4°C	SW-846 Method 8270D ^e	7 days (Extraction); 40 days (Analysis)

Notes:

- ^a Additional analytical methods may be added based on constituents of concern identified at the time of closure, based on **Table 6-1** decision-making process. Additional constituents of concern will be subject to approval by Colorado Department of Health and Environment (CDPHE).
- ^b Solids will only be bias sampled if there are known/recorded spills, visual evidence of stains, discolorations, cracks, or gaps in flooring.
- ^c This is based on USEPA guidance to determine the number of samples as described in Chapter Nine of *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, current edition unless otherwise specified as referenced in the CDPHE Hazardous Waste Regulations (6 CCR 1007-3).
- ^d If a PCD analytical method is not developed at the time of closure, samples will be analyzed at an off-site location that is certified IAW EPA methods and procedures approved by the Division
- ^e Methods listed are from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, current edition unless otherwise specified as referenced in the CDPHE Hazardous Waste Regulations (6 CCR 1007-3).

N/A = not applicable
 RCRA = Resource Conservation and Recovery Act
 SVOC = semivolatile organic compound

Table 6-4. RCRA-Permitted Hazardous Waste Management Units G203, G1009, G1107, G1109, and G1110 Air Monitoring Sampling Requirements

Item	Air Monitoring Sampling Conditions
RCRA-Permitted Hazardous Waste Management Unit Interior Air Sample	4 hours at or above 70°F before monitoring

Notes:

After the conditions listed in this table are established, MINICAMS[®] or Depot Area Air Monitoring System (DAAMS) samples will be collected. If results meet closure performance standards in **Table 6-2**, the structure or equipment is considered clean closed. DAAMS or other confirmatory method that can detect to the concentration required for closure will be used to confirm MINICAMS results if MINICAMS alarm for chemical agent.

RCRA = Resource Conservation and Recovery Act

**Table 6-5. RCRA-Permitted Hazardous Waste Management Unit Building 540
Closure Performance Criteria**

Media and Parameters	Decontamination/Closure Verification Criteria
<u>Rinsewaters</u>	
Chemicals of Concern ^a	Final rinse sample to non-detect for chemicals of concern
<u>Bias Sampling (Concrete Chip Samples)^b</u>	
Chemicals of Concern	Non-detect for chemicals of concern

Notes:

- ^a Prior to Building 540 closure activities, an assessment will be conducted and historical and operating records of wastes, as well as waste codes Building 540 is permitted to store, will be reviewed to determine chemicals of concern for Building 540 closure.
- ^b Solids will only be bias sampled if there are known/recorded spills, visual evidence of stains, discolorations, cracks, or gaps in flooring.

Table 6-6. RCRA-Permitted Hazardous Waste Management Unit Building 540 Confirmatory Sampling and Analysis Methods

Sample Source	No. of Samples	Sampling Method	Analytical Parameters	Sample Container	Sample Collection Preservative	Analytical Method ^a	Sample Holding Time
Rinsewaters	Minimum of one (1) per each of the four waste segregation areas.	Grab	Regulatory Levels of Chemicals of Concern:				
			SVOCs	Amber glass	Cool 4°C	8270D	7 days (Extraction); 40 days (Analysis)
			Halogenated VOCs	3x40mL glass, VOA vial, no headspace, PTFE septa cap	Cool 4°C; HCl or NaHSO ₄ to pH < 2	8260B	14 days with preservatives; 7 days without preservatives
			Pesticides	Amber glass	Cool 4°C	8081B	7 days (Extraction); 40 days (Analysis)
			Nitrates	Amber glass	Cool 4°C	8330A	14 days (Extraction); 40 days (Analysis)
			Metals	HDPE plastic bottle	Cool 4°C; HnO ₃ to pH < 2	6010C or 6020A and 7470A (Hg)	180 days and 28 days (Hg)
Solids ^b	Number of samples will be based on size of storage area sample grid created. ^c	Bias Sampling	SVOCs	Amber glass	Cool 4°C	8270D	14 days (Extraction); 40 Days (Analysis)
			Halogenated VOCs	Amber glass	Cool 4°C	8260B	14 days (Extraction); 40 days (Analysis)
			Pesticides	Amber glass	Cool 4°C	8081B	14 days (Extraction); 40 days (Analysis)
			Nitrates	Amber glass	Cool 4°C	8330A	14 days (Extraction); 40 days (Analysis)
			Metals	HDPE plastic	Cool 4°C	6010C or 6020A and 7470A (Hg)	180 days and 28 days (Hg)

Table 6-6. RCRA-Permitted Hazardous Waste Management Unit Building 540 Confirmatory Sampling and Analysis Methods (Continued)

Notes:

- ^a Methods listed are from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, current edition unless otherwise specified, as referenced in the CDPHE Hazardous Waste Regulations (6 CCR 1007-3).
- ^b Solids will only be bias sampled if there are known/recorded spills, visual evidence of stains, discolorations, cracks or gaps in flooring.
- ^c This is based on USEPA guidance to determine the number of samples as described in Chapter Nine of *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, current edition unless otherwise specified as referenced in the CDPHE Hazardous Waste Regulations (6 CCR 1007-3).

HCl	=	hydrochloric acid
HDPE	=	high-density polyethylene
Hg	=	mercury
HNO ₃	=	nitric acid
mL	=	milliliter
NaHSO ₄	=	sodium bisulfate
PTFE	=	polytetrafluoroethylene
SVOC	=	semivolatile organic compound
VOA	=	volatile organic analysis
VOC	=	volatile organic compound

Table 6-7. PCD Maximum Waste Inventory

Hazardous Waste Management Unit	Number of Permitted Units	Storage Capacity per Unit	Total Maximum Waste Inventory
RCRA-Permitted Hazardous Waste Management Units G203, G1009, G1107, G1109 (solid and liquid waste storage)	4 Igloos	300 rounds or equivalent volume of 330 gallons	1,200 rounds or 1,320 gallons
RCRA-Permitted Hazardous Waste Management Unit G1110 (solid and liquid waste storage)	1 Igloo	144, 55-gallon drums	7,920 gallons (solid and liquid waste)
RCRA-Permitted Hazardous Waste Management Unit Building 540	1 Building	240, 55-gallon drums	13,200 gallons

Note:

RCRA = Resource Conservation and Recovery Act

Table 6-8. PCAPP EDS Site Acceptable Levels for Temporary Closeout and Clean Closure

Media and Parameters	Level
<u>Vapor Samples:</u> Mustard Agent (HD/HT)	
<u>CSU H1102:</u> <i>Temporary Closeout</i>	< 0.003 (3×10^{-3}) mg/m ³ a,b,c
<i>Clean Closure (Final Closure)</i>	< 0.00002 mg/m ³ a,b,c GPL
<u>EDS Units:</u> <i>Temporary Closeout</i>	
• EDS Unit Remain Onsite	< 0.003 (3×10^{-3}) mg/m ³ a,b,c
• Take Offsite	< 0.0004 (4×10^{-4}) mg/m ³ a,b,c WPL
<i>Clean Closure (Final Closure)</i>	< 0.00002 mg/m ³ a,b,c GPL
<u>Rinsewaters</u> ^d (if decontamination conducted)	
<u>EDS Units:</u> <i>Temporary Closeout:</i> (HD/HT)	
• EDS Unit Remain Onsite:	< 50 mg/L
• Take EDS Unit Offsite	Non-detect in final rinse sample
<i>Clean Closure (Final Closure):</i> (HD/HT)	Non-detect in final rinse sample
<u>CSU H1102 and H1103</u> Clean Closure (Final Closure):	Non-detect in final rinse sample
TC Metals, TC SVOCs, TC VOCs	
<u>Concrete</u> ^e <u>Chip Samples</u> (if sampling conducted)	
<u>CSU H1102</u> Clean Closure (Final Closure): HD/HT	Non-detect
<u>CSU H1103</u> Clean Closure (Final Closure): TC Metals, TC SVOCs, TC VOCs	Non-detect ^f
<u>Temporary Closeout for CSU H1103:</u>	Visibly swept and clean interior; no hazardous wastes in storage; non-detect in final rinse sample
<u>Temporary Closeout for Hazardous Waste Roll-off Container Storage Area Adjacent to CSU H1103:</u>	Visibly swept and clean area; no hazardous wastes in storage; no roll-off bin present

Notes:

- ^a Levels presented are from DA Pam 385-61, *Toxic Chemical Agent Safety Standards*, 13 November 2012.
- ^b Mustard agents HD/HT are measured as H.
- ^c Headspace monitoring levels are considered exceeded when concentration results from at least two cycles of MINICAMS[®] or Depot Area Air Monitoring System (DAAMS) sampling are above the acceptable level.
- ^d Acceptable level value is based on using deionized water as rinsate. Potable water may also be used but only if a minimum of two background samples of potable water are collected for the same parameters of interest and analyzed using the same analytical methods.
- ^e If operation records review and visual inspection indicate evidence of stains, discoloration, cracks, gaps, and known spills/releases inside a CSU, then concrete chip samples will be collected.
- ^f Other parameters may be added as necessary based on review of operating records for the known hazardous wastes stored, known/recorded spills, and visual inspection of CSU H1103 during closure.

**Table 6-8. PCAPP EDS Site Acceptable Levels for Temporary Closeout and
Clean Closure (Continued)**

Notes: (Continued)

CSU	=	Container Storage Unit
EDS	=	Explosive Destruction System
GPL	=	general population limit
HD	=	distilled sulfur mustard
HT	=	mustard-T mixture
mg/L	=	milligram per liter
mg/m ³	=	milligram per cubic meter
SVOC	=	semivolatile organic compound
TC	=	toxicity characteristic
VOC	=	volatile organic compound
WPL	=	worker population limit

Table 6-9. Headspace Monitoring Sampling Requirements

Item	Headspace Monitoring Sampling Conditions
EDS Equipment	Isolate potentially contaminated equipment by enclosing in plastic and allowing headspace in the enclosure to equal equilibrium for no less than 4 hours at or above 70°F before monitoring.
Fixed Equipment	Isolate potentially contaminated equipment by enclosing in plastic and allowing headspace in the enclosure to equal equilibrium for no less than 4 hours at or above 70°F before monitoring
Portable Equipment	Isolate potentially contaminated equipment by enclosing in plastic and allowing headspace in the enclosure to equal equilibrium for no less than 4 hours at or above 70°F before monitoring
CSU Interior Space	No less than 4 hours at or above 70°F before monitoring

Notes:

After the conditions listed in this table are established, MINICAMS[®] or Depot Area Air Monitoring System (DAAMS) samples will be collected and analyzed. If results meet acceptable levels in **Table 6-8**, the structure or equipment is considered clean.

CSU = Container Storage Unit
EDS = Explosive Destruction System

Table 6-10. EDS and CSU H1102 Summary of Confirmatory Sampling and Analysis Methods

Sample Source	No. of Samples	Sampling Method/ Equipment	Analytical Parameters	Sample Container	Sample Collection Preservative	Analytical Method ^a	Sample Holding Time
Headspace Sample of EDS Equipment and CSU H1102	One sampling cycle for each structure, equipment, or space	Vapor monitor using MINICAMS [®] or DAAMS ^b	Mustard Agent H ^c	N/A	N/A	MINICAMS using ECBC IOP MT-02; DAAMS using ECBC IOP MT-11 then IOP MT-13	N/A
Rinsewaters	Two	Grab/COLIWASA, bottle, drum thief	Mustard Agent H ^c	Stainless steel or glass jar or bottle with a Teflon [®] -lined cap	4°C	ECBC IOP MT-60	30 days
Concrete Chip ^d Samples of CSU Flooring	Will be based on size of storage area sample grid created	Bias random sampling	H ^c	Stainless steel, polyethylene, or glass 3-40 mL vials with Teflon-lined screw cap	4°C 5 mL Glacial acetic acid and 1 g NaCl	ECBC IOP MT-08 SW-846 3571 followed by SW-846 8271	30 days 3 days and extracts must be analyzed within 14 days of extraction

Notes:

- ^a PCAPP EDS onsite Mobile Analytical Platform will perform chemical agent analysis. A contracted offsite laboratory will be used to perform SW-846 Methods 3571 and 8271.
- ^b DAAMS will be used to confirm MINICAMS results if MINICAMS alarm for chemical agent.
- ^c Distilled sulfur mustard (HD) and mustard-T mixture (HT) will be measured as H.
- ^d If operation records review and visual inspection indicate evidence of stains, discoloration, cracks, gaps, and known spills/releases inside the CSU, then concrete chip samples will be collected.

Table 6-10. EDS and CSU H1102 Summary of Confirmatory Sampling and Analysis Methods (Continued)

Notes: (Continued)

COLIWASA	=	composite liquid waste sampler
CSU	=	Container Storage Unit
DAAMS	=	Depot Area Air Monitoring System
ECBC	=	Edgewood Chemical Biological Center
EDS	=	Explosive Destruction System
H	=	Levinstein mustard
IOP	=	Internal Operating Procedure
mL	=	milliliter
N/A	=	not applicable
NaCl	=	sodium chloride

Table 6-11. CSUs H1102, H1103 and H1103 Roll-off Container Storage Area Confirmatory Sampling and Analysis Methods

Sample Source	No. of Samples	Sampling Method/Equipment	Analytical Parameters ^a	Sample Container	Sample Collection Preservative	Analytical Method ^b	Sample Holding Time
Rinsewaters ^c	1	Grab	TC Metals	HDPE Plastic Bottle	Cool 4°C; HNO ₃ to pH <2	1311 followed by 6010C; 7470A (Hg)	180 days 28 days for Hg
			TC SVOCs	Amber Glass PTFE-lined cap	4°C	1311 followed by 8270D	7 days to extract; 40 days to analyze
			TC VOCs	Amber Glass 40-mL vial with PTFE-lined cap	HCl to pH <2; 4°C	1311 followed by 5030B/8260B	14 days to ZHE, 14 days from ZHE to analysis
Concrete Chip ^d Solid Samples of CSU Floor, or Roll-off Container Storage Area at H1103	Will be based on size of storage area sample grid created	Bias sampling	TC Metals	HDPE Plastic	4°C	1311 followed by 6010C; 7470A (Hg)	180 days 28 days for Hg
			TC SVOCs	Amber Glass	4°C	1311 followed by 8270D	TCLP extract within 14 days, preparative extract within 14 days; 40 days to analyze
			TC VOCs	Amber Glass	4°C	1311 followed by 5030B/8260B	TCLP Extract within 7 days, 40 days to analyze

Notes:

^a Parameters for analysis are based on the known hazardous wastes stored in CSUs H1102, H1103 and H1103 Roll-Off Container Storage Area. Other parameters may be added as necessary based on review of operating records for known/recorded spills, the known hazardous wastes stored, and visual inspection of the CSUs during closure.

^b Methods listed are from Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, current edition, unless otherwise specified, as referenced in the CDPHE Hazardous Waste Regulations (6 CCR 1007-3).

Table 6-11. CSUs H1102, H1103 and H1103 Roll-off Container Storage Area Confirmatory Sampling and Analysis Methods (Continued)

Notes: (Continued)

- ^c Rinsewaters (final clean water rinse) will be sampled and analyzed if decontamination is performed based on operating record review of the known hazardous wastes stored, known/recorded spills, and visual inspection of the CSU during closure that identified stains, discolorations, and other evidence of potential contamination.
- ^d Concrete chip solids will only be bias sampled if there are known/recorded spills, visual evidence of stains, discolorations, cracks or gaps in flooring or concrete pad (H1103 roll-off container storage area), and other evidence of potential contamination.

CSU	=	Container Storage Unit
HCl	=	hydrochloric acid
HDPE	=	high-density polyethylene
Hg	=	mercury
HNO ₃	=	nitric acid
mL	=	milliliter
PTFE	=	polytetrafluoroethylene
SVOC	=	semivolatile organic compound
TC	=	Toxicity Characteristic
TCLP	=	Toxicity Characteristic Leaching Procedure
VOC	=	volatile organic compound
ZHE	=	zero headspace extraction

Table 6-12. Maximum Inventory of Wastes

Location	Media	Waste Quantity		
		EDS P2R	EDS P2A	CSU
EDS^a				
EDS Containment Vessel	Liquid	≈ 160 gallons	≈ 160 gallons	N/A
Neutralent Waste Tote ^c	Liquid	330 gallons	330 gallons	N/A
Rinsewater Waste Tote ^c	Liquid	330 gallons	330 gallons	N/A
Intermediate Tank ^d	Liquid	125 gallons	125 gallons	
Intermediate Tank Secondary Containment	Liquid	≈ 136 gallons	≈ 136 gallons	
Trailer Secondary Containment Pan	Liquid	≈ 166 gallons	≈ 166 gallons	N/A
Reagent Supply Subsystem Secondary Containment Pan	Liquid	≈ 107 gallons	N/A	N/A
CSU H1102^b				
Containment Pan Plus Containers	Liquid	N/A	N/A	≈ 1,792 gallons
CSU H1103^c				
Containment Pan Plus Containers	Liquid	N/A	N/A	≈ 13,640 gallons
Total		≈ 1,354 gallons	1,247 gallons	≈ 15,432 gallons

Notes:

- ^a Values based on two EDS Phase 2 Units for conservative analysis.
- ^b Values based on storage limit of 300 munitions total at 330 gallons; plus 34 pallets at 43 gallons per pallet in CSU.
- ^c Value based on storage limit of 30 X 330-gallon totes plus 17 pallets of 4, 55-gallon drums.
- ^d Intermediate Tank is a less than 90-day hazardous waste tank and will be used to hold hot rinsewaters.

CSU = Container Storage Unit
 EDS = Explosive Destruction System
 N/A = not applicable
 P2A = Phase 2 Unit A
 P2R = Phase 2 Unit R

Table 6-13. Temporary EDS and CSU Closeout Sequence^a

Activity	Day Completed
Initiate Closeout Activities	Day 0
<ul style="list-style-type: none"> • Review operating records and confirm and evaluate any spills, releases, cleanup activities noted • For EDS, perform procedures for servicing, cleaning/decontaminating, and preparing the EDS and associated equipment for subsequent use; collect EDS rinsate sample • Clean CSUs. For EDS and CSU H1102, review/collect headspace monitoring samples/analyses to verify adequate cleaning/decontamination • Evaluate chemical agent analysis results and document • Confirm any wastes generated during closeout activities were properly containerized and stored pending shipment to a TSDF 	Day 1 to 4
Confirm and document that temporary EDS Closeout Activities listed above are completed	Day 5 to 6

Notes:

^a One EDS unit; day completed is an estimate

CSU = Container Storage Unit
 EDS = Explosive Destruction System
 TSDF = treatment, storage, and disposal facility

Table 6-14. EDS Closure Sequence^a

Activity	Day Completed
Initiate Closure Activities	Day 0
PE will observe closure activities and review operating records to:	Day 1 to 5
<ul style="list-style-type: none"> • Confirm and evaluate any spills, releases, cleanup activities noted • Confirm that the EDS procedures for closeout (servicing, cleaning/decontaminating and preparing the EDS and associated equipment for subsequent reuse or demobilization) were followed • Confirm the EDS was monitored to verify adequacy of cleaning/decontamination • Confirm monitoring results were documented and that values met the acceptable levels established for equipment reuse • Confirm that wastes generated from closeout operations were transferred to a less than 90-day hazardous waste storage area pending shipment to a TSDF or were shipped directly offsite to a TSDF 	
Prepare to remove EDS from Environmental Enclosure	Day 6 to 8
Ship all wastes generated from closure to a permitted hazardous waste TSDF	Day 21 to 30
Complete all closure activities	Day 30 to 60
Submit closure certification to the CDPHE	60 days after completion of closure

Notes:

^a Each EDS unit; day completed is an estimate

CDPHE = Colorado Department of Public Health and Environment
 EDS = Explosive Destruction System
 PE = Professional Engineer (Colorado)
 TSDF = treatment, storage, and disposal facility

Table 6-15. CSU Closure Schedule

Activity	Day Completed
Initiate Closure Activities	Day 0
PE will:	Day 1 to 10
<ul style="list-style-type: none"> • Confirm and evaluate any spills, releases, cleanup activities noted • Confirm that cleaning/decontaminating was conducted and documented • Confirm the CSU was monitored and sampled as required by this Closure Plan to verify adequacy of cleaning/decontamination • Confirm monitoring results and other analytical results were documented and that values met the acceptable levels established 	
<ul style="list-style-type: none"> • Confirm that wastes generated from closeout operations were transferred to a less than 90-day hazardous waste storage area established for closure purposes pending shipment to a TSDF or were shipped directly offsite to a TSDF 	Day 11 to 12
Ship all wastes generated from closure to a permitted hazardous waste TSDF	Day 13 to 30
Submit closure certification to the CDPHE	60 days after completion of closure

Notes:

CDPHE = Colorado Department of Public Health and Environment
 CSU = Container Storage Unit
 PE = Professional Engineer
 TSDF = treatment, storage, and disposal facility

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APPENDIX 6-1
DECONTAMINATION PLAN (FOR EDS SITE)

**U.S. Army
Chemical Materials Activity**

Recovered Chemical Materiel Directorate

**Pueblo Chemical Agent-Destruction Pilot
Plant Explosive Destruction System at
Pueblo Chemical Depot**

Decontamination Plan

Final

May 2014

EXECUTIVE SUMMARY

This Decontamination Plan has been prepared for implementing a decontamination strategy after selecting health-based criteria for releasing the Explosive Destruction System (EDS) site and its associated equipment and structures for reuse and maintenance following the completion of chemical agent treatment operations. The approach is intended to certify and ensure decontaminated items meet the desired health-based criterion without compromising worker safety or public and environmental health while also repurposing materials for the most economic use of resources.

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APPENDIX 6-1
DECONTAMINATION PLAN (FOR EDS SITE)

1. INTRODUCTION

This Decontamination Plan has been prepared for implementing a decontamination strategy and selecting a health-based criterion for releasing the Explosive Destruction System (EDS) used for destruction/treatment operations at the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) site and its associated equipment and structures for reuse and maintenance following the conclusion of chemical agent treatment operations.

This Decontamination Plan establishes the approach and health-based criteria for determining the release of tools, supplies, equipment, and facilities from the PCAPP EDS site for future use and/or maintenance in accordance with the Department of Army Pamphlet (DA Pam) 385-61 (DA, 2012). The approach is intended to certify and ensure decontaminated items meet the health-based criteria in order to safely reuse and perform maintenance on equipment, tools, and facilities.

This Decontamination Plan provides information on the decontamination performance standards, methodology, monitoring, documentation, and certification for the process.

1.1 Background

The Recovered Chemical Materiel Directorate (RCMD) will use the EDS to treat/destroy munitions and other items that contain or are contaminated with chemical agent at Pueblo Chemical Depot (PCD). Two EDS units (the Phase 2R [P2R] and Phase 2A [P2A]) will be deployed to PCD to destroy/treat overpacked munitions, Department of Transportation (DOT) cylinders, and other miscellaneous items (ignition cartridges, propellant) currently stored at PCD that contain or are contaminated with mustard agents (distilled sulfur mustard [HD]/mustard-T mixture [HT]), as well as to treat/destroy any reject chemical agent munitions or contaminated bursters generated from PCAPP operations.

The EDS is a transportable system designed to safely access and treat the chemical fill inside an explosively configured munition while, at the same time, destroying the explosive components of the munition. Auxiliary equipment is necessary for support of EDS operations that can potentially be exposed to vapor and liquid agent during treatment operations. Although most of these materials will be decontaminated prior to being reused for future missions, a number of these items will be disposed of as hazardous waste; specific items such as the ones listed in **Table Appendix 6-1-1** will be decontaminated prior to release for reuse or maintenance.

1.2 Purpose

This Decontamination Plan is intended to provide specific guidance for implementing the decontamination strategy and identifying the appropriate health-based criteria for proper

Table Appendix 6-1-1. Miscellaneous Structures, Equipment, and Areas

Item	Description
PDS	Designated area set up at each Environmental Enclosure for personnel to decontaminate PPE and equipment when leaving the exclusion zone of each operation
PPE Change Area	Facilities for personnel to don PPE and to shower after passing through the PDS
Support Conex/ Storage Facility	Commercially available box structure (Conex) that allows for EDS equipment to be transported and provides equipment storage during operations
Loading Area	A designated area at the entrance of each Environmental Enclosure where supplies, items to be processed, and waste containers will be loaded and unloaded
Mobile Analytical Platform	Provides onsite chemical agent laboratory analysis services for air and liquid samples

Notes:

EDS = Explosive Destruction System
PDS = Personnel Decontamination Station
PPE = personal protective equipment

decontamination and release of any tools, supplies, equipment, and facilities utilized at the PCAPP EDS site.

Additionally, the purposes of this Decontamination Plan include the following:

- Identify tools, supplies, equipment, and facilities to be released.
- Describe applicable decontamination materials, process, duration, and treatment technologies to be used.
- Provide a health-based criterion that will be used for selecting the appropriate level of decontamination of equipment and structures.
- Identify the analytical method to determine whether items have been decontaminated below the selected health-based criteria.
- Specify the quality control requirements to ensure decontamination and achievement of the closure or release criteria.
- Prescribe future use(s) for the items (tools, supplies, equipment, and facilities) that will be released from site.

1.3 Scope

This plan applies to the PCAPP EDS site and associated equipment and structures that may be serviced for repair or transferred to subsequent organizations for use. The plan specifies decontamination methods and verification criteria that must be achieved in order to release tools, supplies, equipment, and facilities for reuse. It does not address management of contaminated waste.

1.4 Definitions

This section defines the special terms used throughout this document. Abbreviations are provided in **Appendix Attachment 6-1**.

Clean

Tools, supplies (excluding used carbon filter material, which will be handled as contaminated material), and equipment will be considered clean and available for unrestricted use if all of the following apply to the item:

- Never contacted liquid agent or experienced a chemical agent aerosol (suspended liquid droplets as might be generated by a nozzle) environment and was maintained in a continuously controlled environment where the environment was documented never to have exceeded the short-term exposure limit (STEL) concentration when that item was present
- Never contacted liquid agent or experienced a chemical agent aerosol environment and was maintained in a continuously controlled environment where the environment was documented never to have exceeded the immediately dangerous to life and health (IDLH) level when that item was present and based on a risk assessment considering environmental conditions. Risk assessment must address specific factors as listed in DA Pam 385-61 (5-2d(2)).

Decontamination

Decontamination is the process of removing or decreasing the amount of chemical agent or industrial chemical on any person, object, or area by absorbing, neutralizing, destroying, ventilating, or removing chemical agent or industrial chemical.

Monitoring

Monitoring is the continued or periodic act of seeking to determine whether a chemical material is present.

Barriers

Barriers are physical structures used to retard the migration of gases and vapors.

Ambient Temperature

Ambient temperature is defined as 65° to 85°F.

General Population Limit (GPL)

The GPL is a highly protective vapor exposure criteria for a 24-hour/day, lifetime exposure of the general population, including all ages and those more susceptible individuals. A no observed adverse effect level (NOAEL) represents an exposure at or below which there are no anticipated adverse health effects from either short- or long-term repeated exposures. The GPL is a time-weighted average based on the concentration to which the general public may be exposed 24 hours daily for up to 70 years. The GPL is 0.00002 milligram per cubic meter (mg/m³) for HD.

Worker Population Limit (WPL)

The WPL is the maximum allowable 8-hour time-weighted average concentration that an unmasked worker could be exposed to for an 8-hour workday 40 hours per week for 30 years without adverse effect. The WPL is 0.0004 mg/m³ for HD.

Short-Term Exposure Limit (STEL)

The STEL is the concentration to which unprotected workers may be exposed for up to 15 minutes continuously. The STEL for personnel without respiratory protection is 0.003 mg/m³ for HD.

Restricted Release

The term “restricted release” refers to items that may be released only to personnel who meet the qualifications of a chemical agent worker. This type of classification is a person who could reasonably be exposed to chemical agents above the WPL, is knowledgeable in agent symptoms and characteristics, is provided the necessary training and medical surveillance, and is in facilities equipped with appropriate safeguards (that is, monitoring) to control potential hazards in accordance with the Basis of Worker Protection. This applies when the monitoring results show that the item is greater than or equal to WPL. When the item is monitored and shown to be greater than the GPL but below the WPL, the item may be available for restricted use and released to nonagent workers.

Unrestricted Release

The term “unrestricted release” refers to items that are considered clean or have been cleaned and monitored to the point that they may be released to the general public without restriction.

Vapor Screening Level (VSL)

VSL is an agent vapor concentration independent of time and refers to the level to which an item is monitored to determine the level of cleanliness. Monitoring involves containing the item within an enclosed space to limit incoming dilution.

Immediately Dangerous to Life and Health (IDLH)

An atmosphere that poses an immediate threat to life or health would cause irreversible adverse health effects or would impair an individual's ability to escape from a dangerous atmosphere, regardless of personal protective equipment (PPE) use. IDLH also includes atmospheres where oxygen content by volume is less than 19.5 percent. The IDLH for HD is 0.7 mg/m³.

2. DECONTAMINATION PERFORMANCE STANDARDS

The performance standards for agent decontamination are established in DA Pam 385-61.

This plan provides standards for the PCAPP EDS site to be cleared in accordance with accepted industrial hygiene practices and meet the conditions of the appropriate health-based criteria to release items for reuse and maintenance following the conclusion of chemical agent treatment operations.

2.1 Decontamination Classification Levels for Release

The classification level of release and the level of monitoring required for decontamination and reuse of property is dependent on the designated end state. As presented in **Table Appendix 6-1-2**, RCMD uses five decontamination classification levels:

- Contaminated, Do Not Release
- Clean, Restricted release to agent workers
- Clean, Restricted release to nonagent workers
- Clean, Unrestricted release to the public
- Clean, unrestricted release (never contaminated).

Table Appendix 6-1-2. Decontamination Classification Levels for Release

Classification Level ^a	Legacy Decontamination Nomenclature ^b	Vapor Screening Level	Health Based/Risk Analysis ^c	Desired End Use
<i>Contaminated – Do Not Release; Specific Safeguards Required</i>	1X	≥ STEL	No	N/A Must be treated
<i>Clean, Restricted No Release to General Workforce</i>	3X	< STEL	Yes	Release to agent workers
<i>Clean, Restricted No Release to the General Public</i>	4X	< WPL ^{d,e}	Yes	Release to nonagent workers
<i>Clean, Unrestricted Unrestricted Release to Public</i>	5X	< GPL ^e	Yes	Release to public
<i>Clean, Unrestricted Never Contaminated</i>	0	N/A	N/A	Release to public

Notes:

- ^a Restrictions may preclude disassembly or applying heat or friction (such as grinding) without special controls.
- ^b For information only.
- ^c Health-Based Criteria/Risk Analysis allows for other methods to be used or developed to determine which classification level applies.
- ^d Restricted – Maintenance or disassembly of items will only be performed by personnel who meet the qualifications of a chemical agent worker. Unrestricted – Items have been previously disassembled and are clean so that they can be released to the worker population without risk of agent release.
- ^e Release must be in accordance with approved Equipment Decontamination Plan (AMC Guidance, 2004) and all applicable federal, state, and local regulations.

GPL = general population limit
 N/A = not applicable
 STEL = short-term exposure limit
 WPL = worker population limit

The classification levels are not defined by the screening methodology but are defined by the population to whom the property is intended for release. Legacy waste designated under the old “X” classification system still remains at some of the chemical demilitarization facilities. Therefore, the X criteria are also provided in **Table Appendix 6-1-2** as a cross-reference.

Contaminated – Do Not Release. In accordance with Section 5-2.e of DA Pam 385-61 and the Reutilization and Disposal Guide, property that is designated as liquid agent-contaminated or vapor agent-contaminated will require decontamination or disposal. Property designated as potentially contaminated due to physical signs of potential exposure in an uncontrolled environment, or property for which the agent exposure is unknown, will be required to undergo a qualitative and/or quantitative evaluation prior to determining its management and final disposition. Air monitoring or additional sampling and analysis may be required to determine the property’s potential for contamination. Property that warrants reuse will be decontaminated in accordance with accepted industrial hygiene practices and site-specific procedures.

Clean – Restricted Release to Agent Workers. Decontaminated property that has been monitored to less than the STEL concentration will be considered clean and available for restricted release to agent workers. This property cannot be released to the general workforce. As indicated in **Table Appendix 6-1-2**, restrictions may include requirements that preclude disassembly, or apply heating or friction without special controls.

Clean – Restricted Release to Nonagent Workers. Decontaminated property that has been monitored to less than the WPL concentration will be considered clean and available for restricted use.

Property in this category may be released to nonagent workers but may not be released from government control. The release of property in this category must be in accordance with the approved EDS and applicable permit requirements as well as federal, state, and local regulations. Additionally, as indicated in **Table Appendix 6-1-2**, maintenance or disassembly of property in this category may only be performed by personnel knowledgeable in agent symptoms and characteristics, and in facilities equipped with appropriate safeguards to control potential hazards. However, if property has been monitored once, disassembled, has no occluded spaces,

and meets the selected health based criteria (e.g., GPL), it will be considered clean and can be released to the general worker population without risk of agent release.

Clean – Unrestricted Release to the Public. Decontaminated property with confirmed VSLs less than the GPL concentration will be considered clean and available for unrestricted use. Property in this category may be released to the public.

Clean – Unrestricted Release (Never Contaminated). Per DA Pam 385-61, property will be classified as clean and available for unrestricted use if:

- The property never contacted liquid agent or experienced a chemical agent aerosol environment
- The environment was continuously controlled and documentation shows never to have exceeded the STEL when the item was present.

Surplus tools, equipment, and facilities may be released unconditionally to the public in accordance with all applicable federal, state, and local regulations if the following conditions are met.

- The item is heated to an internal temperature of 1,000°F (538°C) for at least 15 minutes.
- The item is decontaminated in accordance with an approved equipment decontamination plan and certified by the mission commander or designee to the selected health-based criteria (for example GPL) for the reasonably anticipated use environment of the public owner.

2.2 Level of Monitoring for Decontamination and Reuse

Table Appendix 6-1-3 presents the health-based decontamination criteria for restricted and unrestricted release of mustard contaminated material based on results of air monitoring under unventilated conditions. The decontamination criteria in **Table Appendix 6-1-3** are used in combination with **Table Appendix 6-1-2** to determine the classification level for release of the items and/or areas.

The classification levels are defined as:

- *Cleared to Less Than GPL.* Items and facilities cleared to less than GPL may be given unrestricted release to the public, provided they meet the requirements of this plan.

Table Appendix 6-1-3. Health-Based Release Criteria

AEL	TWA Basis	Mustard (mg/m ³)
IDLH	≤ 30 min	7.0×10^{-1}
STEL	15-minute	3.0×10^{-3}
WPL	8-hour	4.0×10^{-4}
GPL	12-hour H/HD	2.0×10^{-5}

Notes:

AEL	=	airborne exposure limit
GPL	=	general population limit (12-hour or 24-hour time-weighted average concentration for the general population)
H	=	Levinstein mustard
HD	=	distilled sulfur mustard
IDLH	=	immediately dangerous to life and health (maximum concentration at which a worker can escape within 30 minutes without a respirator, without experiencing any escape-impairing, or irreversible health effects)
mg/m ³	=	milligram per cubic meter
STEL	=	short-term exposure limit (maximum concentration a worker can be exposed to for up to 15 minutes)
TWA	=	time-weighted average
WPL	=	worker population limit (average allowable concentration an unmasked worker can be exposed to based on 8 hours per day/40 hours/week for 30 years without adverse effects)

- *Cleared to Greater Than or Equal to GPL and Less Than WPL.* Items and facilities cleared to greater than or equal to GPL and less than WPL may be given restricted release to nonagent workers, provided they meet the requirements of this plan.
- *Cleared to Greater Than or Equal to WPL and Less Than STEL.* Items and facilities cleared to greater than or equal to WPL and less than STEL may be given restricted release to chemical agent workers, provided they meet the requirements of this plan.

An item's classification level may be established by monitoring to demonstrate that headspace vapor concentrations do not exceed the VSL corresponding to the respective material classification level in **Table Appendix 6-1-3**. Monitoring will be performed in accordance with the Site-Specific Monitoring Plan (**Attachment 3, Appendix 3-2**, of this Permit).

3. DESCRIPTION OF EQUIPMENT, TOOLS, AND FACILITY

Two EDS units will be deployed to treat/destroy overpacked munitions, DOT cylinders, and other miscellaneous items (ignition cartridges, propellant) currently stored at PCD that contain or are contaminated with mustard agents (HD/HT), as well as to treat/destroy any reject chemical agent munitions or contaminated bursters generated from PCAPP operations. Items will be brought from the PCD permitted storage igloos and placed into Container Storage Unit (CSU) H1102 pending treatment in an EDS. Items will be transferred from CSU H1102 to an EDS unit prior to treatment.

Once the items are enclosed in the EDS Containment Vessel with shaped charges applied, the items are then detonated to access the chemical fill and deactivate any explosive components. Liquid reagents are then added to treat the chemical fill and further deactivate explosives (if present). When treatment is complete, the liquid effluent is drained and solid material is removed manually from the Containment Vessel. The liquid and solid wastes are containerized and stored in permitted CSU H1103 pending shipment to an offsite treatment, storage, and disposal facility (TSDF).

During operations, each EDS unit is situated inside an Environmental Enclosure, as shown in **Figure Appendix 6-1-1**, that provides weather protection and interior environmental control for worker comfort and safety. Each enclosure will have Two Air Filtration System (AFS) units side by side that contain a carbon filtration unit to maintain a negative pressure within the structure relative to the outside air and to capture any vapors that may result from a release. The main span of an enclosure will house the EDS unit and provide sufficient additional space for equipment storage and movement without interfering with treatment operations. An unpack area and a Personnel Decontamination Station (PDS) will be provided.

To prevent any spills or leaks from reaching soil, groundwater, or surface water, a portable berm will be placed atop the entire enclosure floor space. Additionally, separate secondary containment is provided for the EDS Containment Vessel, Reagent Supply Subsystem, and liquid waste containers. All secondary containment will have the capacity to hold 100 percent of the volume of the largest container or 10 percent of the total volume of liquids contained within.

The enclosures will be equipped with doors for entrance and egress and will be connected to the AFS units, each consisting of pre-filters, high efficiency particulate air (HEPA) filters, and sulfur-impregnated carbon (SIC) filters along with an agent monitoring system, fan, and ductwork.

The Environmental Enclosure is a tent-like, all-weather, mobile shelter consisting of a series of arched rigid ribs and tentage. The Environmental Enclosure is a commercially available structure that meets the following requirements:

- *Memorandum for U.S. Army Chemical Materials Agency on DDESB Final Approval for Consolidation and Revision of the System Approvals for the*

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Explosive Destruction System (EDS) Phase 1 and Phase 2 Units, dated 16 September 2010.

- *MIL-STD-1472 – Human Engineering Design Criteria for Military Systems, Equipment, and Facilities.*
- National Electrical Code (NEC), National Fire Protection Association.

Due to either the function or location of these items during operations, the auxiliary equipment has the potential for being exposed to vapors and liquid from chemical agent during treatment operations. Although most of these materials will be decontaminated prior to being reused for future missions, a number of these items will be disposed of as hazardous waste. This Decontamination Plan includes the following items that are physically attached to or located inside the Environmental Enclosures:

- Equipment and tools in Environmental Enclosure (see **Appendix Attachment 6-2**)
- Heating, ventilation, and air conditioning (HVAC) unit
- Roll-up Bay Door #1
- Roll-up Bay Door #2
- PDS
- AFS
- Environmental Enclosure fabric, HVAC ductwork, skeletal structure of the Environmental Enclosure, flooring.

4. DECONTAMINATION METHODOLOGY

4.1 General Decontamination Strategy

All tools, equipment, and items used during the EDS campaign will be assessed to determine if they require decontamination. This will be accomplished by reviewing operating records, monitoring data, inspection logs, and process knowledge.

Once determined that decontamination is required, decontamination will be conducted using general household bleach and/or detergent solution(s) followed by clean water rinse(s). The decontamination solution and clean water rinses may be applied manually (for example, manual wipe down using cloths, rags, wipes) or by mechanical means (for example, spray wash, steam clean, flush through, or wet vacuum, depending on the component). Decontamination will be repeated until the standards are met. If air monitoring results meet acceptable levels, then no further decontamination will be necessary.

4.2 Decontamination Process

The step-by-step decontamination process is outlined in the following EDS P2 Steam Series Standing Operating Procedures (SOPs):

- SOP 17: Clean and Prepare Equipment
- SOP 18: Drain Supply Tanks
- SOP 19: Monitor and Decontaminate the EDS.

4.3 Decontamination Decision Matrix

Based on the *Policy for Chemical Agent Decontamination of Tools, Supplies, Equipment, and Facilities* (PMNSCM, 2010), when determining potential contamination and path forward for equipment reuse and/or ultimate disposition, the following will be considered:

- a. Items can be considered clean and available for unrestricted use if the item never contacted liquid chemical agent or chemical agent aerosol and meets one of the following criteria:
 - (1) If in a continuously controlled environment where the environment is documented to never have exceeded the STEL concentration when the item is present
 - (2) If in a continuously controlled environment where the environment is documented to be greater than the STEL but less than IDLH; and a risk assessment is performed that takes into account factors identified in DA Pam 385-61, Chapter 5-2d.(2).
- b. Tools, supplies, equipment, and facilities require decontamination or disposal if the items have contacted liquid chemical agent; were present in a chemical agent aerosol environment; were in a continuously controlled environment and exposed above the IDLH concentration for any period of time; were in an uncontrolled environment where monitoring indicated the environment exceeded the STEL concentration (also known as VSL); or were in an uncontrolled environment involving storage, use, or presence of chemical agent and where physical factors (such as discoloration, stains, etc.) indicate possible exposure to chemical agent.

Cleaning/decontaminant solutions may be general household bleach and/or general detergent or other appropriate decontaminant and technique referenced in Field Manual (FM) 3-5 or identified in Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45). The U.S. Environmental Protection Agency (USEPA) recommends and approves the use of the Table 1 alternate treatment standards for Resource Conservation and Recovery Act closure purposes.

Decontaminant and decontamination technique selected will depend on the contaminant of concern. For example, the use of bleach (sodium hypochlorite [NaOCl]) is a standard decontamination technique for chemical agent-contaminated non-porous surfaces (metal, glass, plastic, etc.) and is identified as a suitable decontaminant under chemical destruction technology in 40 CFR 268.45, Table 1. Similarly, steam cleaning is identified as an appropriate extraction technology in 40 CFR 268.45, Table 1, for most contaminants. The decontamination/cleaning solutions are generally applied manually through use of a spray device or by wiping down with cloth or paper towels and wipes.

The potentially contaminated PCAPP EDS facilities will first be decontaminated by either of the following steps:

- Areas, tools, supplies, and equipment that have been exposed to only agent vapor above the VSL (classified as vapor exposed) will be decontaminated. If air monitoring indicates that agent contamination levels are not reduced below the release criteria, then alternate decontamination methods (that is, decontamination with bleach solution) will be employed. Additional decontamination methods will be employed until air monitoring and sampling indicate that the contamination is reduced below the release criteria.
- Areas, tools, supplies, and equipment that have been potentially exposed to agent-contaminated liquids and aerosol agent will be decontaminated with a bleach solution. The process for decontamination is to ensure contact with the decontamination solution on all exposed surfaces. Removal of contaminated material may also be employed.

Once the decontamination process has been completed, all free residual liquids will be removed from the surface prior to air monitoring. Decontaminated areas, tools, supplies, and equipment are specifically defined as not being able to entrap and then release hazardous amounts of agent vapor or pose a contact hazard. Items, such as carbon media, that can trap and release agent vapor upon increased temperature are excluded from this definition. Also excluded are items that contain cavities that have been exposed to liquid agent and do not have pathways for VSL monitoring. Excluded items will be disposed of in accordance with PCAPP EDS hazardous waste procedures.

The decontamination decision tree presents a visual reference for the process described above and is located in **Figure Appendix 6-1-2**.

4.4 Monitoring Process

All monitoring for decontamination verification will be performed in accordance with the following Edgewood Chemical Biological Center (ECBC) Internal Operating Procedures (IOPs):

- IOP MT-2: Operation and Maintenance for Fixed Site MINICAMS
- IOP MT-11: DAAMS Tube Monitoring Procedures
- IOP MT-13: Analysis of CWM on DAAMS Tubes Using GCMSD Systems.
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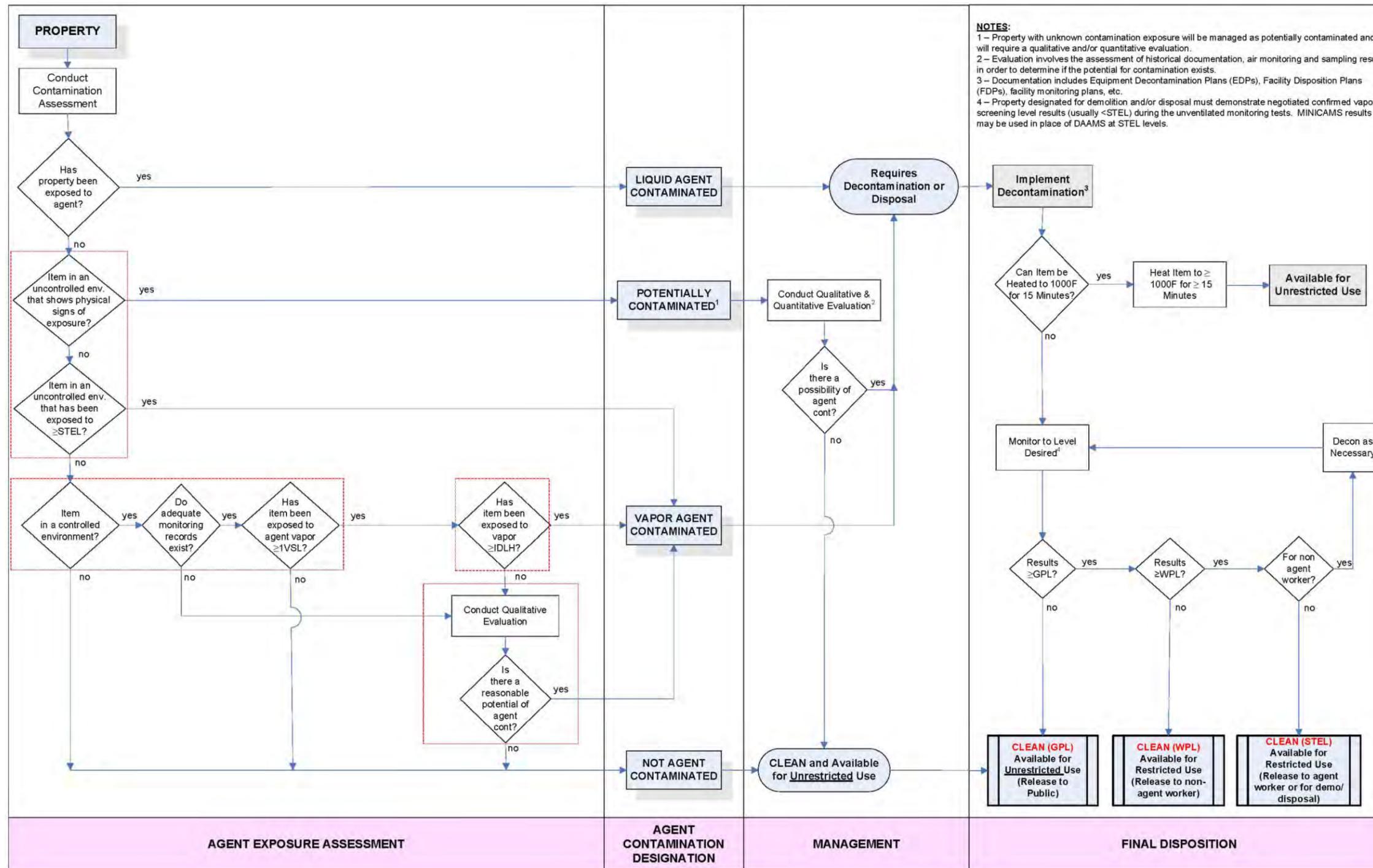


Figure Appendix 6-1-2. Decontamination Decision Tree

5. DOCUMENTATION AND RECORDKEEPING

As the project site manager, RCMD is ultimately responsible for maintaining records that support the operations of the EDS units. In addition to maintaining operational documents, inspection logs, transfer and transport logs, hazardous waste manifests, and various documentation, the records of decontamination will be maintained by RCMD.

It is imperative to ensure proper documentation is maintained for agent-contaminated items and facilities being released from RCMD control for reutilization by other U.S. Army or government entities.

The documentation will record the disposition, end use, and transfer of property. Additionally, the information will document the overall evaluation process. Documentation that will be maintained includes supporting documentation of the qualitative and quantitative evaluations conducted in support of the decontamination assessment; sampling data and documentation of spills, releases, etc., and corresponding cleanup activities. Information documenting the overall decontamination process and materials used will also be retained and managed in accordance with applicable federal, state, and Army regulations.

A data package will be assembled including (1) the decontamination records for each of the remaining pieces of equipment and their configuration and all potentially contaminated areas, as well as validation of decontamination effectiveness (VSL monitoring data) and (2) the facility monitoring data, including VSL monitoring data and operations certification that the facility monitoring hold time was met.

6. CERTIFICATE OF DECONTAMINATION

In accordance with the *Chemical Agent Decontamination of Tools, Supplies, Equipment and Facilities* policy, in order to release contaminated items for reuse to the nonagent government community or the public, the Director of RCMD must sign a memorandum certifying that the released items have been decontaminated with the approved plan and are safe for release. The memorandum requires, at a minimum, the date(s) of the decontamination, monitoring results, and

the decontamination plan as an enclosure. The records of decontamination are required to be maintained by RCMD.

APPENDIX ATTACHMENT 6-1
ACRONYMS/ABBREVIATIONS

APPENDIX ATTACHMENT 6-1
ACRONYMS/ABBREVIATIONS

AFS	Air Filtration System
CFR	Code of Federal Regulations
CSU	Container Storage Unit
DA Pam	Department of the Army Pamphlet
DOT	Department of Transportation
ECBC	Edgewood Chemical Biological Center
EDS	Explosive Destruction System
FM	Field Manual
GPL	general population limit
HD	distilled sulfur mustard
HEPA	high efficiency particulate air
HT	mustard-T mixture
HVAC	heating, ventilation, and air conditioning
IDLH	immediately dangerous to life and health
IOP	Internal Operating Procedure
mg/m ³	milligram per cubic meter

NaOCl	sodium hypochlorite
NEC	National Electrical Code
NOAEL	no observed adverse effect level
P2A	Phase 2A
P2R	Phase 2R
PCAPP	Pueblo Chemical Agent-Destruction Pilot Plant
PCD	Pueblo Chemical Depot
PDS	Personnel Decontamination Station
PMNSCM	Project Manager for Non-Stockpile Chemical Materiel
PPE	personal protective equipment
RCMD	Recovered Chemical Materiel Directorate
SIC	sulfur-impregnated carbon
SOP	Standing Operating Procedure
STEL	short-term exposure limit
TSDF	treatment, storage, and disposal facility
USEPA	U.S. Environmental Protection Agency
VSL	vapor screening level
WPL	worker population limit

APPENDIX ATTACHMENT 6-2
TOOLS AND ITEMS THAT MAY BECOME CONTAMINATED

APPENDIX ATTACHMENT 6-2
TOOLS AND ITEMS THAT MAY BECOME CONTAMINATED

The following items may require decontamination:¹

ITEM:

Primary tool kit
Portable Hydraulic Ram Kit
Socket, 3/4-inch deep well or equivalent
Socket, 7/16-inch deep well or equivalent
Wrench, 3/8-inch crow's foot or equivalent
Wrench, 5/16-inch hex key or equivalent
Wrench, 7/8-inch crow's foot with extension or equivalent
Plastic hammer
Pliers
Conax[®] lube
Perma-Slik[®] lube
Scrub brush
Soft-bristle test tube brush
Spray bottle
General-purpose detergent
Rags or absorbent paper towels
Sample container
Sample packaging
Household bleach (5 percent)
Secondary containment pallets

¹ Items may be subject to change. Please consult the latest version of EDS SOPs for required items.

ITEM:

Liquid waste drums

Bung wrench

Open-head drums

Nonmetallic scouring pad

Tape, Teflon[®] roll

Tape, duct

Bag, plastic, large

Bag, sealable

Debris pan

Decontaminant pail

Rinse pail

Indelible ink pen

Digital camera

Swab, cotton tipped

Air hose with nozzle

Training/shipping metal seal

APPENDIX ATTACHMENT 6-3
REFERENCES

APPENDIX ATTACHMENT 6-3
REFERENCES

Department of the Army Pamphlet (DA Pam) 385-61, *Toxic Chemical Agent Safety Standards*, 13 November 2012.

Project Manager for Non-Stockpile Chemical Materiel (PMNSCM), *Policy for Chemical Agent Decontamination of Tools, Supplies, Equipment, and Facilities*, October 2010.

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