ATTACHMENT F-1

EXAMPLE INSPECTION LOG SHEETS

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PCAPP EDS Daily (When in Use) Operational Inspection Checklist
EXAMPLE

EDS Operation Day: 1 2 **Environmental Enclosure 1 or 2**

Inspected By: _____ **Date:** _____

Signature: _____ **Time:** _____

#	Activity	Yes, No, or Not Applicable (NA)?	Corrective Action Required? If Yes, provide detail below.
EDS Containment Vessel (Interior and Exterior)			
1	Are there any spills, leaks, or liquids in the area?		
2	Does the exterior—tubing and valves—show any signs of corrosion, leakage, or other physical damage, such as tears, stresses, gouges, rips, cracks, loose screws, etc.?		
3	Does the interior show any signs of physical damage that would impair treatment capability?		
4	Are the waste transfer subsystem hoses/connections from the vessel door to liquid waste containers in good condition?		
EDS Waste Transfer Subsystem			
5	Are containers in good condition, i.e., no signs of deterioration, rust, corrosion, or leaking?		
6	Is there adequate aisle spacing between containers and walls of the Environmental Enclosure?		
7	Does the secondary containment for waste containers show signs of cracks, flaking, chips, gouges, or obvious wear or deterioration?		
8	Does the secondary containment for waste containers have signs of drips, spills, or leaks or any accumulated liquids?		
EDS Trailer/Skid Secondary Containment Pan			
9	Does secondary containment pan show liquids, leakage, or signs of corrosion, or other physical damage, such as cracks, gaps, or holes?		
EDS Lift Assist – IF THE LIFT ASSIST IS NOT BEING USED, DO NOT COMPLETE THIS SECTION.			
10	**P2R Unit Only.** Has the lift assist unit been visually inspected to confirm that the unit is marked with load rating and the date of next inspection?		

Comments/Discrepancies/Remedial Work Required: _____

_____

Date Corrective Action Completed: _____ Verified by: _____

PCAPP EDS Site
Daily Inspection (When in Use)
EXAMPLE

Inspected By: _____ **Date:** _____

Signature: _____ **Time:** _____

#	Activity	Yes, No, or Not Applicable (NA)?	Corrective Action Required? If Yes, provide detail below.
Communication Equipment			
1	Are landline telephones, cellular telephones, hand-held radios or other communication equipment present and operable?		
2	Is closed-circuit television operable and visual clarity/tilt, pan and zoom functions acceptable?		
3	Has the integrity of audible/visual alarm been checked?		
Personnel Decontamination Station			
4	Is appropriate and adequate decontamination solution present? Is PDS easily accessible? Is PDS equipment present and operable?		
Spill Kits and Emergency Response Equipment			
5	Do Spill Kits contain sufficient inventory? Are items in good condition and within expiration dates (as applicable)?		
6	Is emergency response equipment such as shovels, brooms, overpacks, present onsite, in sufficient quantities and in good condition to support response actions?		
Monitoring (MINICAMS® and DAAMS)			
7	Are monitors in good physical condition? Operating properly? Are diagnostic indicators operating?		
8	Are sample lines and connections in good condition? Is heat trace functional? Proper ventilation for exhaust?		
9	Was chemical agent challenge test and calibration conducted?		
Utility Container Subsystem			
10	Perform visual inspection of components. Is steam generator in good physical condition? Is any damage present?		
11	Are the flowmeters and the controls mounted on the small skid functioning and operable?		

Comments/Discrepancies/Remedial Work Required: _____

_____

_____

Date Corrective Action Completed:

_____Verified by: _____

PCAPP EDS Site
Monthly Inspection
EXAMPLE

Inspected By: _____ **Date:** _____

Signature: _____ **Time:** _____

#	Activity	Yes, No, or Not Applicable (NA)?	Corrective Action Required? If Yes, provide detail below.
Fire Extinguisher			
1	Are fire extinguishers present and operable? Is there adequate gauge pressure? Is the equipment within the service date?		
Emergency Generators			
2	Start generators; check voltage current and frequency output regularity and filter differential pressure. Are units operable?		
Security			
3	Is fencing of good integrity; any intrusion, or obstruction by vegetation or other damage?		
4	Are warning signs present and legible?		

Comments/Discrepancies/Remedial Work Required:

_____

Date Corrective Action Completed:

_____Verified by: _____

PCAPP EDS Site
Container Storage Unit
EXAMPLE ANNUAL INSPECTION

Name of Inspector: _____

Date and Time of Inspection: _____

Inspection Items	Results	Corrective Action Required?
	Yes or No	**Yes or No [If Yes, Provide Details Below]**
CSU Carbon Filtration System		
Has the validation been conducted in accordance with PCD SOP PU-OOOO-R-491?		

FOR CORRECTIVE ACTIONS: **PROVIDE DESCRIPTION OF CORRECTIVE ACTION(S) AND DATE(S) COMPLETED BELOW:**

PCAPP EDS Site
Container Storage Unit
EXAMPLE WEEKLY INSPECTION

Name of Inspector: _____

Date and Time of Inspection: _____

Inspection Items	Results Yes or No	Corrective Action Required? Yes or No [If Yes, Provide Details Below]
Containers		
Are munition pallets or containers or signs in area labeled with the words "Hazardous Waste," description of contents, applicable waste codes and/or DOT label or wording indicating primary hazard, and accumulation start date?		
Are waste munition containers stacked ONLY 1 high on containment pan? (Must not be more than 1 high)		
Are containers in good condition (i.e., show no signs of deterioration, rust, corrosion, or signs of leaks)?		
Are there any visible cracks, holes, gaps, or open spaces in the interior of the container when cover and closure devices are secured in the closed position? [Subpart CC]		
Are containers securely closed (except when adding or removing wastes)?		
Does any container require repairs? If yes, defect must be repaired or container replaced within 5 days of finding. [Subpart CC]		
Are storage area warning signs present and visible?		
Is adequate aisle space maintained in area to allow unobstructed movement of personal and safety/response equipment?		
Has inventory been verified to be within the permitted capacity for permitted storage?		

Inspection Items	Results Yes or No	Corrective Action Required? Yes or No [If Yes, Provide Details Below]
Secondary Containment (Pallets)		
Does portable secondary containment pan show signs of cracks, holes, gouges, tears, excessive wear, or other physical damage?		
Does portable secondary containment pan show signs of drips, leaks, or spills? Are any accumulated liquids present?		
CSU Floor Area		
Is CSU sealed floor in good condition without visible cracks or accumulated liquids?		
Have general areas been inspected for signs of leakage?		
Is communication system available and functioning? (e.g., radio)		
Are emergency response/spill kit items present and in sufficient supply?		
Are fire extinguisher and eyewash present and operable?		
Are igloo entry/exit doors functioning properly (free of damage, closes and locks) ?		

FOR CORRECTIVE ACTIONS: **PROVIDE DESCRIPTION OF CORRECTIVE ACTION(S) AND DATE(S) COMPLETED BELOW:**

PCAPP EDS Site
Container Storage Unit
EXAMPLE MONTHLY INSPECTION

Name of Inspector: _____

Date and Time of Inspection: _____

Inspection Items	Results Yes or No	Corrective Action Required? Yes or No [If Yes, Provide Details Below]
CSU Carbon Filtration System		
Is the carbon filtration system adequately clean and in good condition, and free of visible damage or deterioration that may affect performance?		
Are vents clean and free of visible damage or significant deterioration? Are exterior and interior screens intact and dampers properly positioned?		
CSU (Exterior)		
Are security, warning signs, doors, locks, fire extinguisher, door vent, rear vent properly placed and operational? Is area clear of debris and vegetation?		

FOR CORRECTIVE ACTIONS: **PROVIDE DESCRIPTION OF CORRECTIVE ACTION(S) AND DATE(S) COMPLETED BELOW:**

PCAPP EDS Site
EXAMPLE SEMI-ANNUAL INSPECTION
CSU and Environmental Enclosure Lightning Protection Systems

Name of Inspector: _____

Date and Time of Inspection: _____

Inspection Items	Results Yes or No	Corrective Action Required? Yes or No [If Yes, Provide Details Below]
CSU Lightning Protection System		
Is there evidence of lightning strikes?		
Are ground and bond connections intact and operating in accordance with DA Pam 385-64?		
Environmental Enclosure Lightning Protection System		
Is there evidence of lightning strikes?		
Are ground and bond connections intact and operating in accordance with DA Pam 385-64?		

FOR CORRECTIVE ACTIONS: **PROVIDE DESCRIPTION OF CORRECTIVE ACTION(S) AND DATE(S) COMPLETED BELOW:**

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F-5 PREVENTION OF ACCIDENTAL IGNITION OR REACTION OF IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES [6 CCR 1007-3 § 100.41(a)(9) and § 264.17]

F-5a Precautions to Prevent Accidental Ignition or Reaction of Ignitable or Reactive Wastes [6 CCR 1007-3 § 100.41(a)(9) and § 264.17]

F-5a(1) Storage of Ignitable or Reactive Wastes

Ignitable wastes, such as spent solvents, may be generated during operations or maintenance activities. If generated, ignitable wastes will be stored in the less than 90-day hazardous waste storage area pending shipment to a permitted treatment, storage, and disposal facility (TSDF). In accordance with the requirements of Colorado Solid & Hazardous Waste Commission Regulations, 6 CCR 1007-3 § 264.17, these wastes will be stored more than 50 feet from the PCD property line.

Smoking will be prohibited on the PCAPP EDS site. “No Smoking” signs will be prominently displayed around the PCAPP EDS site, including the less than 90-day hazardous waste storage area.

Reactive wastes will be stored and treated at the PCAPP EDS site. These reactive wastes are the explosives contained in the energetic components of chemical munitions or are miscellaneous items derived from chemical munitions (for example, ignition cartridges, propellant). Prior to operations, overpacked munitions potentially containing energetic components will have been repacked into universal munition storage containers designed to be processed in the EDS without opening. The universal munition storage containers reduce operator handling hazards and exposure potentials. Miscellaneous items such as ignition cartridges will be packaged in ammunition containers.

The energetic chemical munitions and miscellaneous items will be stored in the CSU pending treatment in an EDS unit. The CSU is an existing earth-covered concrete storage igloo specifically constructed and operated for the storage of energetic munitions. The energetic chemical munitions and miscellaneous items will be treated in an EDS unit designed to contain the shock, fragments, and fill material during the munition/item opening process. The EDS unit serves as the reaction vessel for the subsequent treatment of chemical fills and deactivation of energetics. After treatment in an EDS, the wastes will no longer be reactive.

F-5a(2) Preventive Operation Practices

Accidental ignition or reaction of chemical agent/industrial chemicals and explosives will be prevented at the PCAPP EDS site through administrative and engineering controls. Explosives operators will handle energetic munitions/items and will minimize handling to reduce the potential for dropping. They will be trained in handling energetic chemical munitions and in the use of PPE. Workers will wear appropriate PPE and use proper lifting techniques and mechanisms. Additionally, the use of universal munition storage containers designed to be processed in the EDS without opening will reduce operator handling hazards and exposure potentials. The detonation of explosives during the EDS treatment process will be conducted remotely.

As discussed in Section C-1g(3) of this permit modification request, the items will have been characterized prior to EDS treatment and will not require additional characterization for storage in the CSU or treatment in an EDS. The Containment Vessel and seal are periodically leak-tested to ensure integrity.

After completing the EDS treatment cycle and prior to opening the Containment Vessel door, a headspace sample will be collected to confirm that the vapor concentration level is safe and the door can be opened. After the Containment Vessel door is opened, the solid wastes will be visually inspected and manually removed. Although unlikely to occur, any observed unexploded components will be removed, be placed in appropriate Department of Transportation (DOT)-approved or explosive ordnance disposal (EOD) containers, and transferred to EOD personnel for disposition.

The entire PCAPP EDS site will be a designated non-smoking area identified by prominently posted signs. Administrative controls will be in place to prohibit open flames, smoking, cutting, welding, hot surfaces, frictional heat, sparks, and radiant heat in the Environmental Enclosures and surrounding work areas when munitions are present. Equipment will be grounded and bonded to prevent transfer of electrostatic charges to the munitions.

Lightning protection systems will be provided on the Environmental Enclosures and CSU to prevent accidental ignition or reaction caused by a lightning strike.

F-5a(3) EDS Design for Explosion Containment [6 CCR 1007-3 § 264.31 Subpart C]

A detailed discussion of the EDS Containment Vessel design and features is presented in Section D-11 of this permit modification request.

EDS Design

The EDS Containment Vessel was designed and fabricated to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code requirements Section VIII, Division 3 code case 2564 for impulsively loaded vessels. The static working pressure is 2,800 pounds per square inch (psi) with an impulsive load of 9 pounds trinitrotoluene (TNT) equivalent explosives. Materials of construction were selected to be compatible with the chemical agents, reagents, and high-temperature and high-pressure operating conditions specific to this process.

The EDS Phase 2 units will be capable of safely withstanding a detonation of up to 9 pounds of TNT equivalent explosives.

Depending on the types and numbers of items being treated, the items to be processed will be placed into an expendable metal holder then placed inside the reusable Advanced Fragment Suppression System (AFSS) with expendable steel rods.

The AFSS framework serves to connect, hold, and align explosive charges that open the main body of items being treated to expose chemical fill and to protect the Containment Vessel interior from the high velocity fragments resulting during detonation of shaped charges, burster casing, and munitions (or other items).

Additionally, the Containment Vessel is designed to operate without any method of pressure relief because of the potential for venting toxic vapors.

The EDS work area will be surrounded by an Environmental Enclosure. The enclosure will be equipped with at least one AFS. This system includes prefilters, HEPA and HEGA filters with SIC to maintain negative pressure within the structure and filter the airborne releases, thereby minimizing the potential for airborne contaminants, for example, toxic mists, fumes, dusts, or gases, to be released to the environment. The enclosure will also shelter the Containment Vessel and workspace from the elements.

F-5a(4) EDS Waste Treatment and Vessel Integrity Documentation

The EDS Phase 2 unit was developed and is in use for chemical fill treatment operations. Tests were undertaken to demonstrate that the EDS unit can safely and effectively treat chemical munitions containing explosives and other munitions [for example, German Traktor Rockets (GTRs)] containing propellant-filled motors. These tests successfully demonstrated that EDS Containment Vessel integrity was maintained during EDS operations.

Developmental and operational testing of the EDS Phase 2 Unit 1 is documented in the March 2004 *Explosive Destruction System Phase 2 Unit 1 Test Report for Porton Down*. During the tests, which were conducted at Porton Down, United Kingdom, between 14 April and 11 July 2003, destruction of 34 toxic munitions and items in 16 trials was completed safely, efficiently, and in an environmentally sound manner.

Follow-on test evaluation results documented in Sandia National Laboratories' *Analysis and Testing to Support Processing German Traktor Rockets (GTRs) in EDS*, May 2009, indicated that the Phase 2 unit can safely process GTRs containing propellant-filled motors.

As indicated by the developmental and demonstration tests conducted to date and described previously, as well as recent EDS operations deployed under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) response actions, the EDS is a proven treatment/destruction technology. Most notable, the EDS completed RCRA permitted treatment operations at the Pine Bluff Arsenal in Pine Bluff, Arkansas, in April 2010 where two EDS Phase 2 units and one Phase 1 unit were used to safely destroy/treat more than 1,200 chemical agent munitions comprising various sized mortars, projectiles, bombs, and GTRs without incident.

F-5a(5) Fire Protection

If a fire occurs as a result of an explosion, fire extinguishers will be used to prevent the spread of fire. Additional support will be provided by the PCD Fire Department if necessary. Section G-4 provides information on fire detection, alarm, and procedures that will be used at the PCAPP EDS site.

F-5b General Precautions for Handling Ignitable or Reactive Wastes and Mixing of Incompatible Wastes [6 CCR 1007-3 § 264.17]

A description on how ignitable wastes will be managed and general precautions for handling reactive waste are provided in Sections F-5a(1) and F-5a(2).

F-5c Management of Ignitable or Reactive Wastes in Containers [6 CCR 1007-3 § 264.176]

Leaking munitions containing reactive materials (energetics) will have been repacked into universal munition storage containers designed to be processed in the EDS without opening. Miscellaneous items such as ignition cartridges will be packaged in ammunition containers. All items will be stored in the CSU, an existing igloo specifically designed to store energetic munitions and items pending treatment in an EDS unit. Items will be moved from the CSU to an EDS unit for treatment in a just-in-time delivery. Ignitable wastes may be stored in a less than 90-day hazardous waste storage area at the PCAPP EDS site. Handling of these reactive and ignitable wastes will be more than 50 feet from the PCAPP EDS site fence line, and also will be more than 50 feet from the PCD boundary.

F-5d Management of Incompatible Wastes in Containers [6 CCR 1007-3 § 100.41(b)(1)(iv) and § 264.177]

No incompatible hazardous wastes will be stored at the CSU or treated in an EDS unit.

NOTE: The PCAPP EDS site will not contain any tank systems, waste piles, surface impoundments, landfills, containment buildings, or land treatment units. The requirements to discuss the management of ignitable, reactive, or incompatible wastes in these units are, therefore, not applicable. Therefore, there are no entries for Sections F-5d through F-5o for the requirements listed 6 CCR 1007-3 § 264.177, 264.198, 264.199, 264.229, 264.230, 264.256, 264.257, 264.281, 264.282, 264.313, and 264.1101(a)(3).

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F-4 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT [6 CCR 1007-3 § 100.41(a)(8)]

F-4a Unloading Operations [6 CCR 1007-3 § 100.41(a)(8)(i)]

Munitions or other items will be transported to the CSU at the PCAPP EDS site in accordance with PCD transport procedures. The wastes are transported on pallets and loaded and unloaded by forklift into the CSU. Once at the CSU, items that are selected for treatment will be moved to an Environmental Enclosure using waste handling equipment, such as hand dolly, forklift, or other moving device. All unloading operations will be conducted by trained personnel wearing protective clothing appropriate to the area and activity being conducted. The types of protective clothing to be worn at the PCAPP EDS site will be described in the site Health and Safety Plan.

F-4b Runoff [6 CCR 1007-3 § 100.41(a)(8)(ii)]

Waste handling will take place in the CSU and the Environmental Enclosures, which are enclosed structures. Design features of each structure, such as ceiling, walls, and impermeable flooring as well as use of secondary containment pallets, will protect the hazardous waste management units from precipitation and will prevent runoff from hazardous waste handling areas to other areas of the PCAPP EDS site or the environment. The design features will minimize the potential for contaminated runoff to reach other areas. The CSU structure is described in Section D-1 and Environmental Enclosure structure is described in **Attachment D-1** of the modification request. Additional engineering controls are described in Section D of the modification.

As indicated, any spills that may occur during operations will be contained within an enclosed structure, thus precluding contaminated runoff to reach other areas.

F-4c Prevention of Water Supply Contamination [6 CCR 1007-3 § 100.41(a)(8)(iii)]

Processing and storing all hazardous waste at the PCAPP EDS site will take place inside the CSU and in the Environmental Enclosures. The structures are enclosed concrete floored structures provided with

impervious bases (includes secondary containment pallets/pans) that will prevent the downward percolation of liquids. Additional engineering and administrative controls include the following:

- Each EDS Containment Vessel has a secondary containment pan underneath to collect any liquids that might spill or leak during operation.

- In the CSU, leaking munitions have been repacked into universal munition storage containers that are sealed and never opened; the entire container can be processed in the EDS without opening; additionally, waste containers will be placed on top of secondary containment pans; any leaks or other liquids will be contained by the containment pans.

- Liquid waste containers of the EDS Waste Transfer Subsystem will be placed in portable secondary containment.

- Any spills or releases of hazardous materials will be cleaned up in accordance with the Contingency Plan described in Section G of this permit modification.

By these measures, contamination of clean water, process water, and potable water systems in use at PCD will be prevented.

F-4d Equipment and Power Failure [6 CCR 1007-3 § 100.41(a)(8)(iv)]

Equipment Failure Control

The EDS units are designed to be fail safe. If there is an unlikely equipment failure, an EDS unit will contain the waste material within the Containment Vessel. Each EDS unit will be operated within an Environmental Enclosure with ventilation to an Air Filtration System (AFS) that includes prefilter, high efficiency particulate air (HEPA), and high efficiency gas absorber (HEGA) filter units with sulfur-impregnated carbon (SIC).

Emergency Power

The primary power source for PCAPP EDS site operations will be shore power with a diesel-powered generator as backup power supply for critical systems should the primary power fail. The system will consist of one emergency diesel generator capable of carrying the entire emergency load of the PCAPP

EDS site. The emergency power generating system will also provide backup power to all critical and essential loads in case of a power outage (for example, monitoring, lighting, and AFS).

F-4e Personnel Protection Procedures [6 CCR 1007-3 § 100.41(a)(8)(v)]

Use of PPE, monitoring systems, and engineering controls, such as the Environmental Enclosure AFS and the use of universal munition storage containers for leaking munitions and other items to be processed in the EDS, will reduce worker exposure where chemical vapors may be present in the event of an upset condition.

Various levels of protective clothing will be required at the PCAPP EDS site to protect workers from the effects of chemicals in the work environment. The type of protective clothing worn by the workers will be based on the level of protection required by the location, process, and potential of exposure to chemical agent. A site Health and Safety Plan will detail worker protection requirements and measures that will be followed for site operations.

The monitoring systems will consist of MINICAMS® and Depot Area Air Monitoring System (DAAMS), and are described in **Attachment F-2**.

F-4f Prevent Release to Atmosphere [6 CCR 1007-3 § 100.41(b)(8)(vi)]

Each EDS unit will be operated within an Environmental Enclosure. Both the emissions from the EDS unit and ambient air within the Environmental Enclosure will be ventilated to an AFS that includes prefilter, HEPA, and HEGA filter units with SIC. The AFS midbed will be continuously monitored during operations to ensure emissions to the atmosphere are minimized.

The CSU has a carbon filtration system known as the Igloo Containment System that protects against the release of hazardous materials to the air. Although not expected during the short time wastes are stored in the CSU pending treatment, if a leak from inside the igloo was to occur, natural flow of air through the igloo would carry agent vapors to the carbon panel adsorbers, where vapors would be contained, if dampers are open. A description of the Igloo Containment System is provided in Section D-1 of this permit modification.

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F-3 WAIVER OR DOCUMENTATION OF PREPAREDNESS AND PREVENTION REQUIREMENTS [6 CCR 1007-3 § 100.41(a)(6) and 264.32 and 264.35]

The PCD is not requesting any waivers from the preparedness and prevention requirements of the Colorado Solid & Hazardous Waste Commission Regulations, 6 CCR 1007-3 § 264 Subpart C. This section describes the preparedness and prevention requirements as they pertain to the PCAPP EDS site operations and is in addition to the PCD protective measures and policies described in Section F-3 of the PCD RCRA Permit Renewal Application, June 2013.

F-3a Equipment Requirements [6 CCR 1007-3 § 264.32]

F-3a(1) Internal Communications [6 CCR 1007-3 § 264.32(a)]

Internal communications at the PCAPP EDS site will consist of cellular and/or landline telephones, intercoms, throat microphones, hand-held radios, and headsets. Communication devices will be available throughout the PCAPP EDS site and in all work areas for immediate access and use in the event of emergencies. Cellular and/or landline telephones will be capable of internal and external communications. Throat microphones and headset equipment will be the primary means of communication during EDS treatment operations. Personnel will be alerted of emergencies by hand-held radios or throat microphones/headset unit if wearing personal protective equipment (PPE).

F-3a(2) External Communications [6 CCR 1007-3 § 264.32(b)]

Cellular and/or landline telephones will be the primary means for external communication between the PCAPP EDS site, the PCD, and surrounding areas. Telephones to the outside area will be located in the PCAPP EDS site Command Post.

F-3a(3) Emergency Equipment [6 CCR 1007-3 § 264.32(c)]

An inventory of emergency equipment will be maintained at the PCAPP EDS site. Portable fire extinguishers and spill kits will be located at the PCAPP EDS site. A list of emergency equipment to be available at the PCAPP EDS site is provided in **Table G-5-1**, PCAPP EDS Site Emergency Equipment.

F-3a(4) Water and Fire Control [6 CCR 1007-3 § 264.32(d)]

The primary mechanism for fire control will be fire extinguishers designed for chemical and electrical fires. If water is necessary for fire control, the PCD Fire Department will be contacted.

F-3b Aisle Space Requirements [6 CCR 1007-3 § 264.35]

Adequate aisle spacing will be maintained in each EDS Environmental Enclosure and at the CSU to allow for unobstructed movement of personnel and fire protection, spill control, and decontamination equipment in response to an emergency.

At a minimum, there will be 36 inches between an EDS equipment item and enclosure wall. For the CSU, a 10-foot wide minimum main aisle space will be maintained inside the igloo to facilitate material handling equipment, inspections, and space for personnel to move around stacks. This main aisle will allow unrestricted movement of fire protection and decontamination equipment in case of emergencies. A 3-foot aisle space will be maintained between the igloo walls and palletized waste.

F-3c Testing and Maintenance of Equipment [6 CCR 1007-3 § 264.33]

Testing and maintenance of preparedness and prevention equipment is described in Section F-2 of this permit modification request.

F-3d Arrangements with Local Authorities [6 CCR 1007-3 § 264.37]

Details on the agreements with local authorities are provided in Section G-6 of this permit modification request.

F-2 INSPECTION SCHEDULE [6 CCR 1007-3 § 100.41(a)(5); § 264.15(b)(1)]

F-2a General Inspection Requirements [6 CCR 1007-3 § 100.41(a)(5) and § 264.15(a) and (b)]

The EDS units and Container Storage Unit (CSU) will be inspected according to prescribed inspection schedules designed to detect equipment deterioration and prevent possible equipment malfunctions that will cause a release of hazardous wastes to the environment or pose a threat to human health. The inspection schedule document and inspection logs will be located at the PCAPP EDS site. At a minimum, the inspection program will include inspections of the equipment items listed in **Table F-2-1**.[1] Inspection logs and documents will be retained and available at the PCAPP EDS site. Examples of inspection forms are provided in **Attachment F-1**.

F-2a(1) Types of Problems [6 CCR 1007-3 § 264.15(b)(3)]

The types of problems to look for during inspections are identified in **Table F-2-1**.

F-2a(2) Frequency of Inspections [6 CCR 1007-3 § 264.15(b)(4)]

Inspection frequency is listed in **Table F-2-1**.

F-2a(3) Schedule of Remedial Action [6 CCR 1007-3 § 264.15(c)]

The PCAPP EDS site operators will remedy any deterioration or malfunction of equipment or structures found during inspection in a timely manner that ensures the problem does not lead to an environmental or human health hazard.

F-2a(4) Inspection Log [6 CCR 1007-3 § 264.15(d)]

Inspection logs and documents will be retained and available at the PCAPP EDS site. Examples of inspection forms are provided in **Attachment F-1**.

[1] All tables are located at the end of this section.

F-2b Specific Process Inspection Requirements [6 CCR 1007-3 § 100.41(a)(5); § 264.15(b) and 264.1088]

F-2b(1) Container Inspection [6 CCR 1007-3 § 264.174 and 264.1086(g)(4)]

The CSU, a container storage area located at the PCAPP EDS site will be inspected at least weekly to ensure compliance with hazardous waste facility requirements. PCAPP EDS site operators will look for leaking containers and for deterioration of containers and the containment pallet caused by corrosion or other factor. The containers stored in this area will be inspected weekly as described in **Table F-2-1**. Example inspection forms are provided in **Attachment F-1**.

F-2b(2) Tank System Inspection [6 CCR 1007-3 § 264.195]

The hazardous waste management units addressed in this permit modification are not tanks. Therefore, the requirements of this section are not applicable.

F-2b(3) Waste Pile Inspection [6 CCR 1007-3 § 100.41(b)(4)(iv) and § 264.254(b)]

The hazardous waste management units addressed in this permit modification are not waste piles. Therefore, the requirements of this section are not applicable.

F-2b(4) Surface Impoundment Inspection [6 CCR 1007-3 § 100.41(b)(3)(iii) and § 264.226(b)]

The hazardous waste management units addressed in this permit modification are not surface impoundments. Therefore, the requirements of this section are not applicable.

F-2b(5) Incinerators Inspection [6 CCR 1007-3 § 264.347(b)]

The hazardous waste management units addressed in this permit modification are not incinerators. Therefore, the requirements of this section are not applicable.

F-2b(6) Landfill Inspection [6 CCR 1007-3 § 100.41(b)(7); § 264.15(a) and 264.303]

The hazardous waste management units addressed in this permit modification are not landfills. Therefore, the requirements of this section are not applicable.

F-2b(7) Land Treatment Facility Inspection [6 CCR 1007-3 § 100.41(b)(6)(iii)(c) and § 264.273(g)]

The hazardous waste management units addressed in this permit modification are not land treatment units. Therefore, the requirements of this section are not applicable.

F-2b(8) Miscellaneous Unit Inspection [6 CCR 1007-3 § 100.41(b)(10)(B) and § 264.602]

The EDS is the miscellaneous treatment unit that will be inspected to ensure compliance with the hazardous waste facility requirements. Inspections of the EDS unit(s) will be conducted daily when in use with the checklist provided in **Table F-2-1**. **Table F-2-1** presents the items to be inspected, frequencies, and types of problems. **Attachment F-1** contains examples of inspection forms to ensure compliance as well as to meet any additional requirements needed to protect human health and the environment as specified in the permit.

F-2b(9) Boilers and Industrial Furnaces Inspections [6 CCR 1007-3 § 264.15]

The hazardous waste management units addressed in this permit modification are not boilers or industrial furnaces burning hazardous waste; therefore, this section is not applicable.

F-2b(10) Containment Building Inspection [6 CCR 1007-3 § 264.1101(c)(3) and 264.1101(c)(4)]

The requirements of this section are not applicable because the hazardous waste management units addressed in this permit modification are not and will not operate in a containment building.

F-2b(11) Drip Pad Inspection [6 CCR 1007-3 § 264.574]

The requirements of this section are not applicable because the EDS units and CSU addressed in this permit modification will not use or contain drip pads.

F-2b(12) Inspection Procedures for Equipment Leaks [6 CCR 1007-3 § 264 Subpart BB], **Applicability** [6 CCR 1007-3 § 264.1050] **and Waste Analysis** [6 CCR 1007-3 § 264.1063(d)]

See **Attachment D-3** for compliance with Subpart BB.

F-2b(13) Inspection Procedures for Tanks, Surface Impoundments, and Containers

[6 CCR 1007-3 § 264 Subpart CC]

See **Attachment D-3** for compliance with Subpart CC.

Table F-2-1. Inspection Schedule for EDS Units and CSU at PCAPP EDS Site

6 CCR 1007-3 § 264.15(b)(1)	Frequency[a] 6 CCR 1007-3 § 264.15(b)(4)	Types of Problems 6 CCR 1007-3 § 264.15(b)(3)
EDS Trailer		
Containment Vessel	Daily when in use	Visually inspect exterior, including tubing, hoses, and valves for evidence of corrosion, leakage, or other physical damage such as tears, stresses, gouges, dimples, rips, cracks, loose screws, etc.
	Daily when in use	Visually inspect interior for evidence of physical damage such as gouges and dimples, etc.
	Daily when in use	Conduct inspection and cleaning of sealing surfaces.
	On Day 1 of operation	Conduct Hi-potting test through open vessel door and conduct continuity check of feedthrough and detonator terminal blocks to check for proper functioning.
	On Day 1 of operation	Confirm that a helium leak test for evidence of leakage or other physical damage to the vessel or piping, valves, or instruments connected to vessel door, has been conducted on this unit.
EDS Trailer Secondary Containment Pan	Daily when in use	Visually inspect for evidence of corrosion, leakage, or other physical damage such as cracks, gaps, or holes.
Waste Handling Subsystem	Daily when in use	Visually inspect hoses and quick disconnects for evidence of physical damage such as tears, rips, and corrosion. Inspect to confirm hose connections are in place.
Lift Assist (EDS P2R only)	Daily when in use	Visually inspect that unit is marked with load rating and date of next inspection.
Communication		
Landline Telephones, Cellular Telephones, Hand-Held Radios, Throat Microphones/Headsets	Daily when in use	Check for availability and operability.
Alarm Panels (EDS unit)	Daily when in use	Check function and operability of audible/visual alarm.
Closed-Circuit Television System	Daily when in use	Check for availability and operability. Check visual clarity/tilt, pan, and zoom functions.

Table F-2-1. Inspection Schedule for EDS Units and CSU at PCAPP EDS Site (Continued)

6 CCR 1007-3 § 264.15(b)(1)	Frequency[a] 6 CCR 1007-3 § 264.15(b)(4)	Types of Problems 6 CCR 1007-3 § 264.15(b)(3)
CSU		
Containers	Weekly	Visually inspect containers for leaks, deterioration, rust, and corrosion. Ensure proper labeling, identification, aisle spacing, and container stacking. Inspect general area for signs of leakage. Verify inventory is within permitted capacity for permitted storage.
Secondary Containment (Pallets)	Weekly	Inspect the containment pallets for cracks, chips, or gouges, and areas that indicate excessive wear or deterioration; visually examine grating and inside containment pan with regard to structural integrity. Examine inside pallet for apparent drips, spills, or leaks from munitions. Also examine pallet for spills due to other potential sources, such as precipitation, which may contribute liquids on the CSU floor or within secondary containment pallets.
CSU Floor Area	Weekly	Visually inspect floor area for evidence of precipitation or liquids; damaged seams and deterioration of epoxy coating.
CSU Carbon Filtration System	Monthly	Visually inspect carbon filtration system with regard to structural integrity, operability, adequacy, clean and in good condition; free of visible damage or deterioration that may affect performance. Visually inspect vents for evidence of cleanliness, free of visible damage or significant deterioration; exterior and interior screens intact and dampers properly positioned.
	Annual	Performance validation in accordance with PCD SOP PU-OOOO-R-491 as detailed in the PCD RCRA Permit Renewal Application.
Utility Container Subsystem		
Steam Generator	Daily when in use	Perform visual inspection of components to ensure good physical condition and that there is no damage present.
Flow Meter & Controls Mounted on Small Skid	Daily when in use	Check function and operability. Visually inspect the flow meter and controls for physical integrity.
Environmental Enclosure Air Filtration System	Daily when in use	Ensure unit is functioning and operable.

Table F-2-1. Inspection Schedule for EDS Units and CSU at PCAPP EDS Site (Continued)

6 CCR 1007-3 § 264.15(b)(1)	Frequency[a] 6 CCR 1007-3 § 264.15(b)(4)	Types of Problems 6 CCR 1007-3 § 264.15(b)(3)
Security		
Fences	Monthly	Check for integrity, intrusion, or obstruction by vegetation; gaps at fence base.
Warning Signs	Monthly	Check for presence and legibility.
Fire Protection/Safety Equipment		
Fire Extinguishers	Monthly	Check gauge pressure, general condition, and service date.
Personnel Decontamination Station	Daily when in use	Check for adequate decontamination solution supply, direct access, and operability.
Emergency Response Equipment (Spill Kits and Hand Tools)	Daily when operating	Check for sufficient inventory, items in good condition, and expiration dates have not lapsed (where applicable).
Monitoring		
MINICAMS® and DAAMS (Chemical Agent)	Daily when in use	Visually inspect monitors for physical integrity; check diagnostic indicators on front panel of monitor housing for proper operation; inspect sample lines and connections, ensure heat trace is functional, ensure proper ventilation for exhaust, perform chemical agent challenge test and calibration.
Emergency Backup Power		
Emergency Generators	Monthly	Start unit, check voltage, current, and frequency output regularity and filter differential pressure.
CSU (Exterior)	Monthly	Check security, warning signs, doors, locks, fire extinguisher, door vent, rear vent for proper placement and operation. Ensure area is clear of debris and vegetation.
CSU Lightning Protection System	Semi-Annually	No evidence of lightning strikes; ground and bond connections intact and in accordance with DA Pam 385-64.
Environmental Enclosure Lightning Protection System	Semi-Annually	No evidence of lightning strikes; ground and bond connections intact and in accordance with DA Pam 385-64.

Table F-2-1. Inspection Schedule for EDS Units and CSU at PCAPP EDS Site (Continued)

Notes:

[a] Inspections of the EDS unit(s) and CSU will be conducted in accordance with the checklist during operations and when waste is present; during periods of temporary closeout, inspections will not be conducted.

ASME	=	American Society of Mechanical Engineers
CCR	=	Colorado Solid & Hazardous Waste Commission Regulation
CSU	=	Container Storage Unit
DA Pam	=	Department of the Army Pamphlet
DAAMS	=	Depot Area Air Monitoring System
EDS	=	Explosive Destruction System
HEPA	=	high efficiency particulate air
PCD	=	Pueblo Chemical Depot
RCRA	=	Resource Conservation and Recovery Act
SOP	=	Standing Operating Procedure

SECTION F
PROCEDURES TO PREVENT HAZARDS

F-1 SECURITY [6 CCR 1007-3 §100.41(a)(4) and § 264.14]

This section describes the procedures and equipment that will be located at the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) Explosive Destruction System (EDS) site to prevent unknowing entry and minimize the unauthorized entry of persons or livestock. The PCAPP EDS site will be situated within the property of Pueblo Chemical Depot (PCD). PCD will provide overall security for the installation. The security measures for the PCAPP EDS site are discussed below.

F-1a Security Procedures and Equipment [6 CCR 1007-3 § 264.14(a)]

The perimeter of the site will have security fencing and gates. The general security provisions for the PCAPP EDS site are in addition to the PCD security provisions for the depot and will include the following:

- Warning signs posted at the site perimeter
- Controlled entry point
- Access limited to persons and vehicles displaying appropriate identification badges or paperwork as appropriate
- Two-way radio and/or telephone communication among security personnel, PCAPP EDS site personnel, and the PCD Operations Center (OC).

F-1a(1) Twenty-Four Hour Surveillance System [6 CCR 1007-3 § 264.14(b)]

PCD is a secure base surrounded by a fence with secured gates. The main entrance road takes personnel and visitors to a security gate. At the PCAPP EDS site, a barrier and entry control will be the primary means of ensuring site security.

F-1a(2) Barrier and Means to Control Entry [6 CCR 1007-3 § 264.14(b)]

F-1a(2)(a) Barrier [6 CCR 1007-3 § 264.14(b)(2)(i)]

The entire PCAPP EDS site will be surrounded by security fencing. The integration of general security provisions such as fencing, controlled gates, and guards contributes towards safety and security within the site.

F-1a(2)(b) Means to Control Entry [6 CCR 1007-3 § 264.14(b)(2)(ii)]

To prevent unknowing or unauthorized entry, personnel access to the PCAPP EDS site will be controlled. During operating hours, routine worker access will be controlled through the use of badges and/or sign-in and sign-out rosters to indicate authorized individuals.

Temporary authorization will be given to workers and visitors who will not be onsite full time. Employees, such as electricians, craftsmen, etc., are in this “temporary entry” category. These personnel will be accompanied by an escort during their time within the PCAPP EDS site. Visitor access to the PCAPP EDS site will require advanced notice that will be documented by specially signed visitor forms. During off-hours, access to the PCAPP EDS site will be controlled by locked entrances.

F-1a(3) Warning Signs [6 CCR 1007-3 § 264.14(c)]

Warning signs with the text “Danger-Unauthorized Personnel Keep Out” or text indicating only authorized personnel are allowed and unauthorized entry is dangerous will be posted at each entrance of the PCAPP EDS site as well as other locations to be seen from any approach. These signs will be easily visible at a distance of 25 feet.

The wording on the signs will be clearly legible, written in English and Spanish, and indicate that only authorized personnel are allowed to enter the active portion and that entry onto the active portion can be dangerous.

ATTACHMENT F-2

PUEBLO CHEMICAL DEPOT SITE-SPECIFIC MONITORING PLAN AND MONITORING DEVICES

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Joint Project Manager Elimination (Provisional)

Site-Specific Monitoring Plan for the Explosive Destruction System at Pueblo Chemical Depot

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Joint Project Manager Elimination (Provisional)

Site-Specific Monitoring Plan for the Explosive Destruction System at Pueblo Chemical Depot

October 2013

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1. INTRODUCTION

This document presents a Site-Specific Monitoring Plan (SSMP) for Explosive Destruction System (EDS) operations conducted at Pueblo Chemical Depot (PCD), Pueblo, Colorado. This plan details monitoring requirements for mustard agent and addresses the monitoring requirements specified in the following documents:

- U.S. Army Chemical Materials Agency, *Programmatic Monitoring Concept Plan* (MCP)
- U.S. Army Chemical Materials Agency, *Programmatic Laboratory and Monitoring Quality Assurance Plan* (LMQAP)
- Edgewood Chemical Biological Center (ECBC), Environmental Monitoring Laboratory, *Laboratory and Monitoring Quality Control Plan for Chemical Materials Agency (CMA) and for Chemical Agent Standard Analytical Reference Material (CASARM)* (LMQCP).

Chemical operations will typically be conducted in Level C personal protective equipment (PPE). However, all monitoring will be performed at levels required for unmasked workers, designated as “no respiratory protection” in the airborne exposure limit (AEL) tables.

A typical operational day will be from 10 to 12 hours long. During operations, continuous near real-time (NRT) monitoring and historical monitoring will be performed. MINICAMS® units will not be challenged during non-operational hours (that is, nights and weekends). At no time will chemical fill be stored onsite in the Environmental Enclosures outside of engineering controls during non-operation hours.

1.1 Purpose and Scope

The purpose of this monitoring plan is to define the strategy used to monitor airborne exposure concentrations of mustard agents during EDS operations at the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) EDS site.

This plan outlines monitoring objectives, procedures, and responsibilities for the execution of a monitoring program during operations. It includes worker protection and process monitoring during EDS operations, monitoring of the Modified Ammunition Van (MAV) used to transport munitions from the

PCD hazardous waste storage igloos to the PCAPP EDS Container Storage Unit (CSU) and monitoring of the CSU. Monitoring strategies used to support PCAPP EDS site operations are based on the following:

- Only chemical-filled munitions, Department of Transportation (DOT) cylinders, and other miscellaneous items that are part of the PCD stockpile will be treated/destroyed.
- The EDS unit will be located inside an Environmental Enclosure equipped with an Air Filtration System (AFS).
- Monitoring for the specific chemicals of concern will be performed continuously during operations in the Environmental Enclosure.
- Chemical agent will not be stored overnight in the Environmental Enclosure.

1.2 Chemicals of Concern

The mustard agents distilled sulfur mustard (HD) and mustard-T mixture (HT) will be the only chemical fills treated during EDS operations at PCD.

1.3 Monitoring Objectives

Chemical monitoring during PCAPP EDS site operations is performed to ensure operations are being safely conducted and to detect any conditions that may cause a release of chemical materiel. Monitoring of the site during treatment activities will accomplish the following:

- Provide worker protection.
- Protect the environment from a potential chemical release.
- Provide early warning to decision-makers for implementation of corrective action(s).

1.3.1 Monitoring Levels

Monitoring results will be used to ensure operations are being conducted in a safe manner and to detect any conditions that may cause workers to be exposed to chemical agent vapors during upset conditions.

When conducting chemical agent operations, monitoring at the short-term exposure limit (STEL) will be performed in areas where worker protection monitoring is conducted. Because the NRT monitors measure and report the concentration at the vapor screening level (VSL), the STEL is manually calculated using this concentration reported by the NRT monitor to determine if the STEL has been exceeded.

The VSL is intended for applications and/or locations that require monitoring for an environmental release, engineering controls (for example, filters), process upset condition, or vapor decontamination classification monitoring. The VSL is a concentration-only value and does not consider the analytical method's sampling duration other than to determine the volume of air sampled to calculate the analyte concentration.

The AELs for mustard agents are provided in **Table Attachment F-2-1**.

2. ORGANIZATION AND MANAGEMENT RESPONSIBILITIES

PCAPP EDS site operations will require collaborative efforts between several government agencies. These agencies and their respective duties are discussed in the following paragraphs.

2.1 Joint Project Manager Elimination (Provisional) (JPM E (P))

JPM E (P) is responsible for the following:

- Developing and coordinating all plans and procedures required for EDS site operations at PCD
- Ensuring appropriate review and approval of EDS procedures are obtained from the Department of the Army and outside agencies
- Implementing a quality assurance (QA) program
- Ensuring Occupational Safety and Health Administration (OSHA) and Department of the Army health and safety requirements are met

Table Attachment F-2-1. AELs for HD and HT

	Averaging Time					
	WPL (12 hours)	WPL (8 hours)	WPL (4 hours)	WPL (2 hours)	STEL[a] (15 minutes)	Variable
No Respiratory Protection	2.7×10^{-4} mg/m^3	4×10^{-4} mg/m^3	8×10^{-4} mg/m^3	1.6×10^{-3} mg/m^3	3×10^{-3} mg/m^3	
Air-Purifying Respirator	Use only in accordance with Army/NIOSH approval and restrictions on use.					
M40-Series Mask[b]	1.0×10^{-3}	1.5×10^{-3}	3.0×10^{-3}	6.0×10^{-3}	3.0×10^{-2}	
Supplied-Air Respirator w/o Escape Bottle	0.27 mg/m^3	0.4 mg/m^3	0.4 mg/m^3	0.4 mg/m^3	0.7 mg/m^3	
Self-Contained Breathing Apparatus or Supplied-Air Respirator with Escape Bottle	2.7 mg/m^3	4 mg/m^3	8 mg/m^3	16 mg/m^3	30 mg/m^3	
Vapor Screening Limit						3×10^{-3} mg/m^3

Notes:

[a] Exposures at the STEL shall occur not more than one time per day. The Centers for Disease Control and Prevention (CDC) may publish updated numbers.
[b] Use of the M40-series mask in sulfur mustard operations (in addition to escape purposes) is authorized by DA Pam 385-61.

Airborne exposure limits (AELs) are taken from the U.S. Army Chemical Materials Agency Programmatic Monitoring Concept Plan (MCP) and 69 FR 24164-24168 (3 May 2004). All AELs are concentration and time values, not concentration only values. Administrative controls may be used to limit potential exposure to workers. However, because administrative controls cannot be used to limit the duration of potential public exposure, only the WPL protective action level is significantly affected by administrative controls, which limit the duration of potential exposure.

The maximum use concentration is the product of the AEL and the assigned protection factor for the respirator. The assigned protection factors used in this table are taken from 68 FR 34036-34119, 6 June 2003. For sulfur mustards, air-purifying respirators are for escape purposes only.

mg/m^3 = milligram per cubic meter
NIOSH = National Institute for Occupational Safety and Health
STEL = short-term exposure limit
WPL = worker population limit

- Ensuring all munitions transportation, storage, treatment, waste management, and closure operations at the PCAPP EDS site are conducted in compliance with Federal, State, and local laws, and Army and other applicable regulations

- Overseeing chemical agent treatment and certifying treatment is complete.

2.2 JPM E (P) Risk Management Directorate

The JPM E (P) Risk Management Directorate is responsible for:

- Notifying outside agencies such as the Department of Health and Human Services (DHHS) of monitoring results

- Defining laboratory and monitoring QA requirements for monitoring activities

- Advising the JPM E (P) on laboratory-related quality assurance/quality control (QA/QC) practices

- Recommending QA/QC practices for JPM E (P) to use in supporting the EDS monitoring activities

- Reviewing and evaluating this SSMP and quality control (QC) plans

- Monitoring the effective implementation of this SSMP at the PCAPP EDS site

- Reviewing QC data and recommending remediation, as required.

2.3 JPM E (P) Site Manager

JPM E (P) Site Manager is responsible for the following:

- Developing and coordinating all activities to be conducted during PCAPP EDS site operations

- Providing technical oversight and assistance for EDS operations

- Ensuring all operations are conducted in compliance with Federal, State, and local laws, and Army and other applicable regulations.

2.4 ECBC

Monitoring will be conducted by ECBC, who will:

- Collect and retain all monitoring data and monitoring QC data generated during the project

- Provide guidance for monitoring operations conducted onsite

- Provide trained and certified personnel to set up, calibrate, and challenge monitoring equipment and collect monitoring and waste screening samples

- Provide calibration and challenge research development, test, and evaluation (RDT&E) standards for chemicals of concern

- Perform monitoring procedures outlined in this Plan

- Provide a Mobile Analytical Platform (MAP) configured with instrumentation capable of analyzing Depot Area Air Monitoring System (DAAMS) tubes and performing chemical agent screening of liquid samples collected from the EDS Containment Vessel and waste containers.

3. TYPES OF MONITORING

Placement of each monitoring location is based on potential chemical migration points and verified via the use of a smoke test. When monitoring supports personnel protection, monitoring locations should be located in close proximity of personnel and preferably at the breathing zone height. Heat-traced sample lines (HTSLs) will be no more than 150 feet in length.

The following paragraphs describe the types of monitoring that will be employed during EDS operations. Specific monitoring strategies for analytes are provided in Section 4.

3.1 NRT Monitoring

NRT monitoring is online monitoring conducted in areas where contamination is likely or possible in order to determine airborne chemical concentration of chemical warfare agents in the shortest amount of time at the monitoring level commensurate with engineering controls and worker protection. An NRT monitoring system has the capability to automatically collect, analyze, and report/display the results within 15 minutes when chemicals are present at or above the AEL concentration.

3.2 Historical Monitoring

Historical monitoring during operations is performed to measure very low concentrations of airborne analytes at the worker population limit (WPL) and is designed to trigger activities to investigate the source of contamination that may be found below the alarm level of the NRT system. Sampling is accomplished by collecting an air sample over an extended period of time (usually the duration of a workday); subsequent analysis is conducted offline at the onsite MAP. All historical DAAMS samples must be analyzed within 72 hours of sampling termination.

During operations, historical DAAMS stations will be located at the inlet to the AFS and at the exhaust of the AFS. Samples will be collected and analyzed at any time work is performed in the Environmental Enclosure until the site has completed closure.

3.3 Confirmation Monitoring

Confirmation monitoring is performed to validate or invalidate an alarm or positive measurement received from the principal monitoring method, (either an NRT method or historical method) and is accomplished by collecting a vapor sample in the immediate vicinity of the NRT monitor or historical sampling location. Subsequent analysis is conducted offline at the onsite MAP.

Confirmation monitoring is used for informational and qualitative data reporting purposes in the event of a chemical materiel release. The confirmation sample shall be analyzed by a method different from the principal method (NRT or historical) to increase the likelihood of detecting interferences and only upon a

principal method (NRT or historical) positive response. Confirmation monitoring samples shall be given priority over all routine samples and shall be analyzed within 72 hours of sampling termination.

During chemical agent operations, confirmation DAAMS tubes are continually aspirated throughout the workday. In the event of an NRT alarm, the DAAMS tubes co-located with the alarming MINICAMS are collected and analyzed. DAAMS tubes will be co-located at all NRT monitoring locations.

3.4 Monitoring of Potentially Exposed Workers

During agent operations, monitoring of potentially exposed workers will be conducted in accordance with the DA Memorandum: *Interim Guidance on Occupational Health Practices for the Evaluation and Control of Occupational Exposures to Nerve Agents GA, GB, GD, GF and VX and Mustard Agents H, HD, and HT*, 6 November 2012.

3.5 First Entry Monitoring

When munitions are being stored in the onsite CSU, first entry monitoring must be performed prior to personnel entry into the unit. First entries require monitoring at the STEL for mustard agent, which shall be commensurate with the PPE being worn by the entry team.

The CSU will have two fixed monitoring location points for mustard agent monitoring. Two 1/4-inch outer diameter Teflon® sample lines (not heat-traced), permanently marked front and rear, will run for approximately 6 inches outside of the structure at the headwall through the floor drain to the interior of the structure. The front sample line will remain in close proximity to the interior side of the headwall towards the center of the structure without hindering access to the door. The rear sample line will continue down the length of the floor drain channel to the rear wall, turn, and continue to the location at the mid-point of the rear wall of the structure. Heat-trace lines will be connected to the exterior CSU lines. Exterior CSU lines are contained within a M2A1 container and are permanently attached to a metal plate with stainless steel Swagelok® unions. The unions will be capped when not in use.

Figure Attachment F-2-1 illustrates the monitoring locations to be used for first entry monitoring.

To ensure collection of a clean, representative sample, monitoring will consist of a minimum of one purge cycle once the sample line is in place and one complete sampling cycle of the interior of the CSU.

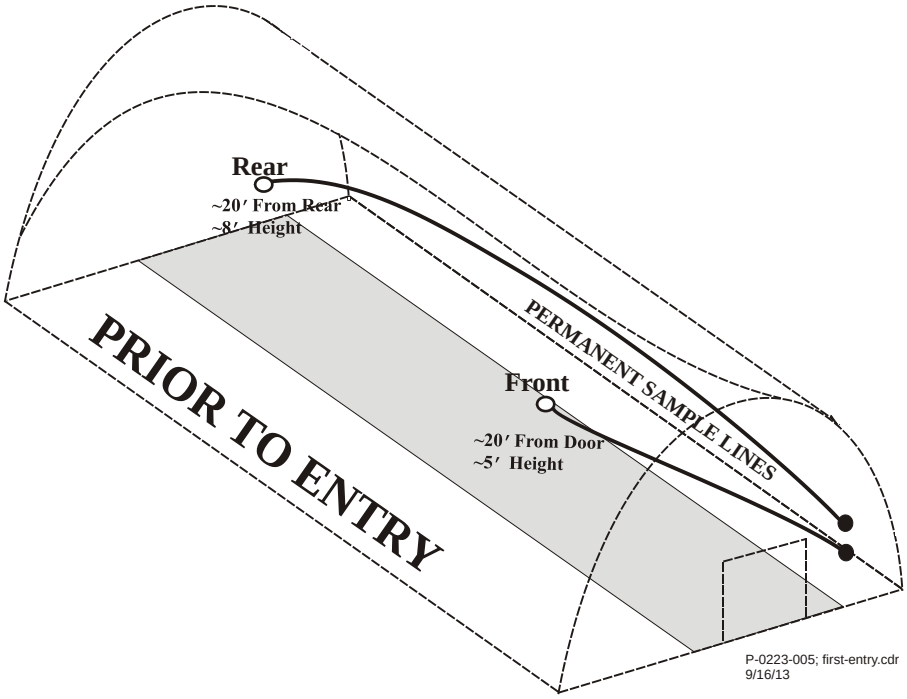


Figure Attachment F-2-1. First Entry Monitoring

Confirmation monitoring is not required but may be performed if NRT monitoring indicates possible chemical agent contamination.

3.6 MAV Monitoring

When munitions/items arrive onsite at the CSU, the interior of the MAV shall be monitored prior to opening the door and removing the munitions. NRT monitoring will be performed at the STEL. If monitoring indicates agent present in the MAV, the PCAPP EDS Command Post will be alerted and the decision on response and/or actions taken will be determined by the JPM E (P) Site Manager.

3.7 CSU Filter System Monitoring

When confirmed readings for mustard agent at or above the alarm level are encountered during first entry monitoring, monitoring of the passive filters will be performed. Using the upstream/downstream monitoring ports, the front door passive filter and rear vent passive filter will be monitored for three consecutive cycles at the VSL for mustard agent to verify the absence of agent breakthrough in the filters. All agent concentrations at or above the alarm level will be confirmed using an alternate method.

In the event of a confirmed agent alarm at either passive filter, monitoring will be performed at the VSL for three consecutive cycles at the low static pressure port on the front door passive filter and at the uppermost monitoring point on the rear vent passive filter. All agent readings at or above the alarm level will be confirmed using an alternate method.

4. MONITORING STRATEGY

The following paragraphs describe the monitoring strategy that will be employed during EDS operations involving HD and HT at the PCAPP EDS site. Both HD and HT will be monitored for mustard (H) using HD as the challenge standard. Monitoring locations during mustard operations are illustrated in **Figure Attachment F-2-2**. **Table Attachment F-2-2** details the monitoring equipment that will be used during mustard operations.

4.1 NRT Monitoring

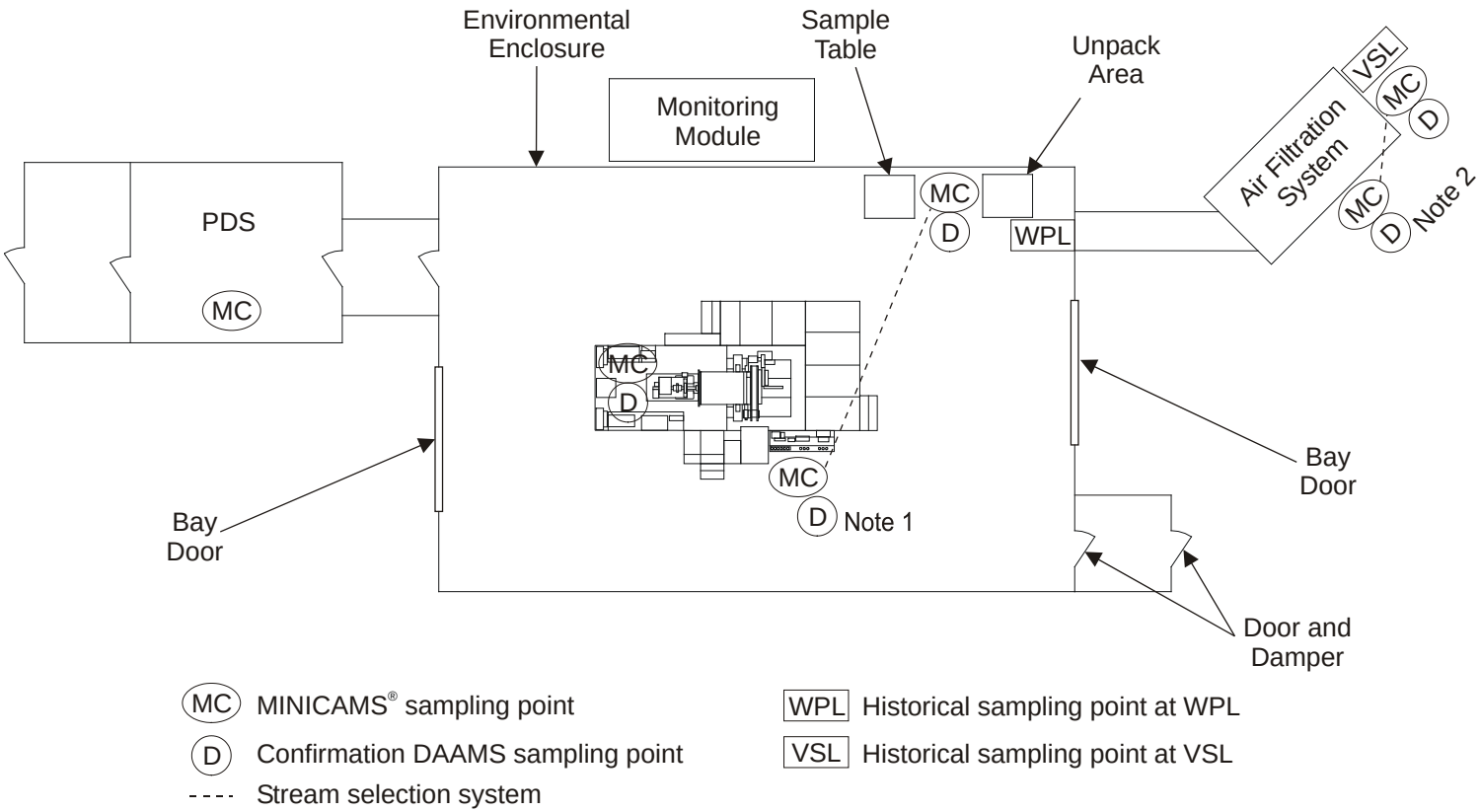
During HD and HT operations, NRT monitoring for worker protection will be conducted at the 15-minute STEL (0.003 milligram per cubic meter [mg/m^3]) and process monitoring will be conducted at the VSL (0.003 mg/m^3).

NRT monitoring will be performed at several locations within the Environmental Enclosure as well as the AFS. NRT monitoring will take place at the locations discussed in the following paragraphs.

4.1.1 AFS

NRT monitoring will be performed at the midbed or the exhaust (stack) locations of the AFS. Monitoring will be performed using an HTSL interfaced with a MINICAMS located in the monitoring shed.

The MINICAMS monitoring the AFS will operate in conjunction with an automatic stream selection system that allows collection and analysis of samples at each of the three levels of the midbed. In the event of an alarm at one of the midbed locations, the stream selection system will be manually switched to monitor the stack location.



Note 1. According to the operation being performed, a single MINICAMS unit equipped with a stream selection system (SSS) will be used to monitor either the sample table/unpack area or over the waste containers. The SSS will be manually switched during operations and in the event of an NRT alarm will be locked on the location of the alarm.

Note 2. The air filtration system will be monitored with a single MINICAMS unit equipped with an SSS. The normal monitoring location will be the midbed location. In the event of an NRT alarm in the midbed, the SSS will be manually switched to monitor the stack location.

P-0223-005; monitoring locations.cdr
9/17/13

1 Figure Attachment F-2-2. Monitoring Locations During Mustard Operations

Table Attachment F-2-2. Mustard Monitoring Application and Monitor Type

Analyte	Monitor/Equipment	Notes
NRT Monitoring[a]		
HD; HT	MINICAMS®	MINICAMS configured with a PCT and an XSD
Historical Monitoring[a]		
HD; HT	DAAMS; GC/MSD	Quantitative analysis
Confirmation of NRT Alarm[a]		
HD; HT	DAAMS; GC/MSD	Qualitative confirmation of MINICAMS alarm
Confirmation of Historical Monitoring[a,b]		
HD; HT	DAAMS; GC/MSD	Qualitative or quantitative confirmation of DAAMS

Notes:

[a] Both HD and HT will be monitored as H.

[b] If historical DAAMS tubes are analyzed on a gas chromatograph/mass spectrometer (GC/MS), confirmation is not required.

DAAMS = Depot Area Air Monitoring System
GC/MSD = gas chromatograph/mass selective detector
HD = distilled sulfur mustard
HT = mustard-T mixture
NRT = near real-time
PCT = preconcentrator tube
XSD = halogen selective detector

4.1.2 Sample Area/Unpack Area or Above Waste Containers

By employing the use of a stream selection device, a single MINICAMS will have the capability of monitoring at either the sample area/unpack area or the area above the waste containers. The stream selection device will be manually switched to the appropriate location depending on the operational procedure being performed at that time.

NRT monitoring of the sample area/unpack area will be performed using an HTSL interfaced with a MINICAMS located in the monitoring shed. The HTSL will be coiled and hung over the table in the unpack area such that it is less than 2 feet above the unpack table.

NRT monitoring of the waste drum area will be performed using an HTSL interfaced with a MINICAMS located in the monitoring shed. The HTSL will be coiled and hung over the waste drums such that it is less than 2 feet above the drums.

4.1.3 Above EDS Containment Vessel

NRT monitoring of the Containment Vessel will be performed using an HTSL interfaced with a MINICAMS located in the monitoring shed. The HTSL will be coiled and hung over the Containment Vessel such that it is less than 2 feet above and slightly in front of the Containment Vessel door.

4.1.4 Personnel Decontamination Station (PDS)

NRT monitoring inside the PDS will be performed using an HTSL interfaced with a MINICAMS located in the monitoring shed. The HTSL will be coiled and hung on the wall. This monitoring location serves for monitoring potentially exposed workers.

5. CONFIRMATION MONITORING

Confirmation monitoring is performed to validate or invalidate an alarm or positive measurement received from the principal monitoring method, (either an NRT method or historical method) and is accomplished by collecting a vapor sample in the immediate vicinity of the NRT monitor or historical sampling location. Subsequent analysis is conducted offline at the onsite MAP.

Confirmation monitoring is used for informational and qualitative data reporting purposes in the event of a chemical detection. The confirmation sample shall be analyzed by a method different from the principal method (NRT or historical) to increase the likelihood of detecting interferences and only upon a principal method (NRT or historical) positive response. Confirmation monitoring samples shall be given priority over all routine samples and shall be analyzed within 72 hours of sampling termination.

During chemical agent operations, confirmation DAAMS tubes are continually aspirated throughout the workday. In the event of an NRT alarm, the DAAMS tubes co-located with the alarming MINICAMS are collected and analyzed.

DAAMS tube station for confirmation of NRT alarms will be co-located at both the midbed and stack of the AFS, over the EDS Containment Vessel, over the waste containers, and at the sample table/unpack area. Alarms confirmation of MINICAMS used for monitoring potentially exposed workers in the PDS or monitoring of the interior of the MAV are not required.

The following paragraphs describe the location of the confirmation sampling equipment.

5.1 AFS

Confirmation DAAMS will be located inside the midbed and stack of the AFS. DAAMS tube stations that allow collection and analysis of samples at each of the three levels of the midbed and the stack of the AFS will be used to collect confirmation DAAMS tube samples in the event of an NRT alarm.

5.2 EDS Containment Vessel

Confirmation DAAMS will be co-located at the distal end of the MINICAMS HTSL located over the EDS Containment Vessel to collect confirmation DAAMS tubes in the event of an NRT alarm.

5.3 Sample Table/Unpack Area

Confirmation DAAMS will be co-located at the distal end of the MINICAMS HTSL located in the vicinity of the sample table/unpack area to collect confirmation DAAMS tubes in the event of an NRT alarm.

5.4 Waste Containers

Confirmation DAAMS will be co-located at the distal end of the MINICAMS HTSL located over the EDS waste containers to collect confirmation DAAMS tube samples in the event of an NRT alarm.

6. HISTORICAL MONITORING

Any time work is performed inside the Environmental Enclosure, historical monitoring will be performed at two locations. Monitoring at the WPL will be performed by collecting DAAMS tube samples inside the Environmental Enclosure at a location near the inlet of the AFS. Monitoring at the VSL will be performed by collecting DAAMS tube samples at the exhaust of the AFS.

Samples will be collected and analyzed at both locations until the site has completed closure.

7. MINICAMS ALARM SETPOINTS

The MINICAMS alarm setpoint will be 0.7Z, where Z represents the monitoring level (AEL).

8. MONITORING EQUIPMENT

Chemicals of concern will be monitored using the following equipment:

- MINICAMS
- DAAMS tubes.

8.1 Monitoring Equipment Description

The following paragraphs describe the monitoring equipment in more detail.

8.1.1 MINICAMS

All NRT chemical agent monitoring will be performed using MINICAMS. The MINICAMS is an automated gas chromatograph (GC) that operates by alternating between sampling and analysis cycles.

During the sample cycle, a vacuum system pulls an air sample into the MINICAMS via an HTSL. For NRT monitoring, the sampling and analysis cycle of the MINICAMS must be no more than 15 minutes.

The sample enters the MINICAMS and concentrates on a solid sorbent tube (i.e., preconcentrator tube). The sorbent tube is maintained at a temperature that will prevent condensation from forming on the sorbent tube. During sample analysis, the solid sorbent tube is heated to thermally desorb the analytes, while nitrogen flows into the sorbent tube to sweep the analytes into the capillary column for analytical separation. The analytes are separated and carried to the detector for sample analysis.

All MINICAMS units will be located in a monitoring shed and will be equipped with an HTSL that will not exceed 150 feet in length. The distal end of each sample line will be positioned at an NRT sampling location.

8.1.2 DAAMS

DAAMS tubes are used to provide historical agent monitoring at the WPL and to confirm agent MINICAMS alarms and historical responses. The DAAMS stations are comprised of solid sorbent DAAMS tubes, pumps, and flow control devices. Monitoring with DAAMS employs air aspiration through the DAAMS tube for a predetermined period of time at a controlled airflow rate. Contaminants in the air are adsorbed on the solid sorbent. Aspirated DAAMS samples are then analyzed in the MAP laboratory to detect chemical materiel. Laboratory analysis uses thermal desorption of the analytes from the sorbent tubes into a gas chromatograph/mass spectrometer (GC/MS) or gas chromatograph/flame photometric detector (GC/FPD). If GC/MS is used for analysis, no additional confirmation is required.

8.2 Preventive Maintenance

Preventive maintenance of all monitoring equipment will be performed in accordance with the approved quality plans and procedures.

9. QC REQUIREMENTS

9.1 Certification Requirements

The MAP laboratory shall perform a certification and validation process for operators, instruments, and methods to confirm that analytical processes are suitable for use.

Method certification will require completion of a successful precision and accuracy (P&A) study and initial baseline study. Method certification will be required before the method can be used in support operations. Method validation will be demonstrated through the continuous baseline study.

9.1.1 P&A Method Certification

P&A studies will be performed at the PCAPP EDS site prior to the pre-operational survey for data evaluation by the JPM E (P) Monitoring Office. All P&A studies must be completed in accordance with the U.S. Army Chemical Materials Agency LMQAP (most current version).

9.1.2 Baseline Method Certification and Validation

All methods shall successfully satisfy the requirements of baseline study in accordance with certification and validation requirements detailed in the U.S. Army Chemical Materials Agency LMQAP.

During the initial baseline studies, all sampling and analysis operations shall be performed exactly as set forth in the applicable analytical procedures under similar operating conditions for instruments shown to be in control. Each NRT station and each historical method is an independent monitoring system and must pass the baseline requirements appropriate for that system on a per-station or per-method basis.

The continuing baseline study will be conducted to validate long-term performance of the monitoring systems. The continuing baseline study begins immediately after successful completion of the initial baseline.

For monitoring cessation less than 60 days, method re-certification baselines shall be performed in accordance with the U.S. Army Chemical Materials Agency LMQAP.

9.2 Calibration Requirements

ECBC shall have an established and documented calibration program. All monitoring and laboratory equipment used to support this mission shall be calibrated in accordance with the requirements detailed in the U.S. Army Chemical Materials Agency LMQAP and the ECBC LMQCP.

Calibration data shall be formatted to support storage and retrieval. Calibration records shall identify the following:

- Chemical name
- Date and time
- Instrument identification number
- Name or unique identification number of operator
- Calibration standard identification number
- Analyte standard introduction, where applicable.

9.3 Challenge Requirements

All instruments and monitoring methods used for the analysis of chemical agents shall be subject to periodic QC sample analysis for each chemical the instrument will analyze to check the process from sample collection through analysis. All instruments/methods will be challenged in accordance with criteria from the latest version of the U.S. Army Chemical Materials Agency LMQAP and the ECBC LMQCP.

9.4 Monitoring QC Data Statistical Validation

Statistical validation will be documented in reports, which will include QC data (i.e., calibrations, challenges), statistical analysis, and corrective actions. The MAP laboratory will submit the QC data to the JPM E (P) mandated statistical program from baseline through the completion of closure at https://home.cma.army.mil/qcdrs.

9.5 Equipment Acceptance Requirements

Monitoring equipment must be qualified by meeting or exceeding qualification requirements as specified in the latest version of the U.S. Army Chemical Materials Agency LMQAP and the ECBC LMQCP.

9.5.1 Acceptance Testing Requirements

Acceptance testing will demonstrate the ability of the equipment to properly collect, detect, and quantify the chemical compound of interest. Acceptance test pass/fail criteria and detailed requirements for equipment criteria are specified in the U.S. Army Chemical Materials Agency LMQAP.

10. LIMITING CONDITIONS OF OPERATION (LCOs)

All JPM E (P) operations are governed by LCOs. The JPM E (P) Site Manager will determine that all monitoring LCOs have been achieved on a daily basis before operations can commence.

11. NRT NOTIFICATIONS

In the event of an alarm, the MINICAMS operator will notify the PCAPP EDS Command Post. Further notifications will be the responsibility of the JPM E (P) Site Manager. **Table Attachment F-2-3** lists several possible scenarios, persons to be notified, and possible actions to be taken.

Table Attachment F-2-3. NRT Alarm Notification Matrix

Situation	Notification	Possible Action[a]
Single MINICAMS® Alarm	• PCAPP EDS Command Post • SSHO	• Await result of next MINICAMS cycle • Evacuate non-essential personnel • Evaluate PPE • Analyze DAAMS tubes
Two Consecutive MINICAMS Alarms	• PCAPP EDS Command Post • SSHO	• Await result of next MINICAMS cycle • Evaluate PPE • Determine source of contamination
Three Consecutive MINICAMS Alarms	• PCAPP EDS Command Post • SSHO	• Determine source of contamination

Notes:

[a] This table is based on detection of chemical warfare materiel (CWM) at the alarm setpoint. Decision on actual actions taken will reside with the JPM E (P) Site Manager. Actions may vary, depending on the actual concentration of CWM detected, the operation being performed, the location of the alarm, etc.

DAAMS = Depot Area Air Monitoring System
PCAPP = Pueblo Chemical Agent-Destruction Pilot Plant
PPE = personal protective equipment
SSHO = Site Safety Health Officer

During operations at PCD, the following NRT alarm setpoint will be used:

- For HD and HT, the alarm setpoint shall be 0.7Z at all monitoring locations.

12. DOCUMENTATION

12.1 General Monitoring Documentation

During operations, monitoring personnel will maintain documentation of all monitoring activities. The documentation will include activity information on daily vapor monitoring, sample records, chain-of-custody (COC) forms or transfer of possession, sample analysis records, equipment calibration, equipment maintenance records, agent response, and Standing Operating Procedures (SOPs), and/or Internal Operating Procedures (IOPs) for vapor monitoring and laboratory analysis.

12.2 Alarm Confirmation Reports

In the event of a confirmed chemical agent alarm, the U.S. Army Chemical Materials Agency MCP requires that a confirmed chemical materiel report be compiled. The report shall contain the following information:

- Identification of the chemical materiel
- Sample ID Number\Sample Station
- Found concentration or positive agent identification, in mg/m^3
- Associated NRT reading (if applicable)
- Date, time, and location of reading or measurement
- QC sample results supporting the analytical results
- Statement on the quality of monitoring data and printouts of the actual data

- Any chemical materiel readings at any relevant stations at the site, destruction facility, or storage facility
- Description of site operations during the sample aspiration period
- A statement of the potential chemical compound's source
- Explanation of response or operator comments
- Name/unique ID number of operator collecting and analyzing the sample
- Analytical method used for analysis
- Analytical instrument ID.

12.3 Equipment Documentation

All support MAP laboratory analytical equipment information will be documented by support laboratory personnel. The MAP laboratory will document and maintain all acceptance test results for the equipment. Information regarding each instrument shall be documented in logbooks, an electronic database, or other applicable format.

12.4 Reference Standards

Standards received by the agent custodian or designated alternates will be maintained onsite, accounted for, undamaged, and properly labeled at all times.

13. TRAINING REQUIREMENTS

All EDS monitoring personnel are required to meet the minimum training requirements outlined in the OSHA standard Title 29 Code of Federal Regulations (CFR) 1910.120 covering Hazardous Waste Operations and Emergency Response (HAZWOPER). All monitoring and laboratory personnel must also meet the training and certification criteria detailed in the U.S. Army Chemical Materials Agency LMQAP.

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APPENDIX ATTACHMENT F-2-1
ACRONYMS/ABBREVIATIONS

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APPENDIX ATTACHMENT F-2-1
ACRONYMS/ABBREVIATIONS

AEL	airborne exposure limit
AFS	Air Filtration System
CFR	Code of Federal Regulations
COC	chain of custody
CSU	Container Storage Unit
DAAMS	Depot Area Air Monitoring System
DHHS	Department of Health and Human Services
DOT	Department of Transportation
ECBC	Edgewood Chemical Biological Center
EDS	Explosive Destruction System
GC	gas chromatograph
GC/FPD	gas chromatograph/flame photometric detector
GC/MS	gas chromatograph/mass spectrometer
H	Levinstein mustard
HAZWOPER	Hazardous Waste Operations and Emergency Response
HD	distilled sulfur mustard
HT	mustard-T mixture
HTSL	heat-traced sample line
IOP	Internal Operating Procedure
JPM E (P)	Joint Project Manager Elimination (Provisional)
LCO	limiting condition of operation
LMQAP	Laboratory and Monitoring Quality Assurance Plan
LMQCP	Laboratory and Monitoring Quality Control Plan

MAP	Mobile Analytical Platform
MAV	Modified Ammunition Van
MCP	Monitoring Concept Plan
mg/m^3	milligram per cubic meter
NRT	near real-time
OSHA	Occupational Safety and Health Administration
P&A	precision and accuracy
PCAPP	Pueblo Chemical Agent-Destruction Pilot Plant
PCD	Pueblo Chemical Depot
PDS	Personnel Decontamination Station
PPE	personal protective equipment
QA	quality assurance
QA/QC	quality assurance/quality control
QC	quality control
RDT&E	research development, test, and evaluation
SOP	Standing Operating Procedure
SSMP	Site-Specific Monitoring Plan
STEL	short-term exposure limit
VSL	vapor screening level
WPL	worker population limit

APPENDIX ATTACHMENT F-2-2
REFERENCES

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APPENDIX ATTACHMENT F-2-2
REFERENCES

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U.S. Army Chemical Materials Agency, *Programmatic Laboratory and Monitoring Quality Assurance Plan*, most recent version.

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