U.S. Army Element
Assembled Chemical Weapons Alternatives

Environmental Assessment
Proposed Installation and Operation of Explosive Destruction System and Explosive Destruction Technology at the Pueblo Chemical Depot, Pueblo, Colorado

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PROPOSED INSTALLATION AND OPERATION OF EXPLOSIVE DESTRUCTION SYSTEM AND EXPLOSIVE DESTRUCTION TECHNOLOGY AT THE PUEBLO CHEMICAL DEPOT, PUEBLO, COLORADO

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TABLE OF CONTENTS

Section/Paragraph	Title	Page
LIST OF ILLUSTRATIONS		v
LIST OF TABLES		v
1	INTRODUCTION	1
1.1	Purpose of and Need for the Proposed Action	1
1.2	Purpose and Need	2
1.3	Scope and Content of EA	3
1.4	Public Participation	4
2	PROPOSED ACTION AND ALTERNATIVES	5
2.1	Proposed Action	5
2.1.1	Phase 1 of Proposed Action	6
2.1.2	Phase 2 of Proposed Action	6
2.2	Technology Overview	6
2.2.1	EDS	7
2.2.2	TDC	8
2.2.3	DAVINCH	8
2.2.4	SDC	10
2.3	Site Considerations and Site Preparation	13
2.3.1	EDS Support Equipment	13
2.3.2	EDT Support Equipment	14
2.4	Mustard-Filled Munitions Stored at PCD	16
2.5	Scope of Demilitarization	16
2.5.1	Overpacked Munitions (EDS)	16
2.5.2	105mm Boxed Munitions (EDT)	18
2.5.3	4.2-inch Boxed Munitions (EDT)	18
2.5.4	PCAPP In-Process Leakers/Rejects (EDT)	18
2.6	Alternatives Considered	19
2.6.1	Alternative A (Preferred): Use EDS to Destroy Overpacked Munitions; Use EDT to Destroy Munitions While PCAPP is Coming Online (2014)	19
2.6.2	Alternative B: Use EDS to Destroy Overpacked Munitions Only; No EDT, PCAPP Online in 2014	19
2.6.3	Alternative C: Use EDT Only to Supplement PCAPP Operations for Overpacked Munitions and Reject Munitions	19
2.6.4	Alternative D: No-Action Alternative	19
3	EXISTING ENVIRONMENT AND POTENTIAL ENVIRONMENTAL CONSEQUENCES	20
3.1	Land Use	20
3.1.1	Impacts of Alternative A – EDS and EDT	20
3.1.2	Impacts of Alternative B – EDS Only	20

TABLE OF CONTENTS (Continued)

Section/Paragraph	Title	Page
3.1.3	Impacts of Alternative C – EDT Only to Supplement PCAPP	21
3.1.4	Impacts of Alternative D – No-Action Alternative	21
3.2	Air Quality	21
3.2.1	Impacts of Alternative A – EDS and EDT	22
3.2.2	Impacts of Alternative B – EDS Only	22
3.2.3	Impacts of Alternative C – EDT Only to Supplement PCAPP	22
3.2.4	Impacts of Alternative D – No-Action Alternative	23
3.3	Water Resources	23
3.3.1	Impacts of Alternative A – EDS and EDT	23
3.3.2	Impacts of Alternative B – EDS Only	24
3.3.3	Impacts of Alternative C – EDT Only to Supplement PCAPP	24
3.3.4	Impacts of Alternative D – No-Action Alternative	24
3.4	Ecological Resources	24
3.4.1	Impacts of Alternative A – EDS and EDT	24
3.4.2	Impacts of Alternative B – EDS Only	27
3.4.3	Impacts of Alternative C – EDT Only to Supplement PCAPP	28
3.4.4	Impacts of Alternative D – No-Action Alternative	28
3.5	Socioeconomic Resources	28
3.5.1	Impacts of Alternative A – EDS and EDT	28
3.5.2	Impacts of Alternative B – EDS Only	28
3.5.3	Impacts of Alternative C – EDT Only to Supplement PCAPP	29
3.5.4	Impacts of Alternative D – No-Action Alternative	29
3.6	Cultural, Archaeological, and Historic Resources	29
3.6.1	Impacts of Alternative A – EDS and EDT	30
3.6.2	Impacts of Alternative B – EDS Only	31
3.6.3	Impacts of Alternative C – EDT Only to Supplement PCAPP	31
3.6.4	Impacts of Alternative D – No-Action Alternative	31
3.7	Minority and Low-Income Populations	31
3.7.1	Impacts of Alternative A – EDS and EDT	31
3.7.2	Impacts of Alternative B – EDS Only	31
3.7.3	Impacts of Alternative C – EDT Only to Supplement PCAPP	32
3.7.4	Impacts of Alternative D – No-Action Alternative	32
3.8	Waste Management Issues	32
3.8.1	Impacts of Alternatives A, B, and C	32
3.8.2	Impacts of No-Action Alternative D	33
3.9	Human Health and Safety	33
3.9.1	Impacts of Alternatives A, B, and C	33
3.9.2	Impacts of No-Action Alternative D	33
3.9.3	Site Safety Submission Document	34
3.9.4	Impacts of Accidents	34

TABLE OF CONTENTS (Continued)

Section/Paragraph	Title	Page
3.10	Noise	35
3.10.1	Impacts of Alternatives A, B, and C	36
3.10.2	Impacts of No-Action Alternative D	37
3.11	Energy Resources	37
3.11.1	Impacts of Alternatives A, B, and C	37
3.11.2	Impacts of No-Action Alternative D	37
4	CONCLUSIONS	38
APPENDIX A	ACRONYMS/ABBREVIATIONS	
APPENDIX B	REFERENCE FIGURES	
APPENDIX C	REFERENCES	

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LIST OF ILLUSTRATIONS

Figure	Title	Page
1	Proposed Locations for EDS and EDT	17

LIST OF TABLES

Table	Title	Page
1	EDS and EDT Summary Table	11
2	PCD Weapons Inventory	17
3	Peak Personnel Requirements for EDS and EDT Construction and Operations Phase	29
4	State of Colorado Regulations on Maximum Permissible Noise Levels	36

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1. INTRODUCTION

1.1 Purpose of and Need for the Proposed Action

In accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), Department of Defense (DoD) Directive 4715.9, *Environmental Planning and Analysis* (DoD 1996), 32 CFR Part 651, and Army Regulation 200-1, *Environmental Protection and Enhancement* (DA 2007), the U.S. Army must consider environmental consequences of proposed actions.

Under Title 14, Part B Section 1412 of Public Law (PL) 99-145 and in compliance with the Chemical Weapons Convention (CWC) (Senate Resolution 75, 105th Congress), the U.S. Army Chemical Materials Agency (CMA) has the responsibility for destroying the U.S. stockpile of chemical agents and munitions excluding those at Pueblo Chemical Depot (PCD) and Blue Grass Army Depot (BGAD). The U.S. Army Element Assembled Chemical Weapons Alternatives (USAE ACWA) has the responsibility for the destruction of the chemical weapons stockpiles located at PCD and BGAD. The USAE ACWA is the proponent for this Environmental Assessment (EA).

Based on the 2002 Final Environmental Impact Statement (FEIS) for the Destruction of Chemical Munitions at PCD, Colorado, the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) was chosen as the primary means for the destruction of the chemical stockpile at PCD. PCAPP is currently under construction and will be capable of handling the high number of munitions that need to be treated to achieve demilitarization. PCAPP is projected to be completed and operational by 2014.

This EA has been prepared to analyze alternatives that could accelerate munitions destruction at PCD during PCAPP construction and operation. USAE ACWA is proposing the use of a mobile treatment unit known as the Explosive Destruction System (EDS) and/or a second system employing one Explosive Destruction Technology (EDT) to accomplish this objective. This EA documents the potential

environmental impacts of the proposed action and its alternatives. The intent is to provide decision-makers with the necessary information to make informed choices regarding an environmentally conscious path forward in achieving demilitarization goals at PCD.

1.2 Purpose and Need

The chemical agent and munition items currently in storage at PCD (see figure B-1 for reference map of PCD) were manufactured prior to 1968 (PMCD 2002). The PCD stockpile consists of mustard agent (distilled sulfur mustard [HD] and mustard-T [HT]) contained in 155mm and 105mm artillery projectiles (figures B-2 and B-3, respectively), and in 4.2-inch mortars (figure B-4). PCD currently stores approximately 2,611 tons of chemical agent in mortar rounds and artillery projectiles in igloos that are monitored through a regular inspection program (PM ACWA 2009).

The CWC requires complete destruction of the entire stockpile by 2012. Based on the existing schedule, PCD will not be able to meet this timeline. U.S. PL 110-116 (Defense Appropriations Act for FY 2008), requires the destruction of the chemical stockpile no later than 2017. The current plan to accomplish this goal at PCD consists of utilizing the PCAPP, which will not be operational until 2014 (alternatives for this approach were evaluated in the 2002 FEIS).

The Office of the Secretary of Defense (OSD) has directed USAE ACWA to investigate actions to close the operational gap between currently operating chemical demilitarization facilities at other stockpile locations and the demilitarization schedule at PCD and accelerate the overall destruction schedule at PCD. The alternatives to maintaining continuity of U.S. chemical weapons destruction operations should be safe, cost effective, substantive, and consistent with efforts to accelerate the destruction of the PCD stockpile.

Through routine inspections, a number of the PCD munitions have been found to be leaking and additional containment for safe storage was required. In addition, a

munitions sampling campaign was conducted and those munitions also required additional containment. All leaking munitions and munitions that were sampled have been placed in overpack containers and stored separately from the remaining stockpile.

The proposed action supports the overall goal to (1) complete the destruction of the PCD inventory of chemical agents in compliance with PL 99-145, the CWC, and PL 110-116 and (2) conduct the destruction activities in a safe, environmentally acceptable, and cost-effective manner.

1.3 Scope and Content of EA

This EA addresses alternatives to commence munitions destruction at PCD for the time frame 2012 to 2014, when PCAPP becomes operational. Issues pertaining to construction and operation of PCAPP were addressed in the 2002 FEIS for PCD. The 2002 FEIS will be relied upon to the extent feasible for information regarding existing site conditions and potential impacts from activities related to destruction of munitions. The proposal to use the EDS and/or EDT systems to fulfill the project purpose at PCD includes explosive-based technologies.

USAE ACWA is considering one Army-developed and three commercially developed EDT systems for the destruction of chemical weapons at PCD. Several previous assessments addressing these systems were reviewed and referenced in preparation of this EA, including the following:

- *Proposed Installation and Operation of an Explosive Destruction Technology at the Anniston Army Depot, Anniston, Alabama: Environmental Assessment*, 2009

- *Proposed Installation and Operation of the Pine Bluff Explosive Destruction System (PBEDS) at Pine Bluff Arsenal, Arkansas: Environmental Assessment*, 2004

- *Design, Construction and Operation of One or More Pilot Test Facilities for Assembled Chemical Weapons Destruction Technologies at One or More Sites Final Environmental Impact Statement*, 2002

- *Destruction of Chemical Munitions at Pueblo Chemical Depot, Colorado Final Environmental Impact Statement*, 2002.

The following constraints pertain to identification of feasible alternatives:

a. The Explosive Destruction System (EDS) is an Army system and is operated by Army personnel; the Transportable Detonation Chamber (TDC), Detonation of Ammunition in Vacuum Integrated Chamber (DAVINCH), and Static Detonation Chamber (SDC) are commercial systems operated by contractors. System availability and shared resources for use at a single installation were considered when developing feasible alternatives for this EA.

b. Use of EDS and EDT at PCD cannot interfere with ongoing construction, systemization, and operation of PCAPP, or any installation operations. Location of EDS and EDT, their use, and personnel were considered.

c. Implementation of the proposed action identified in this EA is contingent upon allocation of funding to support the anticipated schedule and avoid conflicts with the construction and systemization of PCAPP.

1.4 Public Participation

Public involvement is an integral component to this project. Public comments and participation in the decision-making process are invited and welcome. The PCD and ACWA outreach teams will support the public participation goals for this EA. Outreach efforts will be consistent with Assembled Chemical Weapons Alternatives (ACWA)

policy and the Public Participation Plan for the Chemical Weapons Stockpile Disposal Program, U.S. Army Pueblo Chemical Depot.

The public involvement strategy to disseminate information and invite stakeholder input on the proposed change in destruction approach incorporates the following tools: (1) implementation of the ACWA Continuity of Chemical Demilitarization (Bridging the Gap) Congressional Notification and Public Involvement Plan; (2) community forums or special presentations, technology overviews, or site visits, as determined in cooperation with the Colorado Chemical Demilitarization Citizens' Advisory Commission (CAC); (3) maximization of ongoing communication opportunities through the CAC and its Permitting Working Group; (4) local publication and availability of this EA for public comment; and (5) full utilization of public outreach assets in the distribution of this EA, collection of feedback and support of all public meetings.

Resource Conservation and Recovery Act (RCRA) permits and modification to the Pueblo County Certificate of Designation will be required for construction and operation of any technology. Public participation is part of the permitting process.

2. PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The U.S. Army proposes to install and operate one or more EDS/EDT systems to meet the OSD directive of maintaining continuity of U.S. chemical weapons destruction operations and accelerate the overall destruction schedule. The near-term approach will focus on treating overpacked munitions currently in storage at PCD and palletized munitions. These systems were selected to treat stockpiled munitions and to take advantage of the particular capabilities of portable systems.

While the specific systems have not yet been identified, options under review include the EDS, TDC, SDC, and DAVINCH (see figures B-6, B-7, B-8, B-9, B-10, B-11, and B-12).

The vendor will supply the enclosure and all process equipment, utilizing existing PCD facilities, infrastructure, and utilities, as applicable.

2.1.1 Phase 1 of Proposed Action. Two EDS units will be deployed to PCD to treat the inventory of overpacked chemical agent munitions stored at Munitions Storage Area A, PCD.

2.1.2 Phase 2 of Proposed Action. An EDT system will be constructed onsite (concurrently with EDS operations) and used to treat chemical agent munitions before operations at PCAPP. This EDT system will continue to process overpacked and reject munitions, and in-process leakers during PCAPP operations.

2.2 Technology Overview

The four systems for destruction of chemical weapons (EDS, TDC, SDC, and DAVINCH) use one or a combination of three basic principles.

a. *Detonation Technology.* The DAVINCH and TDC systems destroy the agent and explosives in the munition by detonating donor explosives wrapped around the munition.

b. *Neutralization Technology.* The EDS uses small, explosive, shaped charges to open the munition and consume the explosive in the burster and fuze. The agent is destroyed by subsequent neutralization.

c. *Thermal Destruction.* The SDC uses the heat of the electrically heated containment vessel (approximately 550°C to 600°C) or the heat generated by previous detonations to open the munition and destroy the agent, then follows up with off-gas treatment systems (NRC 2009).

The following describes in more detail each system being evaluated for use.

2.2.1 EDS. The proven mobility of the EDS units will assist in expediting the treatment process for munitions. The EDS process will deactivate any energetic components and neutralize any chemical agent present within the overpacked munitions. The waste products resulting from the EDS treatment process (debris and neutralents) and other hazardous waste will be secured and shipped to offsite commercial treatment, storage, and disposal facilities (TSDFs), which are permitted under RCRA for final treatment and disposal. The EDS units also have the potential to treat additional stockpiled munitions (see figures B-6 and B-7).

The EDS is a self-contained, transportable system that is designed to provide onsite treatment of chemical agent munitions. The primary component of the EDS is a stainless steel explosive Containment Vessel. The system is operated by placing the munition in the Containment Vessel with explosive charges attached. Detonation of the charge destroys the explosive component of the munition and opens its outer casing (munition body) to release the chemical fill under total containment (that is, no release to the environment). Neutralizing reagents are then pumped into the sealed Containment Vessel to chemically react with the chemical fill and agent-contaminated components of the munitions. After allowing the mixture of chemicals to react, a sample is drawn through the vessel door to verify that the fill has been neutralized. After verification, the neutralent is drained into Department of Transportation (DOT)–approved containers for shipment to a permitted, commercial TSDF. The pressure generated inside the vessel during the detonation and treatment is vented through a carbon filter, which removes any residual reagents and other chemicals from the air stream. The system achieves a destruction removal efficiency (DRE) of greater than 99.9999 percent for mustard.

While the EDS can be deployed quickly to deal with high priority munitions, it was designed for remediation of non-stockpile munitions, and is not intended for long-term, large-scale demilitarization operations. The EDS has the added advantage of being a government system that has been given Department of Defense Explosives Safety Board (DDESB) approval and used extensively at other locations (Anniston Army Depot [ANAD], Alabama; Pine Bluff Arsenal, Arkansas; Former Rocky Mountain Arsenal,

Colorado; and Dugway Proving Ground, Utah, for example); therefore, an expedited approval process is possible, which may aid in rapid deployment and destruction efforts. The offsite treatment of EDS secondary waste by a permitted TSDF is also well-established and demonstrated as safe and environmentally compliant.

2.2.2 TDC. The TDC is a self-contained, enclosed system for controlled detonation of chemical and conventional munitions. The TDC is a cold detonation chamber technology that employs donor charges in the form of sheet explosives, which are manually prepared and applied by operators. The munitions are placed into the detonation chamber using a jib crane. The TDC is configured with an operator-initiated, external, firing system with positive feedback continuity checks, confirming the system is ready for detonation. Additional oxygen is added to the chamber just prior to the detonation to aid in the destruction process. An expansion chamber downstream of the detonation chamber is designed to control the sudden increase in pressure from the detonation. The system is designed with two flow control valves between the expansion tank and the off-gas system. These valves can be closed, which allows for detonation gases to be held in the expansion tank and tested. The off-gas treatment system removes particulates, organics, and metals. The system has demonstrated performance routinely achieving a DRE of greater than 99.9999 percent for mustard.

The TDC is considered a mobile unit and has DDESB approval for the destruction of munitions containing high-explosive, smoke, riot control agents, incendiary fills, and propellants.

The TDC has been extensively tested and evaluated by DoD organizations with an ongoing chemical weapons demilitarization mission. Considerable documentation is available that is related not only to the viability of the system, but also to the safety of the system.

2.2.3 DAVINCH. The DAVINCH is a cold detonation chamber. Munitions placed in the DAVINCH vessel are detonated in a near vacuum using a donor explosive charge to open the munitions and access the chemical agent. The agent is destroyed as a result

of the high temperature and pressure generated by the shock wave, followed by high-speed cavitation and then a fireball. The main two structural elements of the DAVINCH unit are the outer chamber and the inner chamber. The outer chamber is designed as a pressure boundary to withstand detonation pressure. It is a multiple-layered, cylindrical shell, steel structure. The multiple layers act as crack arrestors to prevent cracks in the innermost layer from propagating into the outer layers, due to the discontinuity of the structure. The inner chamber is designed to resist the impulsive load and to protect the outer chamber from associated munition fragments. The inner chamber does eventually need to be replaced, but because this inner vessel is easily removed and examined, it is considered a “sacrificial barrier” and a replaceable component of the unit.

Munitions are loaded in the chamber via a moving deck with a robotic arm. The donor charge is detonated by remote control after a pre-detonation procedure, which results in the destruction of the munitions. The detonation product gas is kept under negative pressure in the detonation chamber throughout the process, excluding the positive pressure, which lasts approximately 1 minute after detonation. The negative pressure prevents unexpected leakage of any gases. Detectible levels of agent have not been found in the DAVINCH off-gas. The detonation product gas is extracted by the vacuum pump through an off-gas pre-filter and sent to the off-gas treatment system. A predetermined amount of oxygen is mixed with the off-gas at the Cold-Plasma Oxidizer where hydrogen and carbon monoxide (CO) are oxidized.

The DAVINCH system incorporates a hold, test, and release capability. The gas is monitored at the outlet of the oxidizer to ensure the gas contains no chemical agent and then passes through the off-gas retention tank where it is held and tested to confirm agent is below the short-term exposure limit (STEL) before the gas is discharged. After the chemical agent level is confirmed, the gas is discharged by the off-gas blower through an activated carbon filter system. From operational experience and surrogate testing, residual chemical agents are non-detectable in detonation off-gases and are below the STEL. The DAVINCH has been selected for use at Deseret Chemical Depot (DCD) to augment Tooele Chemical Agent Disposal Facility (TOCDF) by processing

selected mustard-filled munitions. The DRE for the detonation product gas prior to any treatment has been determined to be greater than 99.9999 percent on O-ethyl S-(2-diisopropylaminoethyl)methylphosphonothioate (VX)-simulant. Approval of the EDT Site Safety Submission Document (SSSD) by the DDESB is a prerequisite to operation of the selected EDT systems. A DRE for the treatment of mustard agent-containing munitions at PCD will be established.

2.2.4 SDC. The SDC is an electrically heated explosive and chemical agent destruction system providing total containment of blast effects and agent. The indirect fired SDC unit is equipped with a secondary combustion chamber (SCC) and pollution abatement system (PAS). The system is interlocked so it is never open to the outside during operations. The detonation chamber is heated above the auto-ignition temperature of all known explosives and propellants, ensuring complete destruction of both the explosive and agent components in one step without the need to dismantle unstable munitions. The flue gas from the chamber passes through the SCC to ensure agent destruction. The munition bodies are held in the chamber a sufficient amount of time to ensure they are free from explosive and/or agent and are suitable for being disposed of as scrap metal. No counter charges are required and munitions will need no preparation prior to treatment.

The PAS will be comprised of a quench tower, scrubber system, activated carbon, and a baghouse prior to exhausting through the stack. This type system has successfully demonstrated a DRE greater than 99.9999 percent for mustard and has been used and is still in service at many international locations. Approval of the EDT (SSSD) by the DDESB is a prerequisite to operation of the EDT. The SDC has been selected for use at ANAD to augment Anniston Chemical Agent Disposal Facility (ANCDF) by processing selected mustard-filled munitions.

A summary of the EDS and EDT systems is shown in table 1.

Table 1. EDS and EDT Summary Table

	EDS	TDC	SDC	DAVINCH
Processing Rate (Based on 10-hour Day)	155mm = 1 per 2 days 105mm = 2 to 6 per 2 days 4.2-inch = 6 per 2 days	155mm = 17 per day	155mm = Up to 40 per day	155mm = 18 per day 105mm = 54 per day 4.2-inch = 54 per day
Target Munitions	Overpacked munitions, plus up to 2,000, 105mm munitions	Boxed 105mm and 4.2-inch munitions; in-process leakers/rejects; 155mm bursters	Boxed 105mm and 4.2-inch munitions; in-process leakers/rejects; 155mm bursters	Boxed 105mm and 4.2-inch munitions; in-process leakers/rejects; 155mm bursters
Munition Detonation	Shaped charge	Donor charge	Electrical fired	Donor charge
DRE	TBD[a]	TBD[a]	TBD[a]	TBD[a]
Waste Produced by Operation	8 to 10 gallons of liquid waste (monoethanolamine [MEA] based hydrolysate) per detonation; mercury; scrap metal; PPE; dunnage	Lime; pea gravel; spent activated carbon; mercury; scrap metal; PPE; dunnage	Treated off-gases; mercury; scrap metal; PPE; dunnage	Condensate water; spent activated carbon; treated off-gases; mercury; scrap metal; PPE; dunnage
Resources Required	Electricity; water; generator fuel; communications	Electricity; water; natural gas; generator fuel; communications	Electricity; water; natural gas; generator fuel; communications	Electricity; water; natural gas; generator fuel; communications
Land Area Requirement	Approximately 2 acres per EDS	Approximately 5 acres	Approximately 5 acres	Approximately 5 acres
Permit Requirements	RCRA - Part B, Subpart X[b]; CD - Class C Modification; No CAA Permit modifications (no off-gas treatment); CWA NPDES	RCRA - Part B, Subpart X[b]; CD - Class C Modification; Modify CAA Permit; CWA NPDES	RCRA - Part B, Subpart X[b]; CD - Class C Modification; Modify CAA Permit; CWA NPDES	RCRA - Part B, Subpart X[b]; CD - Class C Modification; Modify CAA Permit; CWA NPDES
Safety Separation Distances During Operations	PAED IBD = 419 feet ILD = 200 feet	EDT IBD = 1,250 feet; PTR = 750 feet; ILD = 200 feet	EDT IBD = 1,250 feet; PTR = 750 feet; ILD = 200 feet	EDT IBD = 1,250 feet; PTR = 750 feet; ILD = 200 feet

Table 1. EDS and EDT Summary Table (Continued)

	EDS	TDC	SDC	DAVINCH
Security Fencing and Perimeter Lighting	Two fence requirement: 30 to 150 feet apart (New CLA or attached to existing CLA; construct fencing)	Two fences: 30 to 150 feet apart (EDT inside CLA; CLA security meets this requirement)	Two fences: 30 to 150 feet apart (EDT inside CLA; CLA security meets this requirement)	Two fences: 30 to 150 feet apart (EDT inside CLA; CLA security meets this requirement)
Intrusion Detection	Storage structures with openings >96 square inches	Storage structures with openings >96 square inches	Storage structures with openings >96 square inches	Storage structures with openings >96 square inches
Security Officers	24 hours per day	24 hours per day	24 hours per day	24 hours per day
Communications Plan	PCD radio network	PCD radio network	PCD radio network	PCD radio network

Notes:

[a] DRE will be negotiated under RCRA permit.

[b] RCRA Subpart X: The Subpart X rule allows the hazardous waste management industry flexibility in developing new technologies or modifying existing technologies. Under Subpart X, the Agency has the flexibility to develop technology-specific standards for these units on a permit-by-permit basis when considering the technology-specific data submitted by the applicant to develop the permit conditions based on the environmental performance standards and to issue a permit. Units that do not fit the definition of any of the units covered by the standards of Part 264 or Part 146 would be regulated as miscellaneous units. In addition, unless otherwise excluded, if a new type of unit were developed that did not fit the definition of tank, container, surface impoundment, waste pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, or underground injection well, it would be regulated under Subpart X (U.S. Environmental Protection Agency, 40 CFR Parts 144, 260, 264, and 270).

CAA = Clean Air Act
CD = Certificate of Designation (Pueblo County, Colorado)
CLA = Chemical Limited Area
CWA = Clean Water Act
DAVINCH = Detonation of Ammunition in Vacuum Integrated Chamber
DRE = Destruction Removal Efficiency
EDS = Explosive Destruction System
EDT = Explosive Destruction Technology
IBD = Inhabited Building Distance (applies to non-participating personnel)
ILD = Intraline Distance (applies to EDT operations personnel)
NPDES = National Pollutant Discharge Elimination System
PAED = Public Access Exclusion Distance
PCD = Pueblo Chemical Depot
PPE = personal protective equipment
PTR = Public Traffic Route (transportation must halt during EDT operations)
RCRA = Resource Conservation and Recovery Act
SDC = Static Detonation Chamber
TBD = to be determined
TDC = Transportable Detonation Chamber

Sources: National Research Council, *ACWA Explosive Destruction Technologies*, May 2009; *PCAPP Accelerated EDT Execution Plan*, 2009.

2.3 Site Considerations and Site Preparation

Before implementing the proposed action, the Army will be required to coordinate its actions with various federal, state of Colorado, and local legal and regulatory authorities. At a minimum, Clean Air Act (CAA), Clean Water Act (CWA), and RCRA permits will need to be in place to address the proposed action prior to beginning construction. In addition, prior to beginning construction, the Army is required to submit an application/modification to Pueblo County for a Certificate of Designation.

Implementation of the proposed action requires the selection of sites for the EDS and EDT that do not disrupt the construction and systemization of the PCAPP facility or other operations at PCD. Several alternative locations outside the PCAPP footprint were assessed. Currently, an EDT system is planned to be located within Munitions Storage Area A near the southern boundary. The EDS will be located just outside of the Munitions Storage Area A (south and west of the EDT) due to the required explosive safety distance involved with the use of shaped charges. Infrastructure will be constructed, as needed, to support the EDS and EDT (see figures B-13, B-14, B-15, and B-16).

Site preparation will include grading and grubbing; construction of concrete pads; parking areas; sanitary sewer (if required); storm sewer; firewater/potable water; natural gas, electrical, and drainage work; and EDT enclosure structures.

2.3.1 EDS Support Equipment. The EDS is contained on a trailer requiring a 30x60-foot level area, (with impermeable surface barrier). Additional facilities required to operate the EDS include a system enclosure, a fire set area, power source, water source, personnel decontamination station, establishment of a contamination control line, provision of lighting and utilities, and security fence and access control point.

EDS support equipment can include a backup diesel generator, reagent storage, spill response supplies, air compressor, munition unpack and preparation area, and waste storage.

2.3.2 EDT Support Equipment. The EDT will be modularized and assembled at the site. All necessary mechanical, electrical, and piping components will be included in the EDT modules. Any commodities, such as the insulation, ladders, platforms, piping, instruments, and raceways not installed on the modules, will be installed onsite.

After completing construction, the Army will test the destruction facility. Initial tests will be conducted with agent surrogates; then actual trials will be conducted with actual munitions.

Results of the test runs will be submitted to the state of Colorado and federal agencies. If the test run results are acceptable, the state of Colorado will issue final operating conditions in permits as necessary. As long as operation of the destruction facility continues, the Army will be subject to a variety of reporting, inspection, notification, and other permit requirements of the state of Colorado. The U.S. Department of Health and Human Services (DHHS) will continue its advisory role, reviewing data and making appropriate recommendations concerning public health and safety before toxic operations begin. No National Pollutant Discharge Elimination System (NPDES) permits, other than for sanitary sewage and general construction storm water, will be required. Approval from the DDESB will be required (PMCD 2002).

Additional support equipment and structures for the EDT facility (external to the EDT structure), include the following:

a. *Control Room.* The Control Room, including the operator equipment for remote operation, is where the process is controlled and supervised. All necessary commands and settings can be performed from the operator stations.

b. *EDT Off-gas Treatment System (OTS) Filter Units, Exhaust Blower, and Stack.* The EDT will process agent-containing munitions, which will result in gasses. These gasses, while being mostly free of agent, will still require

further treatment before they are acceptable for release. This treatment will be performed by the EDT OTS.

c. *Heating, Ventilation and Air Conditioning (HVAC) Air Filtration Units and Stack.* The purpose of the HVAC air filtration units and stack is to provide a negative pressure on the environmental protection structure and capture any agent vapor in the exhaust air from the environmental protection structure.

d. *Lockers, Restrooms, Personal Protective Equipment Support, and Storage Building.* This building provides a maintenance and storage facility to serve the EDT. An existing building is equipped to support a men's locker room; however, an additional structure is needed for female workers.

e. *Treaty Sampling.* A treaty sampling concept has been developed to support PCAPP. Should the EDT be accelerated, the procurement of a vendor to supply the treaty sampling device will be accelerated to support EDT operations. EDS operations also require treaty sampling.

f. *Secondary Waste Staging Area (to be located adjacent to EDT environmental protection structure).* Because PCAPP permitted storage locations will not be complete when accelerated EDT operations commence, a RCRA-compliant storage area will be established prior to waste shipment.

g. *Emergency Generator.* A backup generator supplied by the EDT vendor will power essential equipment, as needed (for example, filters, induced draft (ID) fans, monitoring equipment, and lighting).

h. *Parking Area.* Parking will be established during construction in a temporary lot in close proximity to the EDT construction access point (exterior to Munitions Storage Area A, Chemical Limited Area [CLA]).

i. *Entry Control Facility (ECF).* To accommodate EDT construction, a normally secured gate will be used. During systemization and operations, the existing Munitions Storage Area A ECF will be used. The ECF controls pedestrian and vehicular access to and egress from the CLA. The ECF houses security personnel and equipment to screen personnel entering and leaving the CLA.

Existing structures and infrastructure present within Munitions Storage Area A may be used to fulfill a portion of these requirements, reducing the need for additional construction. Proposed siting is reflected in figure 1. Upgrades to roadways and utilities will be addressed, as necessary.

2.4 Mustard-Filled Munitions Stored at PCD

The chemical agent munitions currently stored at PCD consist of HT-filled 4.2-inch mortars (M2), HD-filled 4.2-inch mortars (M2A1), HD-filled 105mm projectiles (M60), and HD-filled 155mm projectiles (M104 and M110). Some 105mm projectiles have been reconfigured to remove the propellant and fuze but kept the burster and nose plug. Unreconfigured 105mm projectiles with integral fuzes and bursters are contained in sealed tubes with bags of propellant, two tubes to a box. All of the 155mm projectiles have been configured to contain lifting plug and burster but no fuze. The 4.2-inch mortars with integral fuze, burster, propellant wafers, and ignition cartridge are contained in sealed tubes, two tubes to a box. Table 2 provides percentage of stockpile for each munition (NRC 2009).

2.5 Scope of Demilitarization

2.5.1 Overpacked Munitions (EDS). Currently, overpacked munitions are stored at PCD. All overpacked munitions currently stored plus those generated up to EDT construction will be destroyed by two EDS units.

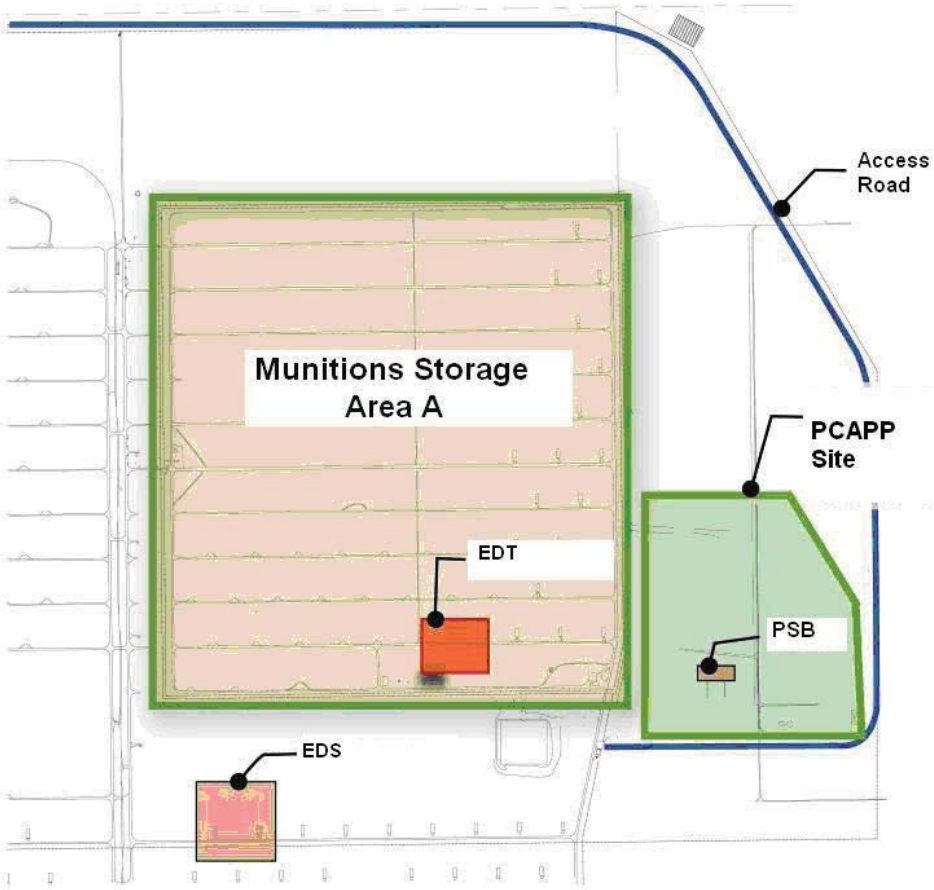

Figure 1. Proposed Locations for EDS and EDT

(Note: The areas depicted do not represent fixed boundaries, but rather the general area for siting the EDS and EDT Systems.)

Table 2. PCD Weapons Inventory

Munition	Agent Fill	Percent of Stockpile
105mm projectile M60	HD	49%
155mm projectile M110	HD	34%
155mm projectile M104	HD	4%
4.2-inch mortar M2A1	HD	10%
4.2-inch mortar M2	HT	3%

Source: National Research Council Destruction Technologies, 2009.

After destruction of the overpacked munitions and 105mm palletized munitions, the two mobile EDS units will be decontaminated and clean-closed. Once the EDS units have been closed under RCRA clean closure rules, they will then be demobilized for reuse at another location, or placed into lay-away status and maintained in a condition ready for transport to any site where they may be needed in the future. All concrete pads constructed and used for EDS at PCD will be left in place.

2.5.2 105mm Boxed Munitions (EDT). EDT operations will likely begin with boxed 105mm munitions with the single safety M57 fuze. Processing rates will be ramped to support shakedown activities and verify proper operation on all EDT equipment.

2.5.3 4.2-inch Boxed Munitions (EDT). An initial shakedown period (similar to the 105mm boxed munitions described previously) will be used to ramp the EDT to its full processing rate. As the 4.2-inch mortar campaign occurs during PCAPP plant operations, the EDT will also be used to process munitions' bursters removed during PCAPP enhanced reconfiguration. It is assumed the bursters can be staged (up to the 5,000 pounds net explosive weight [NEW] limit) in the PCAPP Energetics Service Magazine to accommodate efficient processing in the EDT.

2.5.4 PCAPP In-Process Leakers/Rejects (EDT). In-process leakers/rejects will be handled by the EDT as needed until elimination of the chemical weapons stockpile, projected for 2017.

Transport and delivery of munitions (from storage to the EDT) using Munitions Ammunition Vehicles will be provided throughout the EDT operations period. Army and DoD safety and surety policies will be followed regarding the transportation/transfer from storage to the treatment site. Deliveries will typically only occur 5 days a week, during daylight hours. Adequate munitions storage will be provided near the EDT to allow continued operations on weekends and holidays.

2.6 Alternatives Considered

2.6.1 Alternative A (Preferred): Use EDS to Destroy Overpacked Munitions; Use EDT to Destroy Munitions While PCAPP is Coming Online (2014). Two EDS units are used to destroy the munitions contained in overpack containers, any newly generated overpacked munitions, and 105mm munitions, stored in Munitions Storage Area A at PCD. The EDS units will continue to destroy 105mm munitions until the EDT is ready for operations. Once the inventory of overpacked munitions is destroyed and the EDT system is operational, the EDS units complete the closure process. Concurrent with EDS operations, an EDT system is constructed to continue destruction of boxed munitions to maintain continuity of U.S. chemical weapons destruction operations between operation of the EDS and the beginning of operations at PCAPP. The EDT continues to process boxed and reject munitions during PCAPP operations.

2.6.2 Alternative B: Use EDS to Destroy Overpacked Munitions Only; No EDT, PCAPP Online in 2014. Two EDS units are used to destroy the munitions contained in overpack containers, any newly generated overpacked munitions, and a portion of the 105mm munitions stored in Munitions Storage Area A at PCD.

2.6.3 Alternative C: Use EDT Only to Supplement PCAPP Operations for Overpacked Munitions and Reject Munitions. An EDT system is constructed to treat overpacked munitions, leakers, rejects, and boxed munitions to supplement operations at PCAPP.

2.6.4 Alternative D: No-Action Alternative. The No-Action Alternative continues to store the munitions at PCD until PCAPP is operational. Under this alternative, no EDS or EDT system is deployed to accelerate munitions destruction and no chemical agent treatment occurs until PCAPP begins operations in 2014.

3. EXISTING ENVIRONMENT AND POTENTIAL ENVIRONMENTAL CONSEQUENCES

This section describes the possible environmental effects from the proposed action and the potential environmental impact that could occur as a result of the proposed action and alternatives.

3.1 Land Use

The PCD installation is government-owned and operated and contains buildings, structures, and undeveloped areas (PMCD 2002). This section considers impacts of the proposed action to existing land use, including compatibility with existing and surrounding land-use designations on PCD. There will be no impacts to land use in areas located outside PCD from the proposed action.

3.1.1 Impacts of Alternative A – EDS and EDT. The EDS and EDT are located in disturbed (EDS) and developed (EDT) areas of PCD designated for chemical weapons demilitarization and industrial use. The proposed locations for both types of systems are not in close proximity to designated wildlife management areas (see figure B-5) located in the southeastern and western portions of PCD (PCD 2009). Construction impacts include soil disturbance that is controlled through implementation of standard sedimentation and erosion control measures to avoid impacts to adjacent areas. Areas disturbed during construction are restored and stabilized upon completion of the work. Direct impacts occur within developed land in Munitions Storage Area A for the EDT system, and in an approximately 4-acre area of disturbed land immediately south of Munitions Storage Area A for the EDS units. Secondary impacts include noise and increased vehicle use on existing roads. These activities do not impact land uses in the affected areas as the impacts are comparable to existing uses in this area of PCD.

3.1.2 Impacts of Alternative B – EDS Only. As described for Alternative A in paragraph 3.1.1, the EDS units to be used for Alternative B are located in disturbed areas of PCD designated for industrial use. The proposed construction and operations,

including construction of all EDS unit components within a 4-acre area, connecting to existing utilities and roads, and vehicle use of existing roads to access the site, do not affect the land use of any PCD areas.

3.1.3 Impacts of Alternative C – EDT Only to Supplement PCAPP. Impacts from construction and operation of the EDT system are the same as described for Alternative A, with the exception that EDS construction and operation do not occur.

3.1.4 Impacts of Alternative D – No-Action Alternative. There are no impacts to existing land uses under this alternative.

3.2 Air Quality

Impacts on air quality have been considered from the perspective of priority pollutants and hazardous and toxic air pollutants. Potential emission sources include emissions from construction activities, operation of EDS and EDT, which require ventilation stacks, and vehicle use associated with operational activities. Pueblo County is in attainment with the U.S. Environmental Protection Agency (EPA) National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants, ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and particulate matter less than 10 microns in size (PM_{10}). This means air quality will be considered protective of human health. Potential increases in emissions of priority pollutants are evaluated by how much they will increase concentrations above baseline levels.

PCD and PCAPP have synthetic minor air permits that are currently under review and modification. The EDT will require a modification to the air permit.

To support air permitting efforts, Army personnel will estimate the emissions from the sources to ensure that the synthetic minor status for air permitting is maintained. Approval of the air permit modification will be necessary before EDT construction can begin. If emissions approach the Title V threshold with no relief in sight, PCD and PCAPP will need to pursue a Title V permit (Bechtel 2009).

Construction emissions will include fugitive dust (that is, contributes to particulate levels) generated during land clearing and grading activities, and vehicle and generator emissions (NO_2, CO, SO_2, and volatile organic compounds [VOCs]).

During continued storage of mustard-filled munitions, it is possible that a munition may occasionally leak. Any leaking munition will be contained in an overpack and moved to a permitted storage igloo. As a result, an extremely small air quality impact is expected.

Operational emissions include: (1) emissions from detonation of the explosives, trinitrotoluene (TNT), and cyclonite that may pass through the EDS and EDT filter systems and (2) emissions from emergency diesel generators when electrical power is lost or interrupted. Emissions of VOCs from filling the diesel storage tanks will be negligible and will not be considered.

Therefore, provided the EDS and EDT filter systems are installed and maintained to function correctly, no adverse impacts to air quality is anticipated.

3.2.1 Impacts of Alternative A – EDS and EDT. Alternative A has the greatest magnitude of construction and operational emissions based on the fact that a total of three systems will be constructed and operated (two EDS units and one EDT system). However, as described previously, emissions will be intermittent and temporary, consist of low levels, and are anticipated to have negligible impacts on air quality.

3.2.2 Impacts of Alternative B – EDS Only. Alternative B includes air emissions associated with construction and operation of two EDS units; therefore, total potential air emissions will be less than the total potential emissions for Alternative A. Emissions from all potential sources for Alternative B will be low and are anticipated to have negligible impacts on air quality.

3.2.3 Impacts of Alternative C – EDT Only to Supplement PCAPP. Alternative C includes air emissions associated with construction and operation of a single EDT system; therefore, total potential air emissions will be less than the total potential

emissions for Alternative A. Emissions from all potential sources for Alternative C will be low and are anticipated to have negligible impacts on air quality.

3.2.4 Impacts of Alternative D – No-Action Alternative. Potential impacts to air quality from the No-Action Alternative consist of leaks that may occur due to the slightly longer duration of storage of the targeted munitions. Periodic monitoring of the stockpile will prevent the potential for adverse impacts to air quality from this alternative.

3.3 Water Resources

This section evaluates potential impacts to groundwater, surface waters, wetlands, water supply, and storm water. The project location is in the northern segment of PCD and not in close proximity to the Arkansas River or 100-year floodplain.

Water supply required for operation of the EDS and EDT and associated personnel facilities (for example, locker rooms, restrooms) will be withdrawn from groundwater. The water requirements for these systems is minor in comparison to other demands on PCD. Impacts to groundwater for the PCAPP were quantified and it was determined that there could be temporary, localized declines in the water table associated with groundwater withdrawals for that facility (PMCD 2002). Water use for the EDS and EDT will primarily occur prior to operation of the PCAPP and will consist of much smaller quantities. Therefore, impacts to groundwater from construction and operation of the EDS and/or EDT will be negligible.

3.3.1 Impacts of Alternative A – EDS and EDT. Construction and operation of the EDS and EDT do not have any direct or indirect impacts on surface waters, including wetlands, at PCD. The proposed sites for the systems and associated facilities are not located close to any surface waters; the nearest surface water body is Boone Creek with spring-fed headwaters located approximately 900 to 1,200 feet to the south. Construction will be managed to ensure no adverse impacts occur to the source of Boone Creek (a spring-fed system) from ground disturbance or erosion. Operation of the new facilities will include standard measures to control storm water from all

buildings, pavement, and impervious surfaces to prevent adverse impacts to receiving waters down-gradient from the sites. Sanitary waste will be processed in accordance with current PCD practices and will not be discharged to surface waters.

3.3.2 Impacts of Alternative B – EDS Only. As described in paragraph 3.3.1, implementation of the EDSs for Alternative B will not impact water resources at PCD.

3.3.3 Impacts of Alternative C – EDT Only to Supplement PCAPP. Alternative C impacts developed land within Munitions Storage Area A; potential impacts to water resources are comparable to the types of impacts described for Alternative A, but of lesser potential magnitude based on installation of a single EDT system. As described for Alternative A, appropriate measures will be implemented to prevent adverse impacts to water resources.

3.3.4 Impacts of Alternative D – No-Action Alternative. There are no impacts to water resources from this alternative.

3.4 Ecological Resources

This section evaluates potential impacts to ecological resources, including vegetation, wildlife, and protected species. There are currently no known federally listed endangered, threatened, proposed, or candidate species at PCD (PCD 2009). Occurrence of federally listed species or designated critical habitat for listed species requires compliance with Section 7 of the federal Endangered Species Act (ESA). Species with designated state status (that is, state species of concern) are identified in this section as well; these species are not afforded the protection of the ESA, but are considered in management strategies for PCD from an ecological perspective and to reduce the potential of becoming federally protected species in the future (PCD 2009).

3.4.1 Impacts of Alternative A – EDS and EDT. The sites for the EDS and EDT are located on disturbed (EDS) and developed (EDT) land in PCD. As described in paragraph 3.3, activities related to construction and operations for the EDS and EDT

are not located in or near surface waters, wetlands, or floodplains, and therefore, have no impact on aquatic species. Adequate sedimentation and erosion controls will be used during construction to prevent potential for water quality impacts down-gradient from the site. Therefore, no impacts to aquatic species will occur from construction or operation of the EDS and EDT.

The site for the EDT is located in a developed area of PCD, in the southern portion of Munitions Storage Area A. Current site conditions include existing cleared and paved land, buildings, and the perimeter fence surrounding Munitions Storage Area A, which will be incorporated into the requirements for security fencing for the EDT system. Current wildlife use of this area is limited to species that could pass over or through the fence (for example, birds, small mammals) and that are habituated to use of man-made structures. These species will be temporarily displaced to nearby areas during construction disturbance. Some species using developed areas are considered nuisance species whose presence is undesirable (for example, pigeons; PCD 2009). Temporary disturbance to such species will constitute negligible impacts to ecological resources, including vegetation and wildlife habitat, for construction or operation of the EDT system.

The EDS will be located immediately south of Munitions Storage Area A (Bechtel 2009) in an area that was one of three sites evaluated for locating the PCAPP in the 2002 FEIS (PM ACWA 2002) (see figure B-17). All facilities for two EDS units (trailers, fire set area, compressor, generator, decontamination areas, etc.) will be located in an area approximately 4 acres in size.

Vegetation in the vicinity of the proposed EDS site consists of shortgrass prairie and sand sagebrush vegetation (PMCD 2002) that has colonized previously disturbed areas (PMCD 2002). Vegetation includes common species of short (that is, generally less than 2 feet) prairie grasses and sand sagebrush and rabbitbrush species. These vegetative communities are two of the three most common community types present on PCD, and occur throughout the eastern Colorado plains, although they are considered vulnerable vegetation communities in Colorado (PCD 2009). The most important

shortgrass prairie communities on PCD are located elsewhere, associated with the Chico Basin and Signal Rock Sandhill Potential Conservation Areas (PCD 2009).

Wildlife associated with shortgrass prairie and sand sagebrush vegetation includes amphibians and reptiles (great plains toad, western Woodhouse's toad, Couch's spadefoot toad [*a state special concern species*; Colorado Division of Wildlife, undated], prairie rattlesnake, gopher snakes, coachwhips, and ornate box turtle); (PMCD 2002; PCD 2009). Greater diversity of amphibian species is associated with surface waters located south of the proposed site (Boone Creek, Lynda Ann Reservoir).

Shortgrass prairie and sand sagebrush vegetation provides suitable habitat for common bird species such as lark sparrow, lark bunting, horned lark, mourning dove, western meadowlark, and western kingbird. These species currently nest in/near disturbed lands on PCD such as around the storage igloos. Birds observed primarily in shortgrass communities on PCD include mountain plover (formerly proposed as a federal threatened species, but the proposal was withdrawn, U.S. Fish and Wildlife Service [USFWS] 2003), ferruginous hawk (*a state special concern species*; Colorado Division of Wildlife, undated), and burrowing owl (*state listed as threatened*, Colorado Division of Wildlife undated). The burrowing owl is not federally listed under ESA but is protected by the provisions of the MBTA and is considered a sensitive species by the USFWS and Bureau of Land Management (BLM) due to decreases in density and/or habitat.

Small mammals that inhabit shortgrass prairie include the black-tailed prairie dog. This animal was formerly a federal candidate species that was removed from candidate listing status by the USFWS in 2004. After again being proposed for listing, a December 2009 USFWS finding states that following review of all available scientific and commercial information, listing the black-tailed prairie dog as either threatened or endangered is not warranted at this time (http://edocket.access.gpo.gov/2009/E9-28852.htm). Monitoring for black-tailed prairie dog colonies on PCD from 1998 to 2006 indicates periodic use of areas located southwest of Munitions Storage Area A, (PCD 2009). However, this area of PCD is not designated as a primary management

area for this species, and if necessary will be mitigated in compliance with the PCD Integrated Natural Resources Management Plan (INRMP) (PCD 2009). Prairie dogs inhabit areas immediately to the west of the proposed EDS site.

Black-tailed prairie dog communities are important for commensal species that rely upon their burrows and the habitat they create, such as the burrowing owl and mountain plover, and predator species including swift fox (*state special concern species*, Colorado Division of Wildlife, undated) and ferruginous hawks (PCD 2009). The burrowing owl is protected by the MBTA, which provides that it is unlawful to pursue, hunt, take, capture, or kill any migratory bird, part thereof, nest, egg, or product, unless permitted by regulations. Black-tailed prairie dogs can be found just west of the proposed EDS disturbance zone. Furthermore, there is the potential for burrowing owls to occur within prairie dog colonies as well.

Other small mammals associated with shortgrass prairie include common species such as spotted ground squirrel, thirteen-lined ground squirrel, rabbits, and mice. These species draw carnivores such as coyotes, swift foxes, raccoons, badgers, and striped skunks. Pronghorn use shortgrass prairie within PCD but tend to use eastern and western portions of PCD.

Impacts to these species of wildlife will include potential for injuries or death from collision with construction vehicles and equipment during construction, and increased road traffic accessing the facility during the operational phase. Indirect impacts will be displacement from noise and equipment disturbance during construction, and routine noise, traffic, and human disturbance during operations.

Based on these determinations, Alternative A has negligible impacts on ecological resources.

3.4.2 Impacts of Alternative B – EDS Only. Potential for impacts from this alternative are comparable to those described for the EDS (as described in Alternative A), with potential for displacement of several ground-dwelling species and

indirect impacts from noise, construction disturbance, and human disturbances in an area of PCD where wildlife is already habituated to such impacts. Therefore, impacts of Alternative B on ecological resources are negligible.

3.4.3 Impacts of Alternative C – EDT Only to Supplement PCAPP. Potential for impacts from this alternative are comparable to those described for the EDT system described in Alternative A.

3.4.4 Impacts of Alternative D – No-Action Alternative. Continued storage of mustard munitions has no impact on ecological resources.

3.5 Socioeconomic Resources

The potential for socioeconomic impacts consists of impacts to existing facilities and services on PCD and in the local community. Excluding contractors, military personnel, and reuse tenants, PCD directly employs in excess of 240 people. As a result of PCD employee expenditures for goods and services, there are in excess of 120 indirect jobs in the local economy. Onpost employment and related expenditures create millions of dollars annually in personal income in the local economy (PMCD 2002).

3.5.1 Impacts of Alternative A – EDS and EDT. The primary impacting factor for socioeconomics is the direct employment associated with facility construction and operations. This direct employment results in direct income that is spent in the local economy. These expenditures, as a result, create indirect employment and indirect income, creating benefits for the local community. While the EDS may provide some short-term employment, construction and operation of the EDT provides employment until the chemical weapons stockpile is eliminated from PCD in 2017. Table 3 shows the estimated number of personnel that support construction and operations efforts.

3.5.2 Impacts of Alternative B – EDS Only. The EDS will be used temporarily (2012 to 2013) to treat overpacked and 105mm munitions stored at PCD, then will go through a closure process and be removed from PCD. Construction of the concrete

Table 3. Peak Personnel Requirements for EDS and EDT Construction and Operations Phase

	EDS	EDT
Construction Phase[a]	90 to 100	90 to 100
Operations Phase[a]	20 to 42	50 to 60

Note:

[a] Personnel numbers are approximations, assuming two EDS units and one EDT unit.

Source: Pine Bluff EA.

pads and utilities provide temporary direct employment. However, the EDS is to be operated by government personnel who are specially trained to operate the system. The socioeconomic impact of EDS operations is expected to be minor and temporary.

3.5.3 Impacts of Alternative C – EDT Only to Supplement PCAPP. Socioeconomic impacts from construction and operation of the EDT system during operation of the PCAPP are comparable in nature, but of lesser magnitude, than those described for Alternative A. Benefits to the local community will be realized from additional jobs created for contractor personnel to operate the EDT system as described for Alternative A.

3.5.4 Impacts of Alternative D – No-Action Alternative. Without destruction facility construction and operations, there will be none of the socioeconomic impacts, particularly the potential impacts to public services and traffic. Conversely, there will be none of the beneficial effects related to employment, income, and public finances.

3.6 Cultural, Archaeological, and Historic Resources

The National Historic Preservation Act (NHPA) establishes a comprehensive program to preserve historic and cultural resources. Under the provisions of Section 106 of

NHPA, federal agencies are required to consider the effects of their actions on historic properties and provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on federal projects prior to implementation (Section 106 16 U.S.C. § 470f). Historic and cultural resources include archaeological, historic, and cultural resources listed or eligible for listing in the National Register of Historic Places. The procedure for meeting Section 106 requirements is defined in ACHP's regulations, "Protection of Historic Properties" (36 CFR Part 800). PCD has been evaluated extensively for eligible properties as described in the 2008 Draft *Integrated Cultural Resources Management Plan* (ICRMP) (Draft PCD 2008) (see figure B-18). PCD has consulted with the State Historic Preservation Officer (see figure B-19).

3.6.1 Impacts of Alternative A – EDS and EDT. The sites for the EDS and EDT are located on disturbed (EDS) and developed (EDT) land on PCD. According to the Draft ICRMP, PCD has been surveyed for cultural resources almost in its entirety; the few remaining areas that have not been surveyed are areas that have been developed or disturbed to such an extent that cultural resources that may exist in those locations are not anticipated to retain sufficient integrity to be of interpretive value.

The EDS and EDT will be located in disturbed lands that are unlikely to contain cultural resources and for which further investigations and/or construction monitoring will not be required (PCD 2008, Appendix D). In the event ground disturbance in any previously undisturbed areas located east of Running Route 1 is required, such as for connecting to existing electrical utility lines at the PCAPP, construction monitoring will be required as this area has been designated a sensitive area for cultural resources (PCD 2008, Appendix D).

Some existing buildings in Munitions Storage Area A may be used for various EDT system functions (for example, maintenance, locker rooms, laundry). All the existing buildings in Munitions Storage Area A have been evaluated for National Register listing. Those that were deemed eligible for listing have been adequately documented in accordance with a programmatic agreement between the U.S. Army, PCD, and the

Colorado State Historic Preservation Officer (SHPO), and further review of potential impacts to these structures is not required (PMCD 2002).

Therefore, construction and operation of the EDS and EDT for Alternative A will not impact properties listed, or eligible for listing, on the National Register of Historic Places.

3.6.2 Impacts of Alternative B – EDS Only. As described in paragraph 3.6.1 for Alternative A, the site for the EDS is located on disturbed land south of Munitions Storage Area A and construction and operation of the EDS do not impact properties listed, or eligible for listing, on the National Register of Historic Places. Provided no ground disturbance occurs east of Running Route 1, no construction monitoring is required.

3.6.3 Impacts of Alternative C – EDT Only to Supplement PCAPP. Impacts from Alternative C are the same as described for the EDT system in Alternative A.

3.6.4 Impacts of Alternative D – No-Action Alternative. Continued storage of mustard munitions has no impact on cultural resources.

3.7 Minority and Low-Income Populations

3.7.1 Impacts of Alternative A – EDS and EDT. Environmental justice populations were considered in the decision to destroy chemical agent munitions at PCD. Low income and minority populations are not considered to be disproportionately impacted. Operation of EDS and EDT will occur near PCD munition storage areas onpost that are not located near local populations, housing areas, or other community-linked infrastructure.

3.7.2 Impacts of Alternative B – EDS Only. As described in paragraph 3.7.1 for Alternative A, low income and minority populations are not considered to be disproportionately impacted by the operation of an EDS.

3.7.3 Impacts of Alternative C – EDT Only to Supplement PCAPP. As described in paragraph 3.7.1 for Alternative A, low income and minority populations are not considered to be disproportionately impacted by the operation of EDT.

3.7.4 Impacts of Alternative D – No-Action Alternative. Low income and minority populations are not considered to be disproportionately impacted by implementation of the No-Action Alternative.

3.8 Waste Management Issues

Executive Order 12088, *Federal Compliance with Pollution Control Standards*, and other PLs require that all federal agencies comply with all applicable federal, state, and local pollution control standards. Compliance with applicable pollution control standards requires that the Army secure environmental permits in the same manner as private project sponsors. Department of the Army Regulation 200-1 requires that all applicable permits and approvals for an activity be obtained prior to commencing construction.

Separate applications will be submitted for the EDS and EDT to obtain the necessary RCRA, CWA, and CAA permits.

3.8.1 Impacts of Alternatives A, B, and C. Mustard agents (H, HD, and HT) are listed waste according to the Colorado Department of Public Health and Environment Regulations Part 261; H and HD are listed as waste code P909 and HT is listed as waste code P910. (Mustard agent is listed as a hazardous constituent in 6 Code of Colorado Regulations [CCR] 1007-3, Section 261.33.) Waste munitions containing any of the mustard agents are listed wastes K901 under 6 CCR 1007-3, Section 261.32. In addition, the same section of the CCR declares that residues resulting from treating waste chemical weapons are listed wastes K901. Any soil, water, debris, or containers contaminated through contact with chemical weapons hazardous waste is listed waste K902. Colorado statutes address hazardous waste in Title 25 Article 15; Hazardous Waste, 25-15-101 to 25-15-515, and Title 25 Article 16; Hazardous Waste Sites, 25-16-101 to 25-16-311. Solid waste residuals from the demilitarization

processing are listed hazardous wastes under 6 CCR 1007-3, Section 261.3(c)(2)(i). The listed wastes retain the hazardous classification regardless of their hazardous characteristics unless they are delisted by the state of Colorado.

The EDS/EDT process deactivates any energetics and neutralizes any chemical agent present within the munitions. Any secondary waste products of the EDS/EDT process will be secured in a compliant storage area and shipped to offsite commercial TSDFs, which are permitted under RCRA for final treatment and disposal of such wastes.

3.8.2 Impacts of No-Action Alternative D. If no action is taken, no additional wastes will be generated other than those wastes associated with the continued monitoring and maintenance of the stored munitions.

3.9 Human Health and Safety

According to PL 91-121 (Armed Forces Appropriations Act of 1970) and PL 91-441 (Armed Forces Appropriations Act of 1971), any destruction plan that the Army prepares must be reviewed by DHHS, whose advisory responsibility and authority are normally thought of in terms of its public health and safety functions; DHHS also looks critically at the potential impacts of proposed projects.

3.9.1 Impacts of Alternatives A, B, and C. Onsite demilitarization using EDS and EDT has proven to be safe, effective, and efficient, and eliminates the hazard associated with continued storage. The risk to the public associated with transport of secondary waste to a TSDF is considered by DOT.

3.9.2 Impacts of No-Action Alternative D. If no action is taken, the potential risks posed by the longer storage of the targeted munitions remain until destroyed during PCAPP operations. Munitions have been safely stored at PCD since the 1960s, so the impact of continued storage of mustard-filled munitions to the work force and public is considered to be extremely small.

3.9.3 Site Safety Submission Document. A critical activity in obtaining approval for startup of the EDS/EDT is the submission and approval of a unit-specific SSSD.

Due to the fact that the accelerated EDT will be located in Munitions Storage Area A (adhering to the separation distance criteria defined in the Department of the Army Pamphlet [DA Pam] 385-61, *Toxic Chemical Agent Safety Standards*, December 2008; DA Pam 385-64, *Ammunition and Explosives Safety Standard*, December 1999; DoD 6055.9-STD, *DoD Ammunition and Explosive Safety Standards*, August 2009) and will be operated largely independent of PCAPP, a new SSSD will be required for the EDT (Bechtel 2009).

Approval of the EDS/EDT SSSD by the DDESB is a prerequisite to operating the treatment units. The SSSD approval process is extremely rigorous and requires numerous reviews by other government agencies and approval prior to submission to the DDESB.

3.9.4 Impacts of Accidents. Measures will be employed to reduce the potential for an accident during the construction and operation of a chemical agent munitions demilitarization facility at PCD. Additional measures will be in place to contain any contamination in the unlikely event that an accident involving agent should occur, and to clean up contaminated facilities and resources in the even more remote possibility that an accident should result in external contamination.

Measures to avoid a potential accident include: (1) intensive training of personnel in monitoring and assessing facility conditions, and in using proper operational and contingency procedures, (2) design of the facility to include many monitoring and fail-safe features to automatically shut down operations should abnormal conditions arise. In the event that an accident should occur during operations, redundant containment features (for example, multiple containment barriers and negative air pressure HVAC) will be designed into the facility to reduce the likelihood that agent could escape into the environment, and (3) if a release of agent were to occur, which involved a spill or down-wind deposition of agent, the Army has procedures, equipment,

and trained personnel in place for addressing the situation quickly to contain contamination and clean up affected areas.

The previously discussed measures will control and contain, within the facility, the foreseeable accident scenarios associated with demilitarization operations at PCD. The probability that an accident might involve offpost release of mustard agent is extremely low.

The analysis of hazards and accident scenarios in this EA is solely intended to provide potential impact from hypothetical accidents at PCD. As such, the accident analysis presented in this EA should not be considered a detailed safety assessment.

3.10 Noise

The Noise Control Act of 1972, along with its subsequent amendments (Quiet Communities Act of 1978, *United States Code*, Title 42, Parts 4901-4918), delegates to the states the authority to regulate environmental noise and directs government agencies to comply with local community noise statues and regulations. The state of Colorado has quantitative noise-limit regulations. The maximum permissible noise limits for the various classes of source areas under the Colorado Noise Abatement Law are listed in table 4.

The threshold of human hearing is, by definition, zero decibels (dB); background levels at a recording studio are, ideally, around 15 dB; conversational speech is around 60 to 65 dB at the location of the listener, and a jet takeoff can be in the 120 dB range at a distance of about 30 meters (100 feet) from the runway.

Sound typically occurs over a wide spectrum of frequencies. For many types of sound measurement, these frequencies are weighted (some count more, some count less) to determine the decibel level. The so-called “A-weighting” was developed to approximate the way in which the human ear responds to sound, and this weighting, expressed as dBA, applies to the values given in table 4.

Table 4. State of Colorado Regulations on Maximum Permissible Noise Levels

Maximum permissible noise level [dB(A)]:[a]		
Zone	7 a.m. to 7 p.m.	7 p.m. to next 7 a.m.
Residential	55	50
Commercial	60	55
Light Industrial	70	65
Industrial	80	75

Notes:

[a] At a distance of 25 feet or more from the property line, periodic, impulsive, or shrill noises are considered a public nuisance when such noises are at a level of 5 decibels using the A-weighted scale (dBA) less than those listed. For a period not to exceed 15 minutes in any one hour, the noise level may be exceeded by 10 dBA. Source: Colorado Revised Statutes, Title 25 on Health, Article 12-103 on Noise Abatement.

Source: Pueblo FEIS, 2002.

The EPA guideline recommends a day-night sound level of 55 dBA or less to protect the public from activity interference and annoyance in typically quiet outdoor and residential areas (PMCD 2002). Maintaining relatively continuous noise below this level also protects against hearing loss, although less stringent requirements are typically set for that purpose.

3.10.1 Impacts of Alternatives A, B, and C. Noise impacts from construction activities at the PCD EDS and EDT sites are expected to be minimal, due to noise dissipation from surrounding buildings and terrain, and distance from housing areas.

Based on the enclosed treatment chamber design of each system and additional structural enclosure of the EDS and EDT, operational noise impact is expected to be negligible to the surrounding environment.

Operators will be required to wear appropriate hearing protection when operating power generators, HVAC, and associated EDS and EDT mechanical equipment.

3.10.2 Impacts of No-Action Alternative D. Continued storage of mustard munitions has no noise impact on the environment. If no action is taken, sound levels will be expected to remain at their present low levels.

3.11 Energy Resources

3.11.1 Impacts of Alternatives A, B, and C. During construction, electrical power will be used for a variety of activities. The quantity of electrical power needed for construction cannot be estimated precisely, but it is expected that it will not exceed the existing capacity of the electrical distribution system.

Overhead power lines will be installed to connect existing power sources with the destruction facilities and the electrical system upgraded, as necessary. Buried electrical lines will only be run in small sections under fencing where needed to facilitate security. All utilities will be installed in accordance with PCD requirements.

Underground natural gas lines currently exist near the southeast corner of Munitions Storage Area A. The EDS does not utilize natural gas for operations; therefore, it is not expected that lines will be run to the EDS site. However, the EDT will require natural gas, and underground lines will be run, as needed, to support operational requirements.

No significant impact is expected from the installation or use of additional gas or electric lines.

3.11.2 Impacts of No-Action Alternative D. Under the No-Action Alternative, there will be no project-related changes to the existing electric or gas utilities. Upgrades to the PCD electrical distribution system that will be implemented under any of the treatment options will not be implemented under the No-Action Alternative.

4. CONCLUSIONS

The information and analyses presented in this EA indicate that no significant impacts will result from the proposed action as described in paragraph 2.1. There is no significant increase of impact to the environment when compared to the current mission of PCD. Implementation of appropriate health and safety measures will minimize the potential risk of exposure to hazardous materials for workers and the public.

An evaluation of the No-Action Alternative of continuing to store chemical agent munitions at PCD until PCAPP is operational concludes that no significant impacts will occur. However, the No-Action Alternative prevents the Army from meeting directives to maintain continued chemical agent munitions destruction until PCAPP comes on line.

Utilizing currently available technologies will destroy overpacked munitions that are currently in storage and will maintain continuity of U.S. chemical weapon destruction operations in the demilitarization plan for PCD.

Based on review of available previous environmental assessments and documentation and the considerations previously listed, there are no significant adverse environmental impacts of the proposed action.

APPENDIX A
ACRONYMS/ABBREVIATIONS

APPENDIX A
ACRONYMS/ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ACWA	Assembled Chemical Weapons Alternatives
AEC	U.S. Army Environmental Command
ANAD	Anniston Army Depot
ANCDF	Anniston Chemical Agent Disposal Facility
AR	Army Regulation
BGAD	Blue Grass Army Depot
BLM	Bureau of Land Management
CAA	Clean Air Act
CAC	Citizens' Advisory Commission
CCR	Code of Colorado Regulations
CDNR	Colorado Department of Natural Resources
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CLA	Chemical Limited Area
CMA	U.S. Army Chemical Materials Agency
CO	carbon monoxide
CWA	Clean Water Act
CWC	Chemical Weapons Convention
DA Pam	Department of the Army Pamphlet
DAVINCH	Detonation of Ammunition in Vacuum Integrated Chamber
dB	decibels
dBA	decibels using the A-weighted scale
DCD	Deseret Chemical Depot
DDESB	Department of Defense Explosives Safety Board

DHHS	U.S. Department of Health and Human Services
DoD	Department of Defense
DOT	Department of Transportation
DRE	destruction removal efficiency
EA	Environmental Assessment
ECF	Entry Control Facility
EDS	Explosive Destruction System
EDT	Explosive Destruction Technology
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
HD	distilled sulfur mustard
HT	mustard-T
HVAC	heating, ventilation, and air conditioning
ICRMP	Integrated Cultural Resources Management Plan
ID	induced draft
INRMP	Integrated Natural Resources Management Plan
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NEW	net explosive weight
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council

OSD	Office of the Secretary of Defense
OTS	Off-gas Treatment System
PAS	pollution abatement system
Pb	lead
PCAPP	Pueblo Chemical Agent-Destruction Pilot Plant
PCD	Pueblo Chemical Depot
PL	public law
PM	Program Manager
PM_{10}	particulate matter less than 10 microns in size
PMCD	Program Manager for Chemical Demilitarization
RCRA	Resource Conservation and Recovery Act
SCC	secondary combustion chamber
SDC	Static Detonation Chamber
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SSSD	Site Safety Submission Document
STEL	short-term exposure limit
TDC	Transportable Detonation Chamber
TNT	trinitrotoluene
TOCDF	Tooele Chemical Agent Disposal Facility
TSDF	treatment, storage, and disposal facility
USAE ACWA	U.S. Army Element Assembled Chemical Weapons Alternatives
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
VX	O-ethyl S-(2-diisopropylaminoethyl)methylphosphonothioate

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APPENDIX B
REFERENCE FIGURES

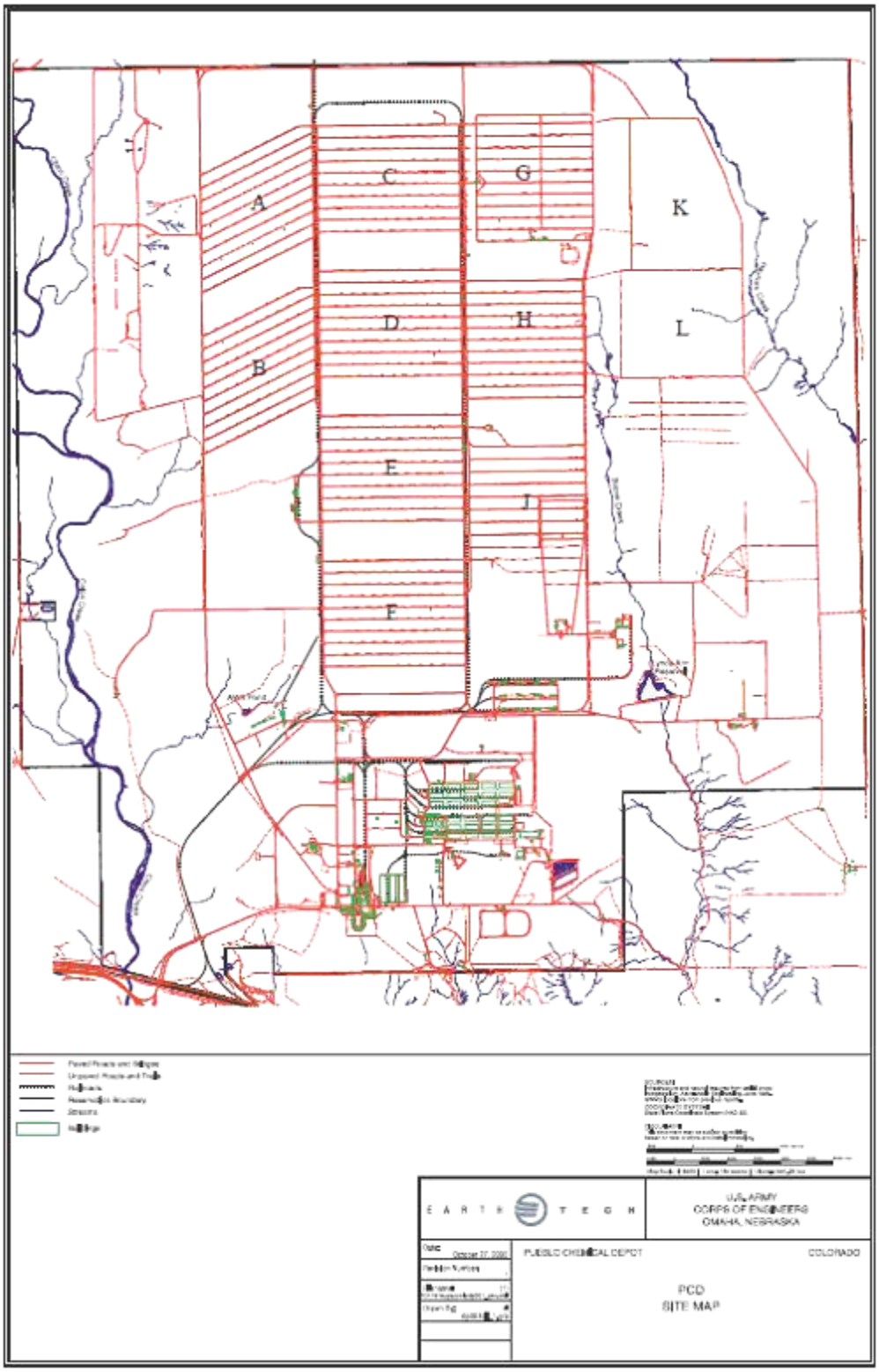
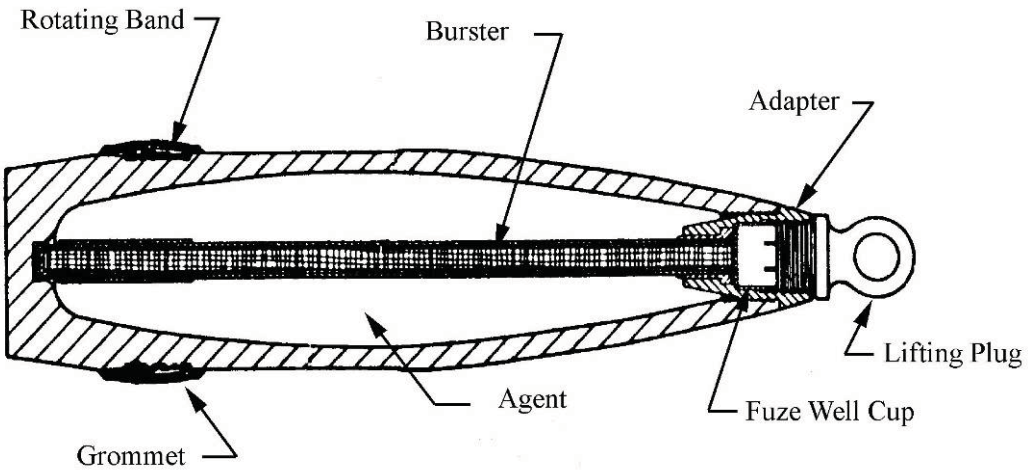
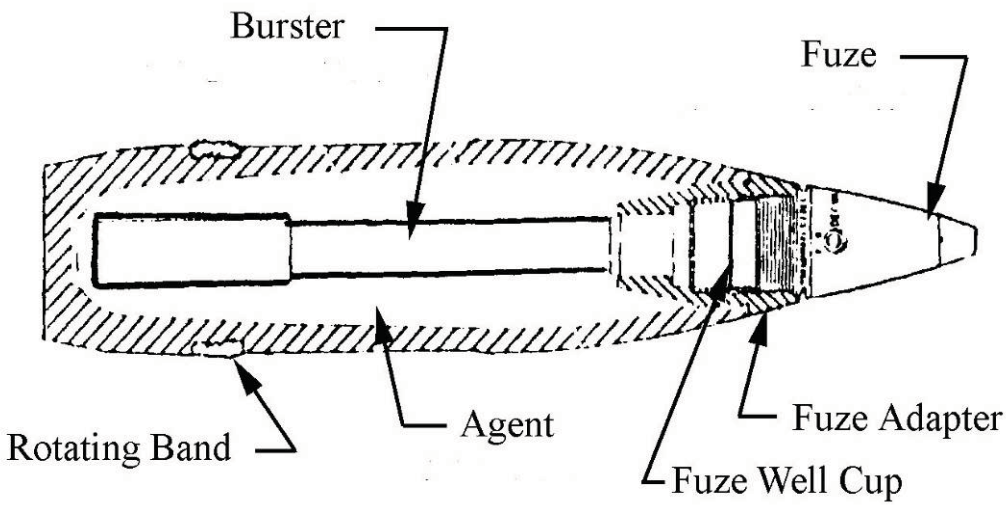


Figure B-1. Pueblo Chemical Depot (PCD)



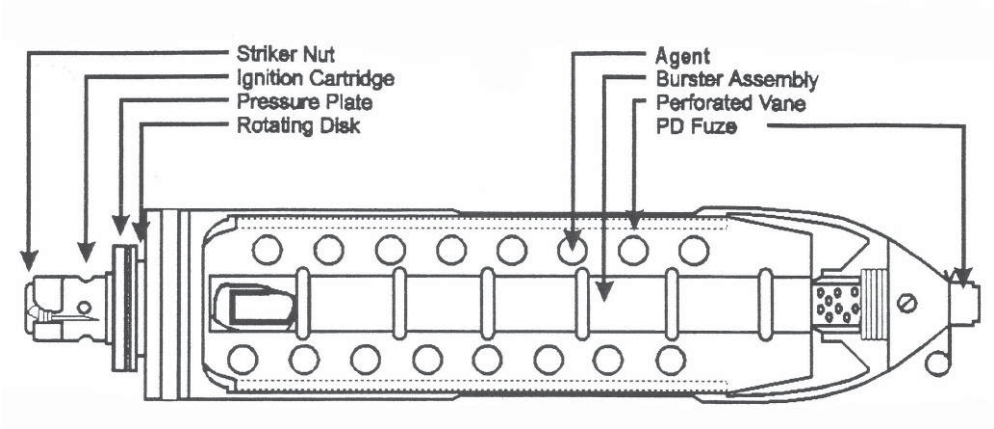
	M110
Length	26.8 in
Diameter	155mm
Total weight	94.6 lb
Agent	HD
Agent weight	11.7 lb
Burster	M6
Explosive	Tetrytol
Explosive weight	0.41 lb

Figure B-2. 155mm Projectile



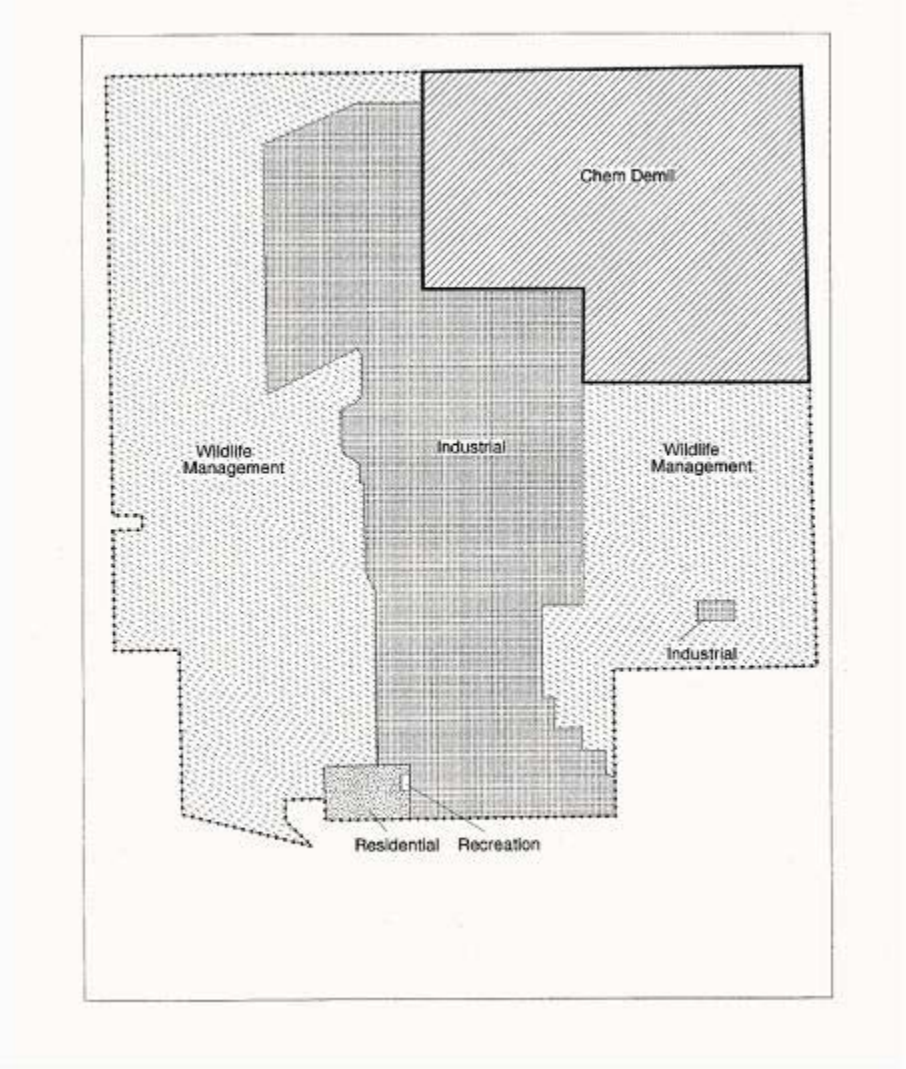
	M60 Cartridge
Length	31.1 in
Diameter	105mm
Total weight	42.9 lb
Agent	HD
Agent weight	3.0 lb
Burster	M5
Explosive	Tetrytol
Explosive weight	0.26 lb

Figure B-3. 105mm Projectile



	M2A1	M2
Length	21 in	21 in
Diameter	4.2 in	4.2 in
Total weight	25 lb	25 lb
Agent	HD	HT
Agent weight	6.0 lb	5.8 lb
Burster	M8	M8
Explosive	Tetryl	Tetryl
Explosive weight	0.14 lb	0.14 lb

Figure B-4. 4.2-inch Mortar



Source: Pueblo FEIS, 2002

Figure B-5. Land Use Areas at PCD

Source: http://www.sandia.gov/news-center/news-releases/2005/all/bio-EDS.html

Figure B-6. Explosive Destruction System

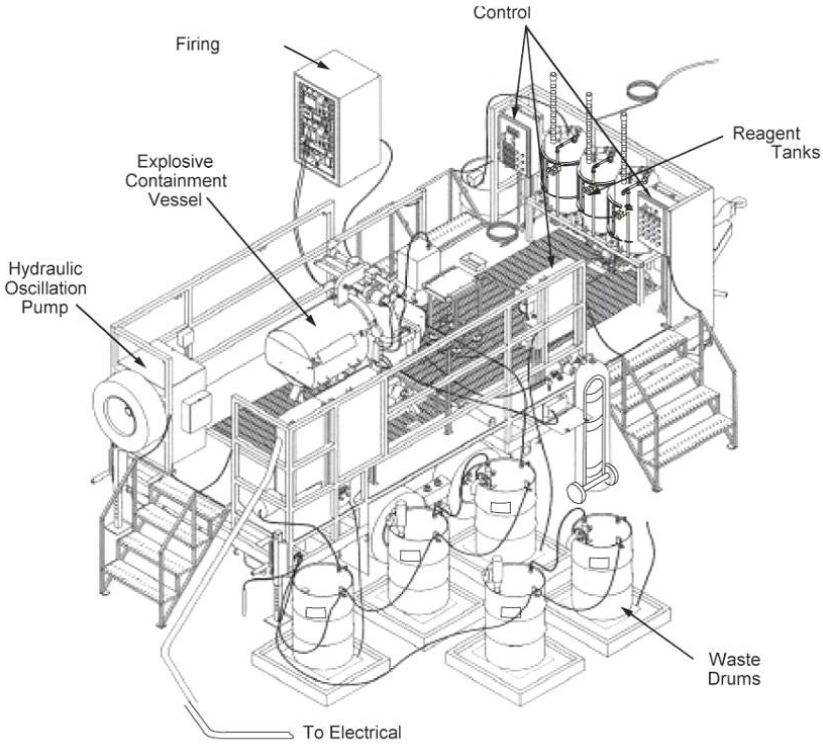


Figure B-7. Major Components of the EDS

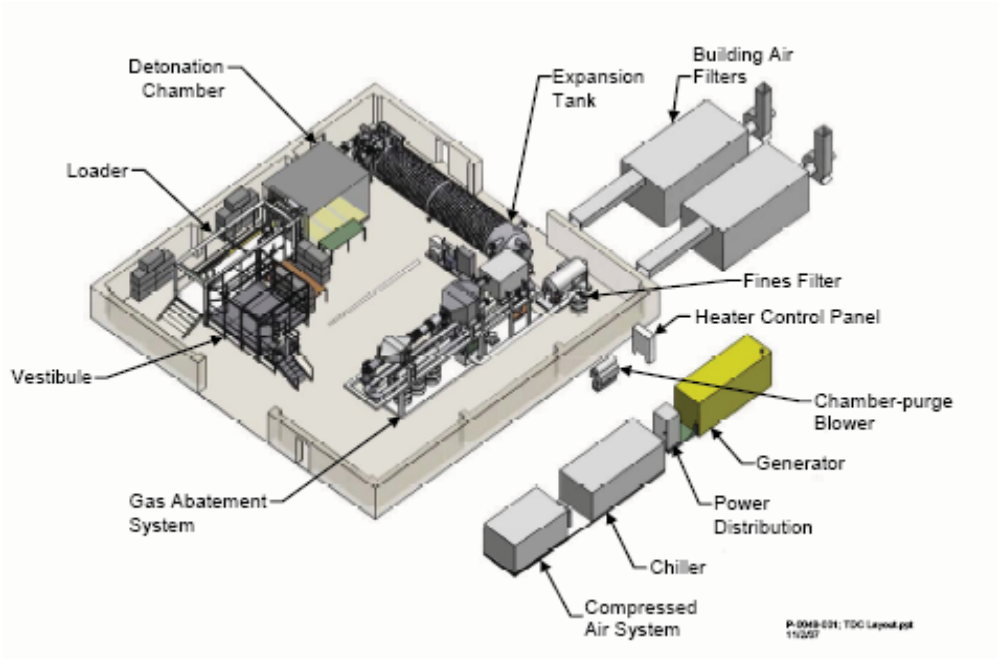


Figure B-8. Diagram of the Transportable Detonation Chamber (TDC) Unit

Source: Surrogate Test for M55 Nerve Agent Rocket Mortar by DAVINCH: Ryusuke Kitamura, Masaya Ueda and Joseph Kiyoshi Asahina; Kobe Steel, Ltd

Figure B-9. DAVINCH

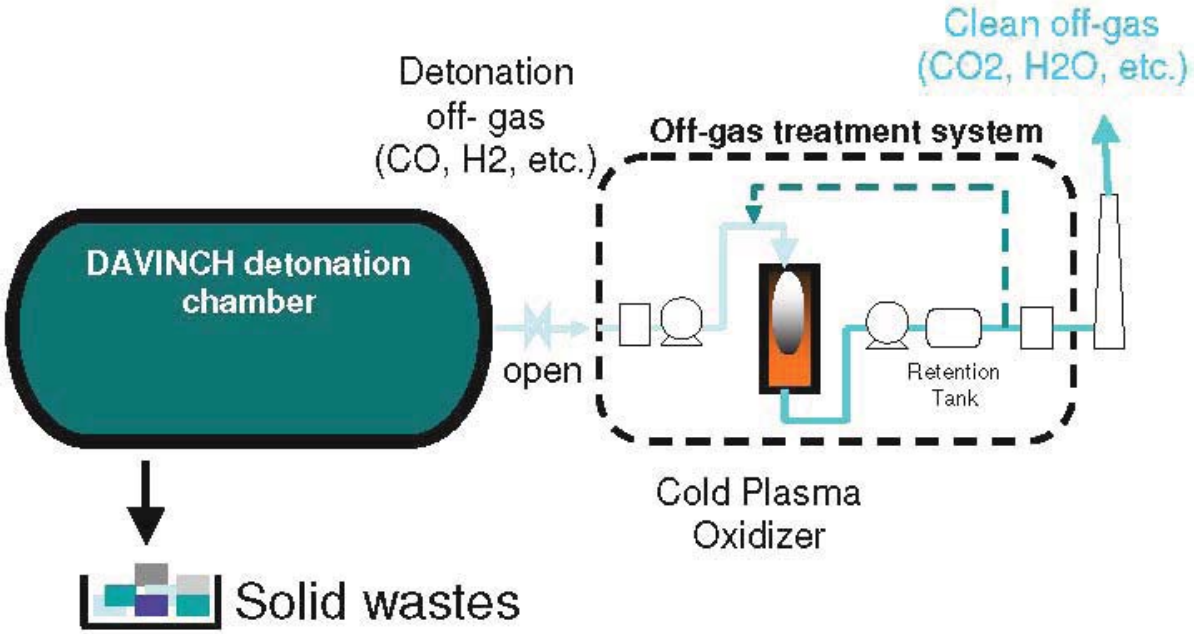


Figure B-10. DAVINCH System

Source: http://www.army-technology.com/contractors/mines/dynasafe/dynasafe4.html

Figure B-11. Static Detonation Chamber (SDC)

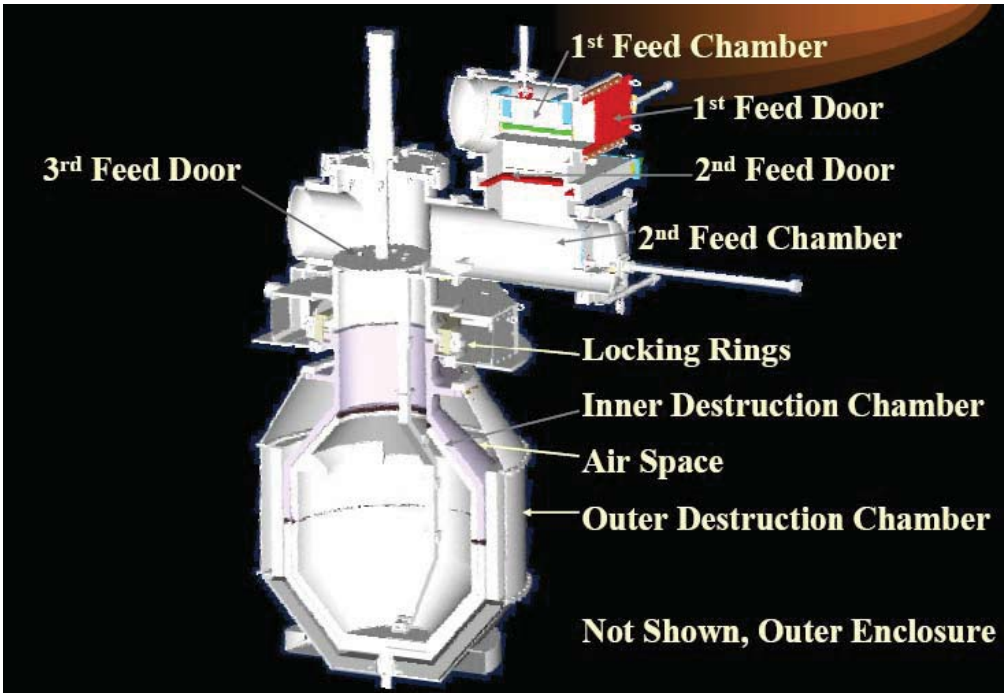


Figure B-12. Cross Section of the SDC

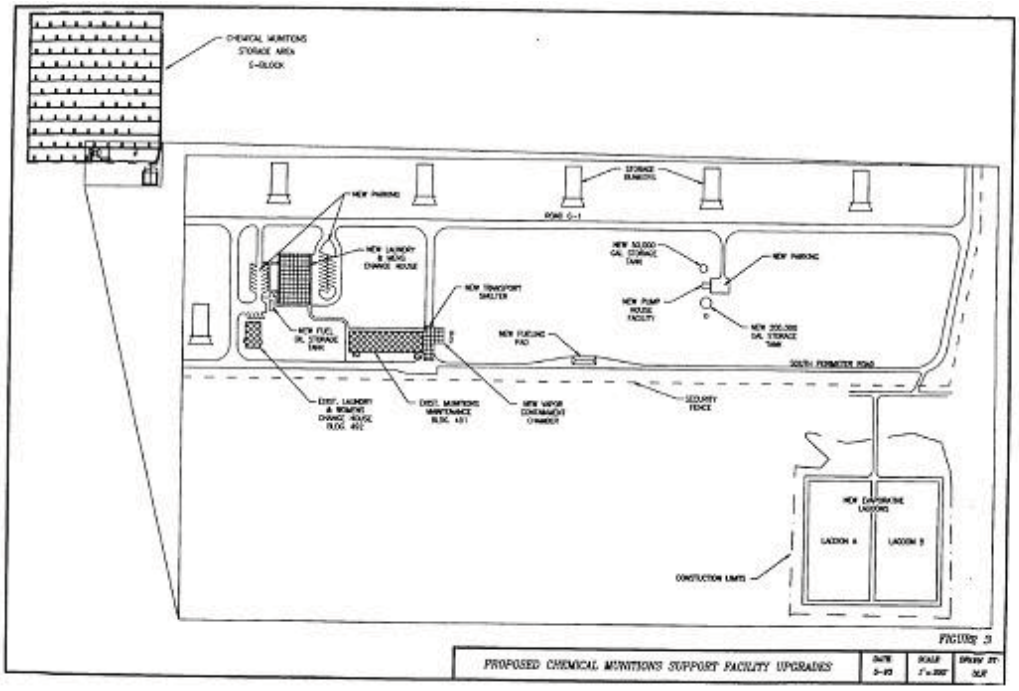


Figure B-13. Reference Map (EA Chemical Munitions Support Facility, 1993)

(Note: Some of these structures may be used for EDT.)

Figure B-14. Proposed Siting for EDS and EDT (proposed locations in yellow)

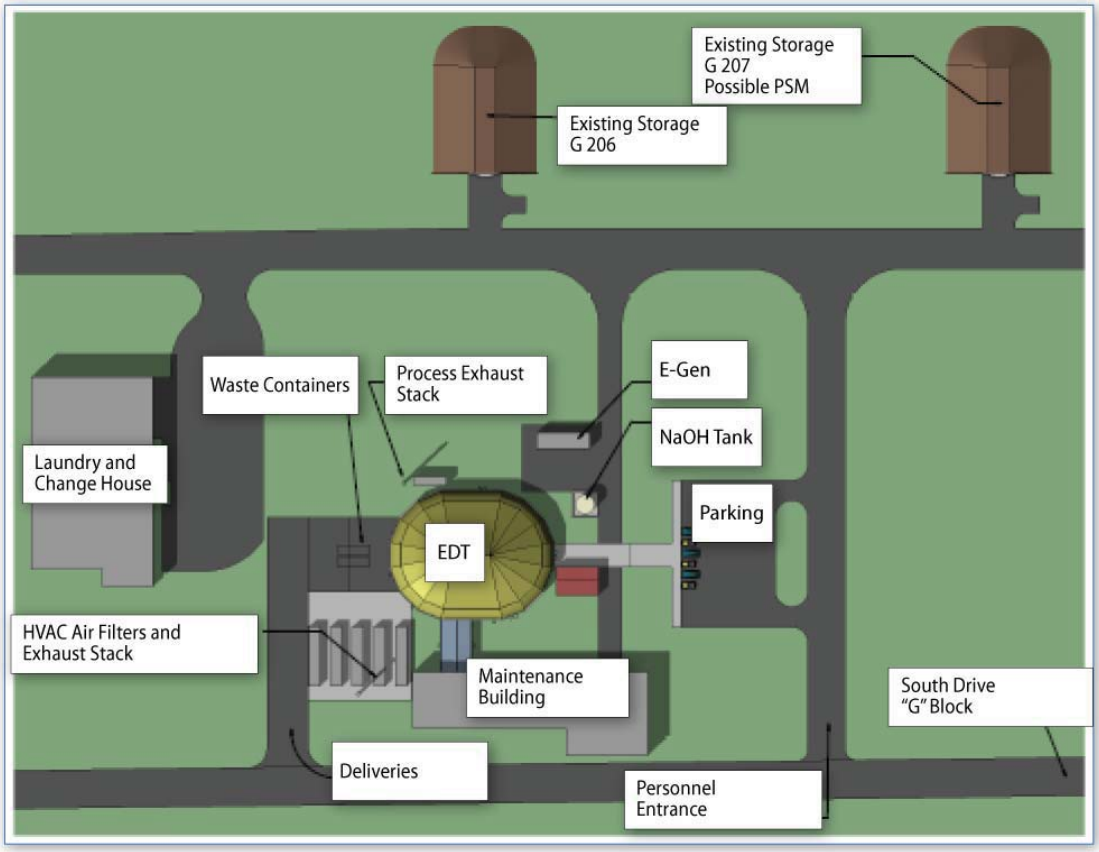
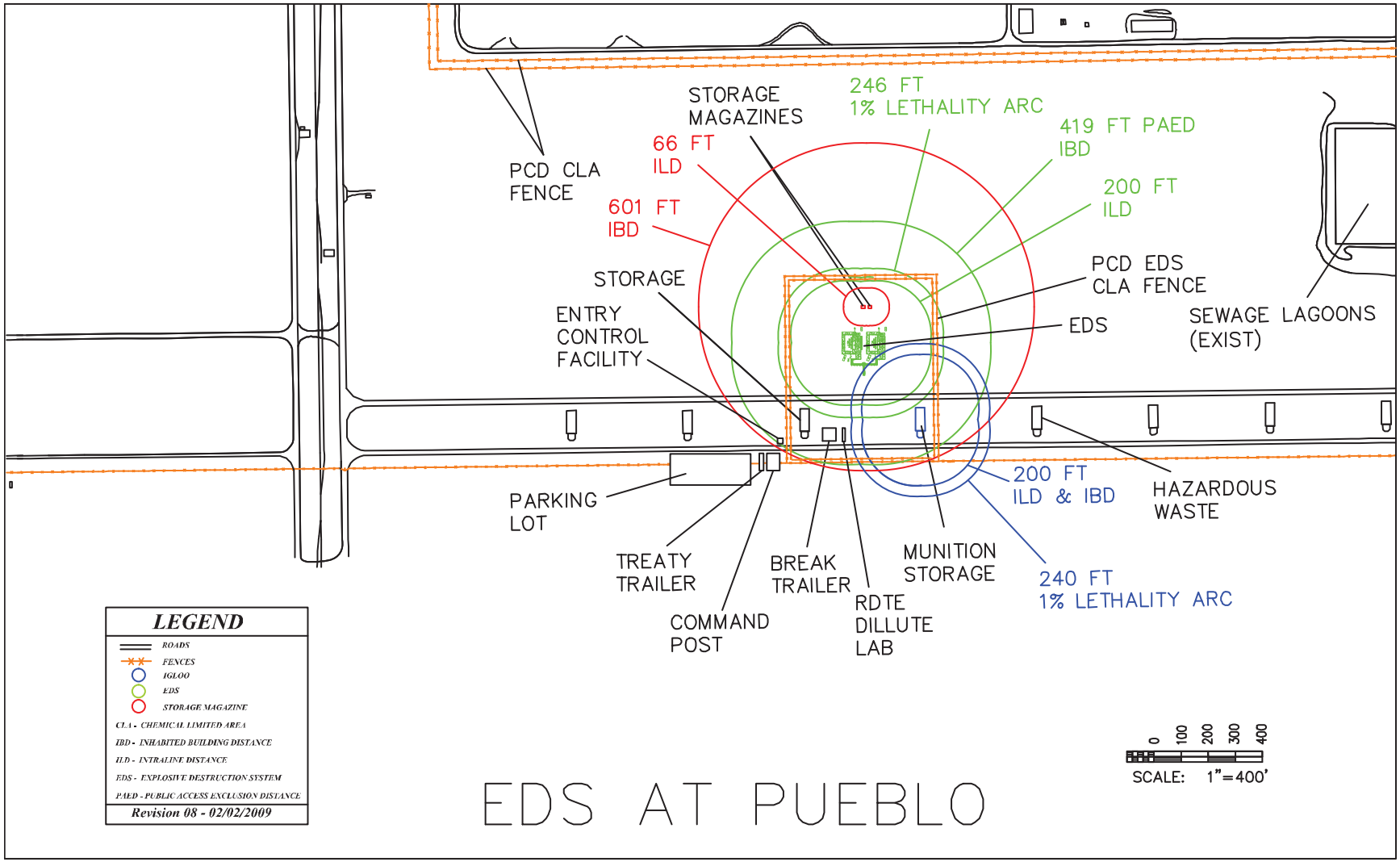


Figure B-15. EDT Site Layout (concept drawing)



Source: Steve Bird, PCD.

Figure B-16. EDS Site Plan

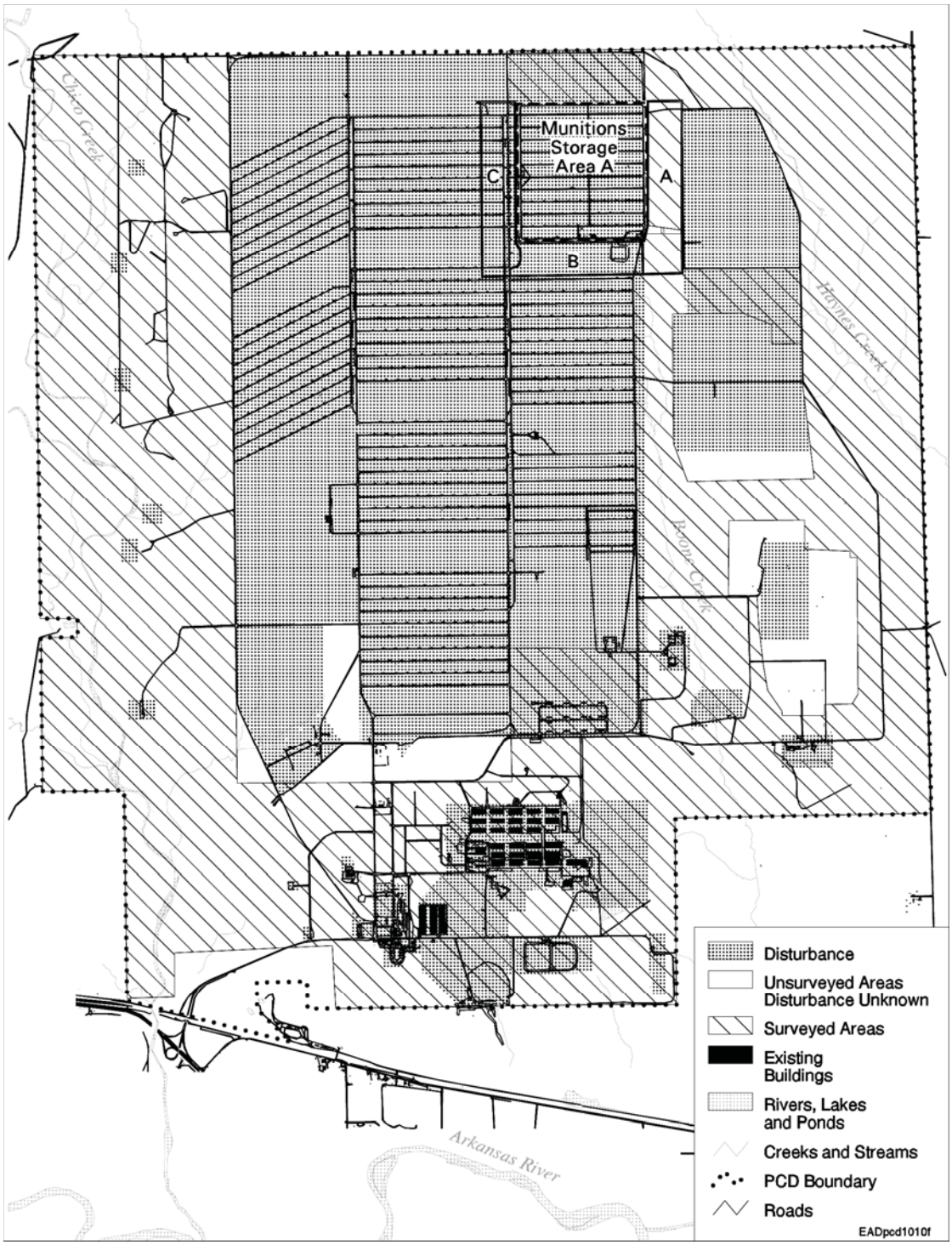


Figure B-17. Disturbed and Surveyed Areas of PCD

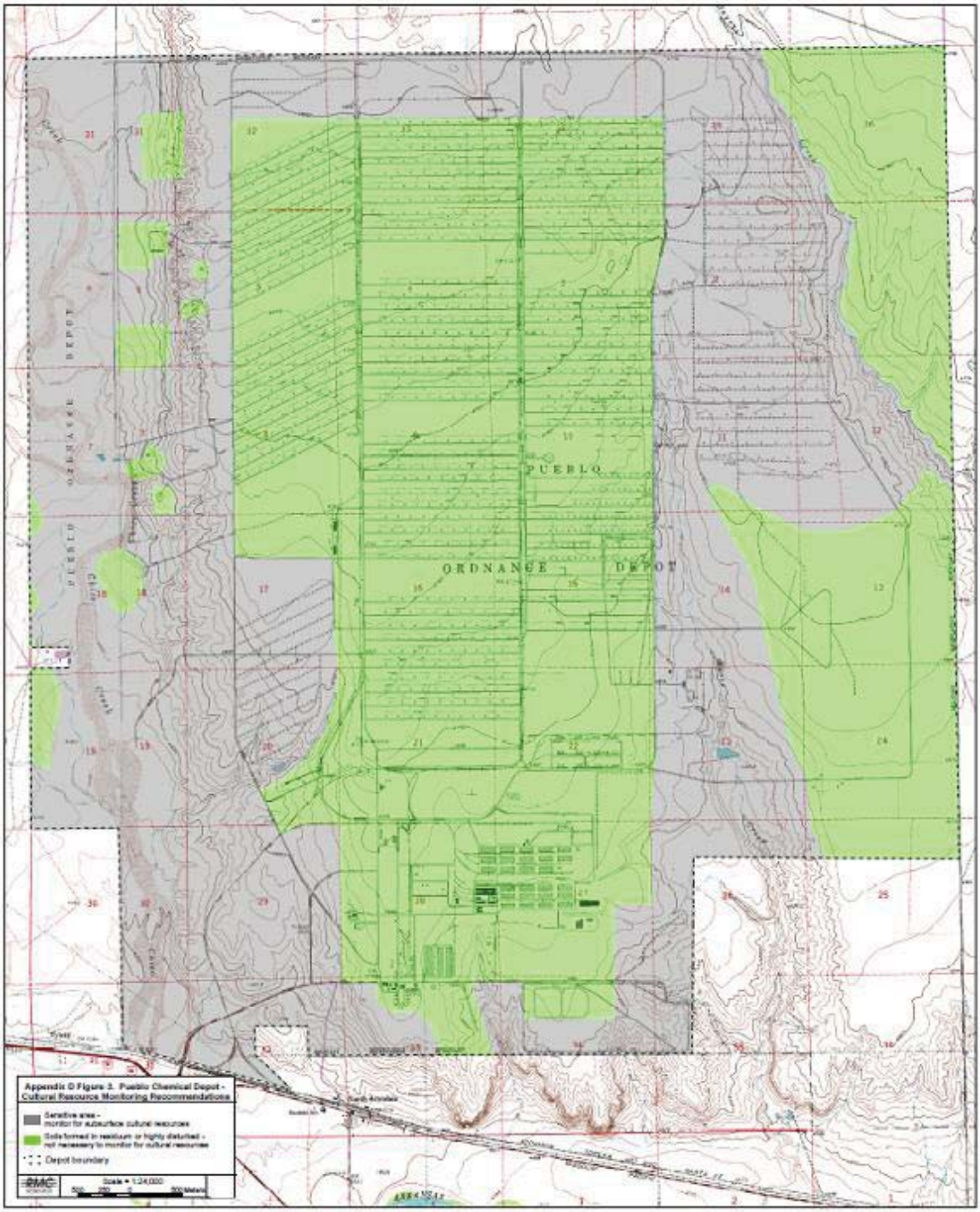


Figure B-18. Cultural Resources Monitoring Areas of PCD

OFFICE *of* ARCHAEOLOGY *and* HISTORIC PRESERVATION

19 January 2010 CHS #56288

Kathryn R. Cain
Chief, Environmental Management Office
US Army Chemical Materials Agency
Pueblo Chemical Depot, Building 1
45825 Highway 96 East
Pueblo, CO 81006-9330

RE: Installation and Operation of Chemical Weapons Demolition Facilities, Pueblo Chemical Depot, Pueblo County

Dear Ms. Cain:

Thank you for your recent correspondence dated 8 January 2010, concerning the proposed construction of two chemical weapon destruction facilities at the Pueblo Chemical Depot. Our office has reviewed the submitted materials. One facility will be constructed in the southern portion of G-Block, while the other will be situated between G- and H-Blocks. We concur with your assessment that the proposed project will have no adverse effect on historic properties at the Depot.

If you have any questions, please contact Joseph Saldibar, Architectural Services Manager, at (303) 866-3741.

Sincerely,

Edward C. Nichols
State Historic Preservation Officer, and
President, Colorado Historical Society

OFFICE OF ARCHAEOLOGY AND HISTORIC PRESERVATION
303-866-3392 * Fax 303-866-2711 * E-mail: oahp@chs.state.co.us * Internet: www.coloradohistory-oahp.org

- 1 -

COLORADO HISTORICAL SOCIETY
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Figure B-19. State Historic Preservation Officer Correspondence

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APPENDIX C
REFERENCES

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REFERENCES

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