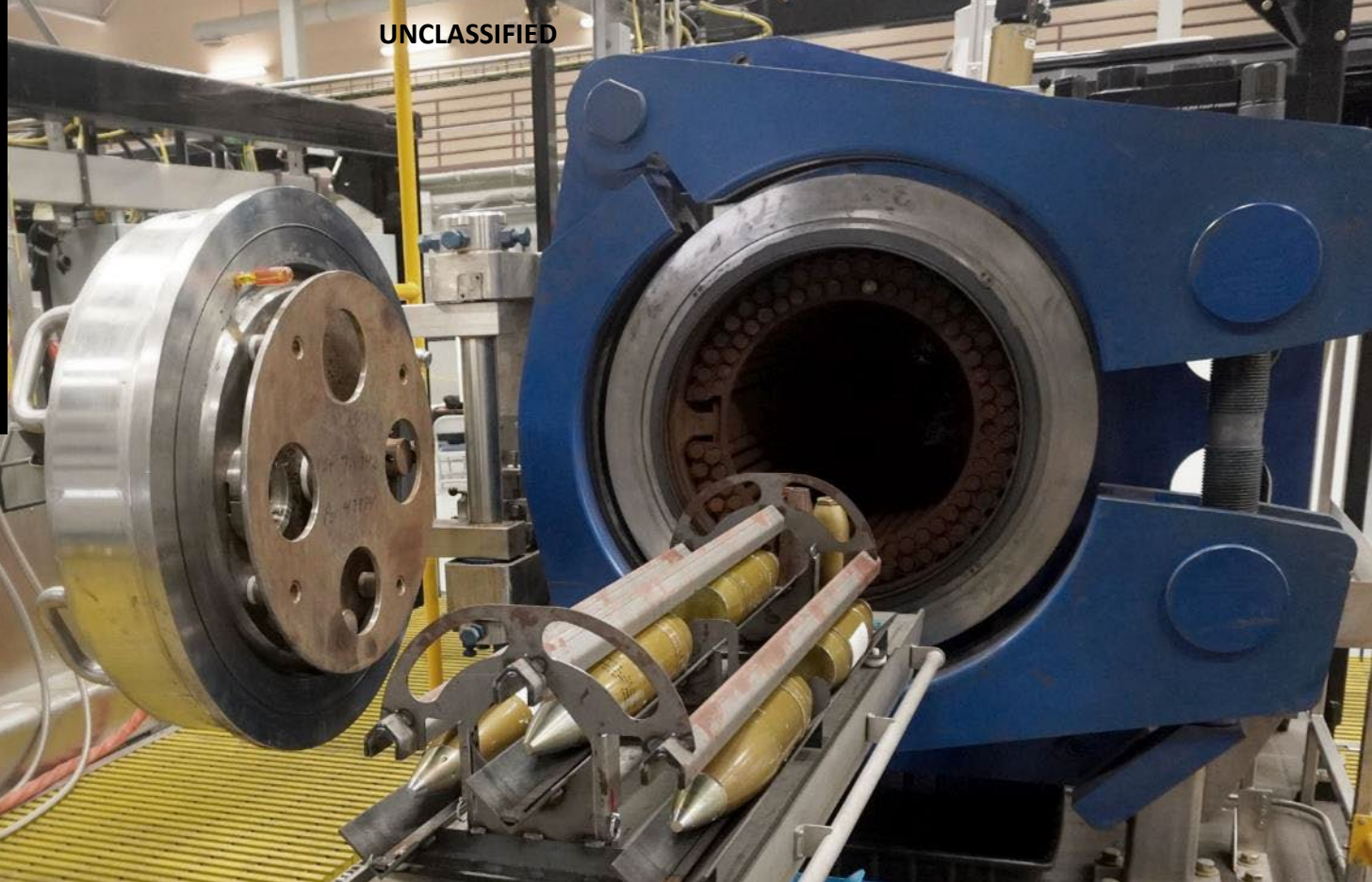


UNCLASSIFIED



**U.S. ARMY**



**Dr. Candace Rock**  
Chemical Materials Activity  
Director, Recovered Chemical Materiel  
June 25, 2025

Distribution Statement A: Approved for public release. Distribution unlimited.

UNCLASSIFIED





# Chemical Materials Activity Overview

## The U.S. Army Chemical Materials Activity (CMA)

- Supports continued compliance with the international Chemical Weapons Convention treaty,
- Assesses and destroys recovered chemical warfare materiel, and
- Nation's knowledge base and expertise for safe and secure chemical weapons stockpile storage and emergency preparedness







During the early part of the 20th century, chemical agents and munitions were tested and later disposed of on active military installations – usually by burial.

In 1997, the United States ratified the Chemical Weapons Convention (CWC), the international treaty requiring the destruction of all stockpiled chemical weapons, declared recovered chemical warfare materiel (RCWM), and former chemical weapons production facilities.

RCWM is most often encountered during range-clearing operations and environmental remediation efforts on active military installations and formerly used defense sites.





# Burial Pits





U.S. ARMY

# Examples of Recovered Items



Distribution Statement A: Approved for public release. Distribution unlimited.







U.S. ARMY

# CMA Mission

AMC FUNDING



## COMPLY

### ENDURING MISSION

#### Chemical Weapons Convention (CWC)

- AR 525-92 establishes CMA Director as Army Chemical Treaty Implementing Agent for Chemical Weapons Convention (CWC)
- Develop and maintain challenge/visit operation plans, education and training plans; maintain readiness for challenge inspection
- Review CWC declarability of RCWM: prepare declarations
- Provide guidance/participate in inspections at Schedule 1 facilities (Single Small-Scale Facility, Aberdeen Proving Ground, MD and Protective Purposes Production Facility, Fort Leonard Wood, MO) and annual reviews/inspections of RCWM
- Maintain accredited OPCW laboratory and develop documentation required by the OPCW



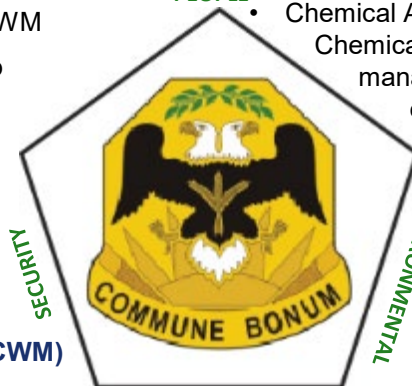
## STORE

### EVOLVING MISSION

#### Materiel Management

- Secure storage of RCWM including chemical accountability, maintenance and transportation
- Responsible for Chemical Accountability Management Information Network, CAMIN, in compliance with U.S. Army regulations and CWC treaty that oversees destruction of chemical agent
- Maintain National Inventory Control Point, centralized policy and procedures for inventory control of the U.S CW stockpile to include transport and packaging
- Chemical Ammunition Surveillance Office (CASO) / Redstone Chemical Activity (RCA) expertise at Redstone Arsenal for management of RCWM and munitions and explosives of concern (MEC), as well as miscellaneous investigative derived wastes

PEOPLE



SAFETY

DOD DEFENSE-WIDE FUNDING



## ASSESS & DESTROY

### ENDURING MISSION

#### Recovered Chemical Warfare Materiel (RCWM)

- Assessment and destruction support for:
  - Unexpected RCWM recoveries (explosives/munitions emergencies (CONUS))
  - RCWM recovered at environmental remediation burial locations (planned CONUS missions)
- Continued Research, Development, Test and Evaluation (RDT&E) of technologies to assess and destroy RCWM
- Support to Combatant Commands (reimbursable funding)



## PROTECT

### ENDING MISSION

#### Chemical Stockpile Emergency Preparedness Program (CSEPP)

- Protect civilian population on and off post
- Joint administration w/Federal Emergency Management Agency (FEMA)
- Sustained preparedness in Kentucky (CO complete 13 Feb 24)
- Joint Army/State/County preparedness
- Exercises and planning, and integration of technology
- Emergency Operations Centers





# Overview of Mission

## RCWM Program Mission Statement

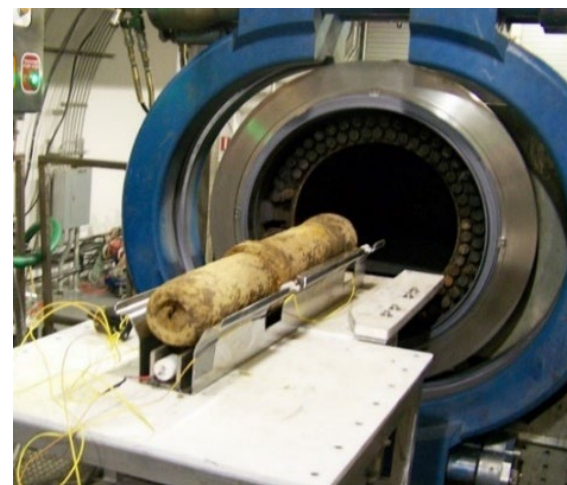
To achieve a comprehensive, coordinated, effective, protective, and environmentally compliant enterprise-based approach to the recovery, assessment, and destruction of RCWM.



Recovery



Assessment



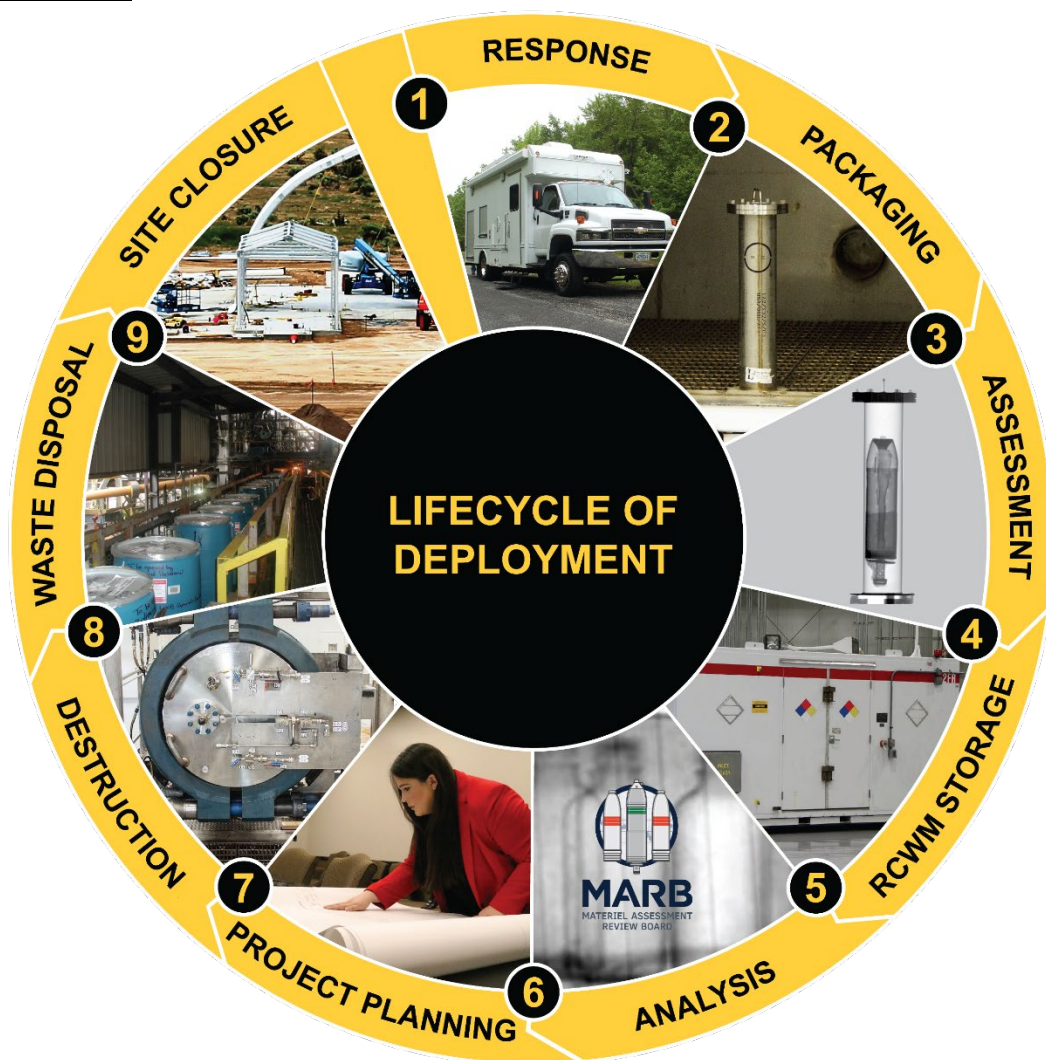
Destruction





U.S. ARMY

# Lifecycle of Deployment



- 1 RESPONSE**  
RCMD deploys the Mobile Munitions Assessment System (MMAS) to assess items with an unknown liquid fill
- 2 PACKAGING**  
Items overpacked by CBRNE Analytical and Remediation Activity (CARA)
- 3 ASSESSMENT**  
Items assessed using Digital Radiography and Computed Tomography (DRCT), Portable Isotopic Neutron Spectroscopy (PINS) or Raman Spectrometry
- 4 RCWM STORAGE**  
Recovered Chemical Warfare Materiel (RCWM) items stored in an interim holding facility or in an igloo, if available
- 5 ANALYSIS**  
Materiel Assessment Review Board (MARB) convenes to determine the chemical fill, explosive configuration and recommended disposition
- 6 PROJECT PLANNING**  
RCMD coordinates with state and federal regulators and other stakeholders; prepares destruction plans
- 7 DESTRUCTION**  
Systems such as the Explosive Destruction System (EDS) destroy recovered chemical munitions; the Single CAIS Access and Neutralization System destroys Chemical Agent Identification Set (CAIS) bottles
- 8 WASTE DISPOSAL**  
Waste shipped to permitted treatment, storage and disposal facility (TSDF)
- 9 SITE CLOSURE**  
Site closed in accordance with all local, state and federal regulations and permit requirements and international treaty standards

Distribution Statement A: Approved for public release. Distribution unlimited.

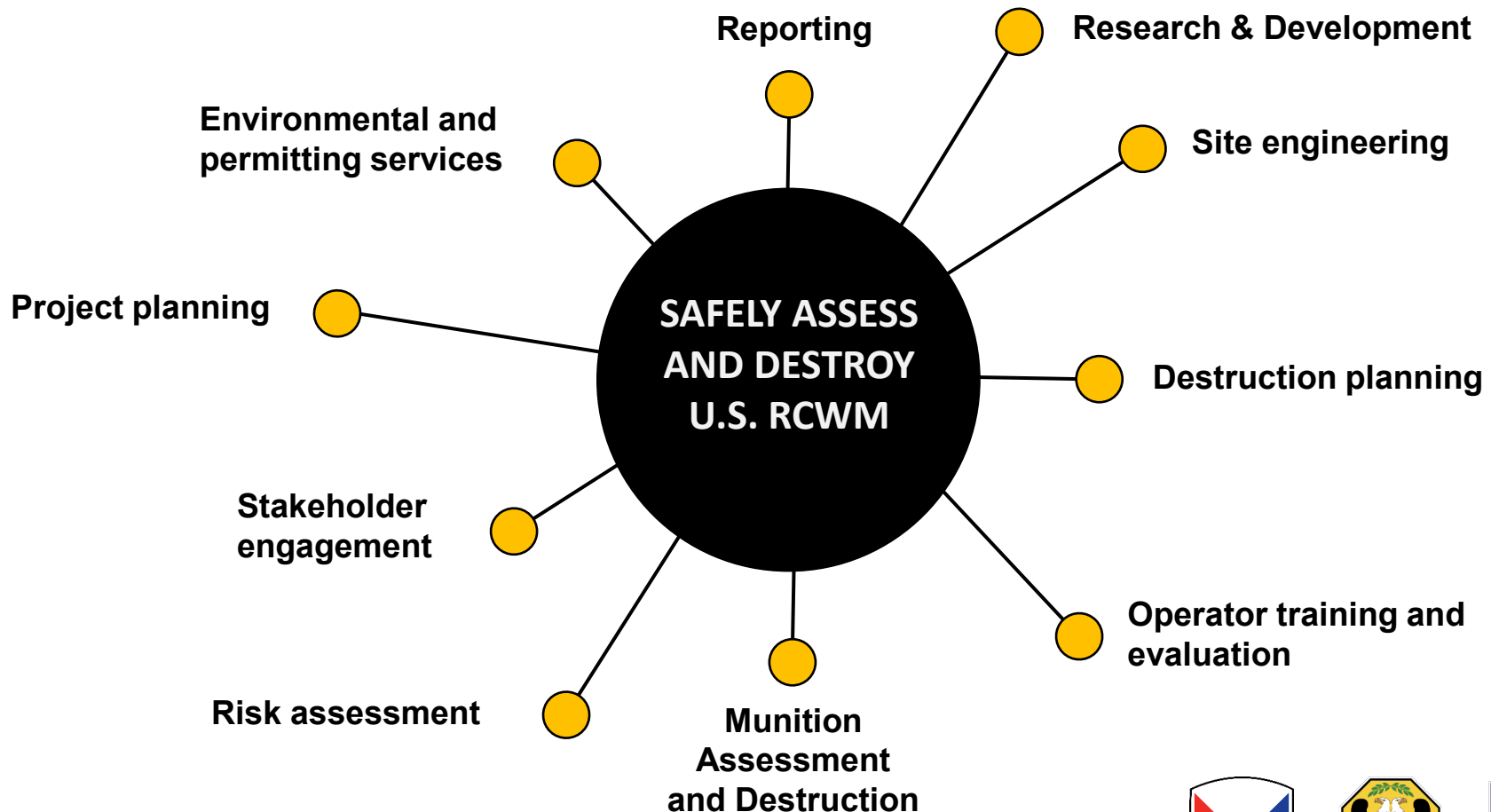






# Required Deployment Support-RCWM Program

RCMD possesses the programmatic, logistic, subject matter and project management expertise to successfully complete any RCWM operation.



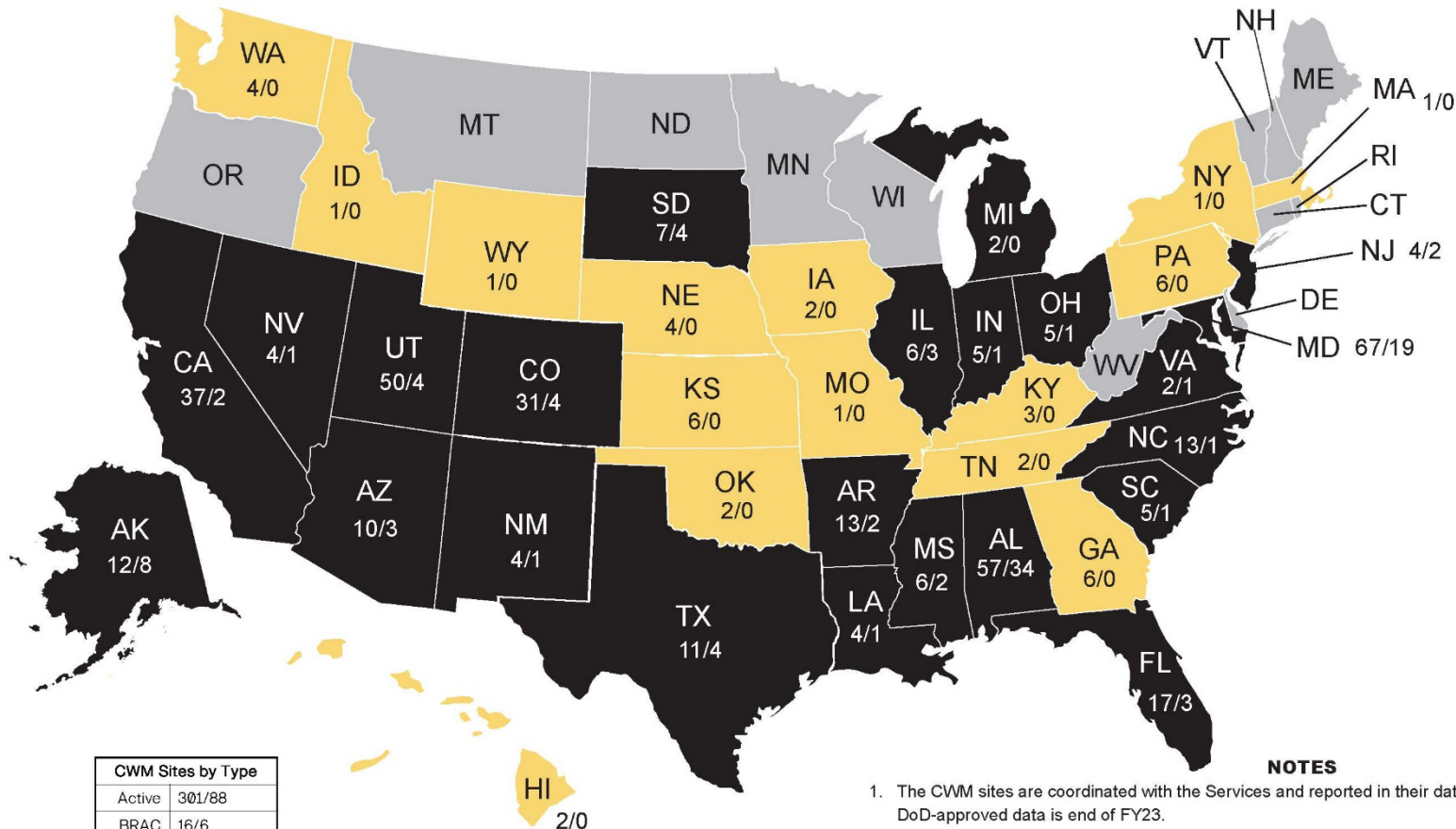
Distribution Statement A: Approved for public release. Distribution unlimited.





U.S. ARMY

# CWM Site Inventory



CWM Sites by Type	
Active	301/88
BRAC	16/6
FUDS	104/11
Total	421/105

## KEY

Site counts for each state indicate: Total CWM sites/CWM sites with future work required

States with CWM site(s) with future work planned as of EOY FY 2023

States with CWM site(s) but no future work planned

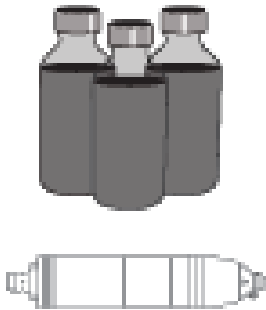
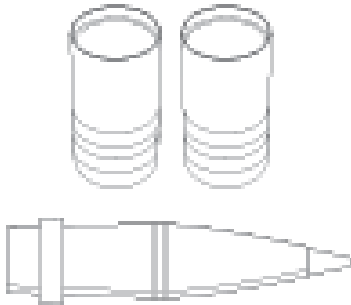

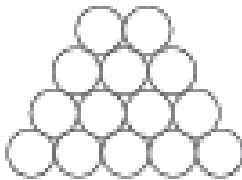
States without CWM sites

## NOTES

1. The CWM sites are coordinated with the Services and reported in their databases of record. The latest DoD-approved data is end of FY23.
2. CMA works with the DoD Services' environmental program managers and updates the site inventory annually.
3. There are no known CWM sites in Delaware, but CWM recovered by commercial fishing operations is brought to shore, packaged, and transported to Dover Air Force Base for safe storage, assessment, and destruction.
4. CWM sites in the Northern Marianas Islands (Guam) (2/1), U.S. Virgin Islands (1/0), and Washington, D.C. (4/1) are not depicted on this map.



# RCMD Achievements

DESTROYED MORE THAN <b>16,800</b>	DESTROYED MORE THAN <b>315,000</b>	DESTROYED <b>10</b>	DECONTAMINATED AND DESTROYED OR RECYCLED <b>7,824</b>
MUNITIONS, CAIS AND OTHER CWM TO DATE	MORE THAN 57,000 DRUMS OF BINARY CHEMICALS AND MORE THAN 258,000 155MM BINARY PROJECTILE BODIES	CHEMICAL WEAPONS PRODUCTION FACILITIES IN FIVE STATES AL, AR, CO, MD, IN	TON CONTAINERS IN MD, AR, UT
			







U.S. ARMY

# Response



## MMAS

**Mobile Munitions Assessment System (MMAS)** provides analysis of recovered items with unknown fills.

Travels anywhere in the United States where RCWM are found

Equipment carried on the MMAS rapidly identifies the contents and condition of recovered items

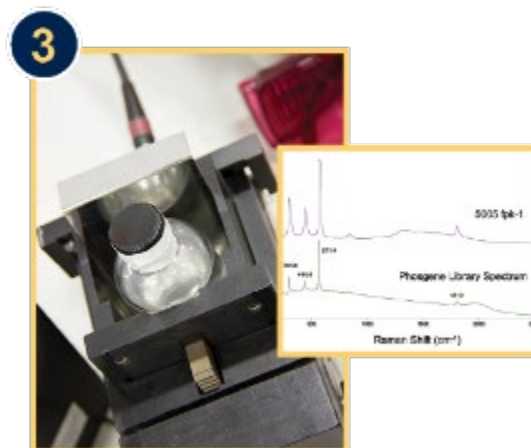
Serves as command center, equipment storage and weather monitoring center



**DRCT**



**PINS**



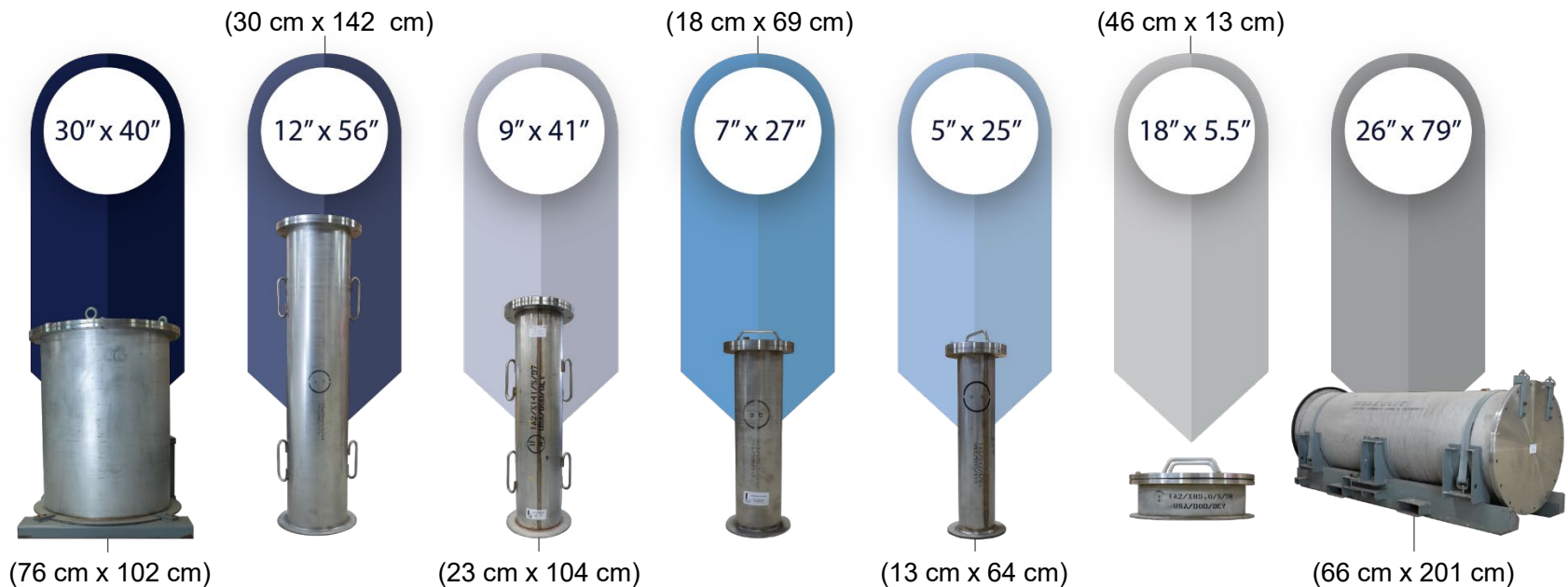
**Raman Spectrometer**





# Packaging

- Suspect items are placed into a Multiple Round Container (MRC) for safe storage and possible transport to await final disposition
- RCMD designed and approved by Department of Transportation for off-site transport of CWM
- Seven different MRCs designed for safe storage and transport of CWM





# Assessment

Digital Radiography and Computed Tomography System (DRCT) uses X-ray technology to produce high-quality images of an item's interior to determine if it contains a liquid fill and its explosive configuration.



## DRCT

Distribution Statement A: Approved for public release. Distribution unlimited.

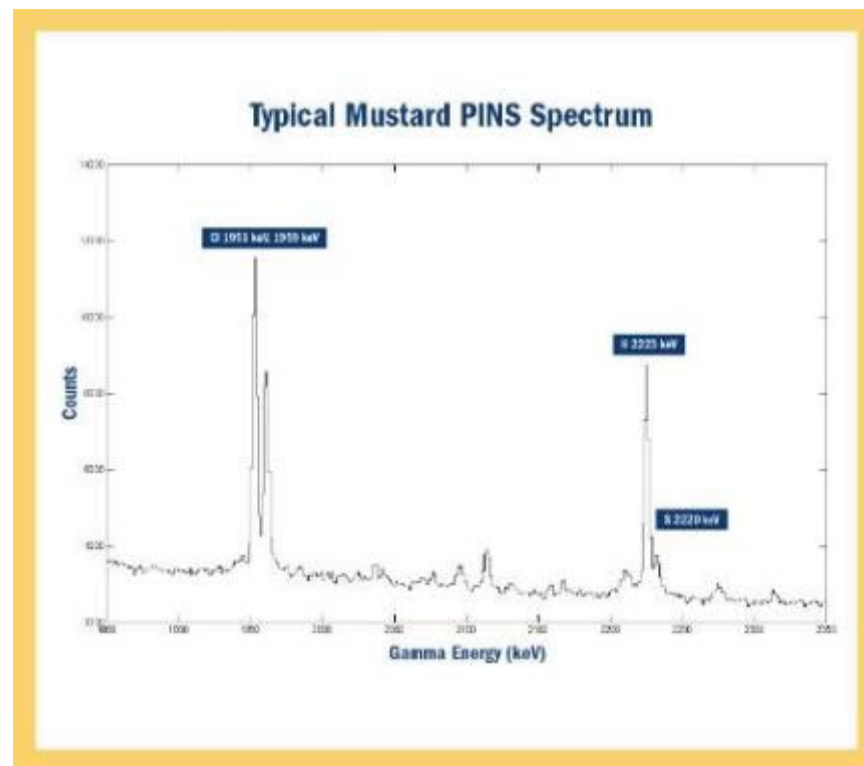






# Assessment

Portable Isotopic Neutron Spectroscopy (PINS) accurately detects presence of chemical elements using neutron particles to produce unique energy spectrum emitted by chemicals inside munition.





# RCWM Storage

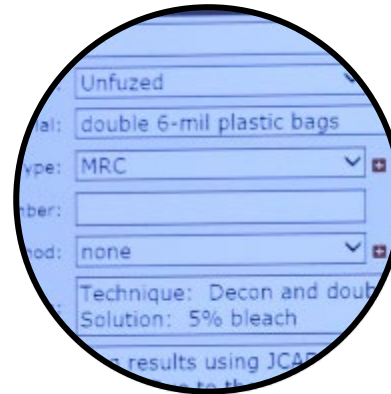
Interim Holding Facility (IHF) provides safe, temporary storage for RCWM at sites where storage facilities, such as igloos and bunkers are not available.





# Analysis

- January 1995: U.S. Army Materiel Command established the Materiel Assessment Review Board (MARB) as recognized authority for Army regarding identification of the fill in recovered items
- MARB comprised of permanent voting members as well as non-voting and ad-hoc members who are subject matter experts in chemical warfare materiel
- RCMD manages the MARB database







# Destruction

RCMD maintains and deploys proven neutralization technologies to safely destroy recovered chemical warfare materiel



**EXPLOSIVE DESTRUCTION SYSTEM (EDS)**



**SINGLE CAIS ACCESS AND NEUTRALIZATION SYSTEM (SCANS)**





# EDS Evolution

**PHASE 1, UNIT 1**



**PHASE 1, UNIT 2, 3**



**PHASE 2**



**EDS Phase 1:** Weighs 33,800 lbs. with an explosive rating of 1.5 lbs. (TNT Equivalent)

**EDS Phase 2:** Weighs 57,300 lbs. with an explosive rating of 4.8 lbs.

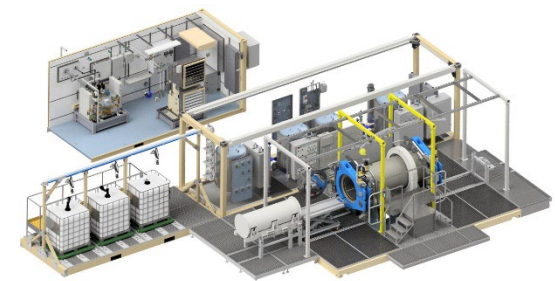
**PHASE 2 RETROFIT**



**PHASE 2A**



**Phase 3 - developmental**



**EDS Phase 2 Retrofit (P2R):** Weighs 57,300 lbs. with an explosive rating of 9.0 lbs.

**Phase 2A:** Weighs 86,000 lbs. with an explosive rating of 9.0 lbs.

**EDS P3:** Weighs 110,000 lbs. with an explosive rating of 24.0 lbs. Approximately twice the internal volume of the P2 vessel and double doors provide capability to treat large chemical bombs and allow greater throughput of smaller RCWM.

Distribution Statement A: Approved for public release. Distribution unlimited.

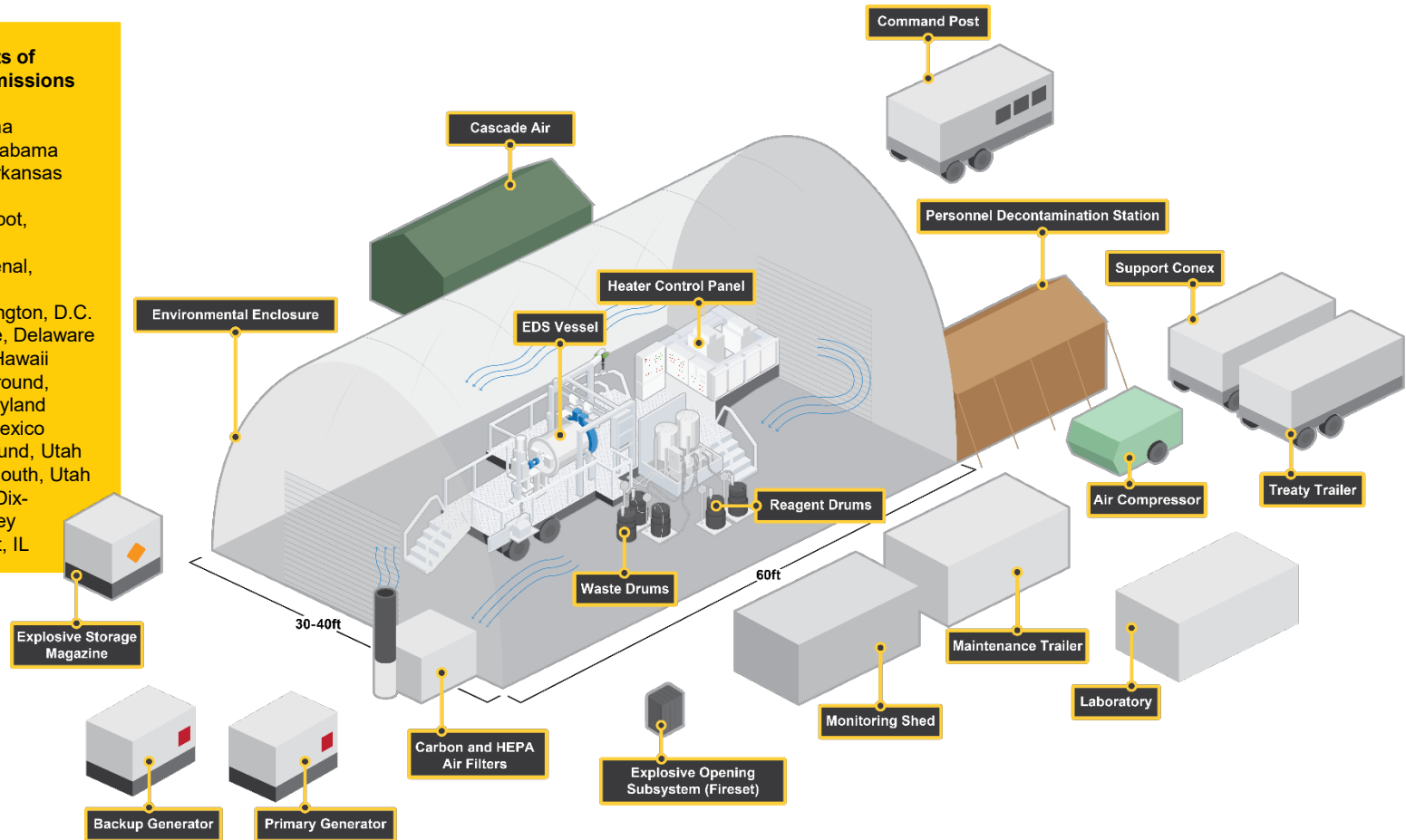




# EDS Site Layout

**As of July 2024, highlights of successfully completed missions include:**

- Camp Sibert, Alabama
- Redstone Arsenal, Alabama
- Pine Bluff Arsenal, Arkansas
- Livermore, California
- Pueblo Chemical Depot, Colorado
- Rocky Mountain Arsenal, Colorado
- Spring Valley, Washington, D.C.
- Dover Air Force Base, Delaware
- Schofield Barracks, Hawaii
- Aberdeen Proving Ground, Edgewood Area, Maryland
- Albuquerque, New Mexico
- Dugway Proving Ground, Utah
- Tooele Army Depot South, Utah
- Joint Base McGuire-Dix-Lakehurst, New Jersey
- Savanna Army Depot, IL

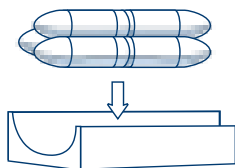




# Destruction

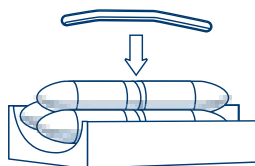
## EDS Process

### Before



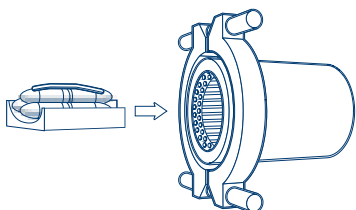
#### STEP 1

Operators place up to six items in munition holder.



#### STEP 2

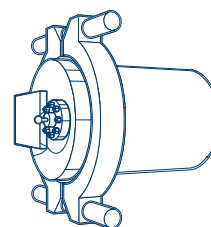
Linear-shaped charges are attached along the munition(s).



#### STEP 3

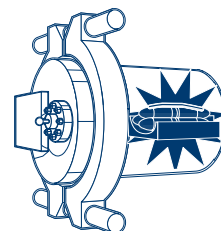
Operators slide the holder into the vessel.

### During



#### STEP 4

Operators attach electrical components, vessel is closed and sealed, and a leak test is performed.



#### STEP 5

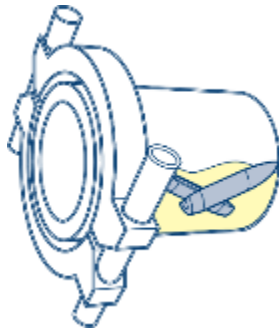
Operators remotely detonate the linear-shaped charges to access the munition(s) and chemical fill, while eliminating any explosive hazard.



# Destruction

## EDS Process

### During



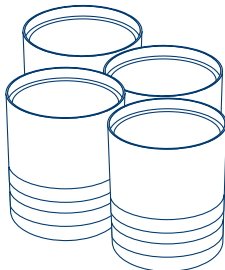
#### STEP 6

Once neutralization chemicals are added, the vessel is heated, if needed.

#### STEP 7

The vessel is rotated to mix the contents and neutralize the chemical fill.

### After



#### STEP 8

Liquid waste is drained; solid waste is sealed in drums and sent offsite for processing at an approved facility.



# Post-Destruction Images







# RCMD Treaty Obligations

The U.S. Army Arms Control Implementation Policy AR 525-92 establishes the CMA Director as the Army Implementing Agent for the CWC.

- CTIC manages all implementation and compliance
- RCMD is responsible for all RCWM operations





# RCMD Treaty Obligations

Moment of  
recovery

1

Assessment/  
Analysis (MARB)

2

Declarability  
decided

3

OPCW must receive destruction start  
date notification 30 days before first day  
of a declared item's destruction (FDDID)  
(CTIC requests 60 days before)

4

CTIC requests to be notified  
of any operation change  
affecting a declared item

5



Distribution Statement A: Approved for public release. Distribution unlimited.



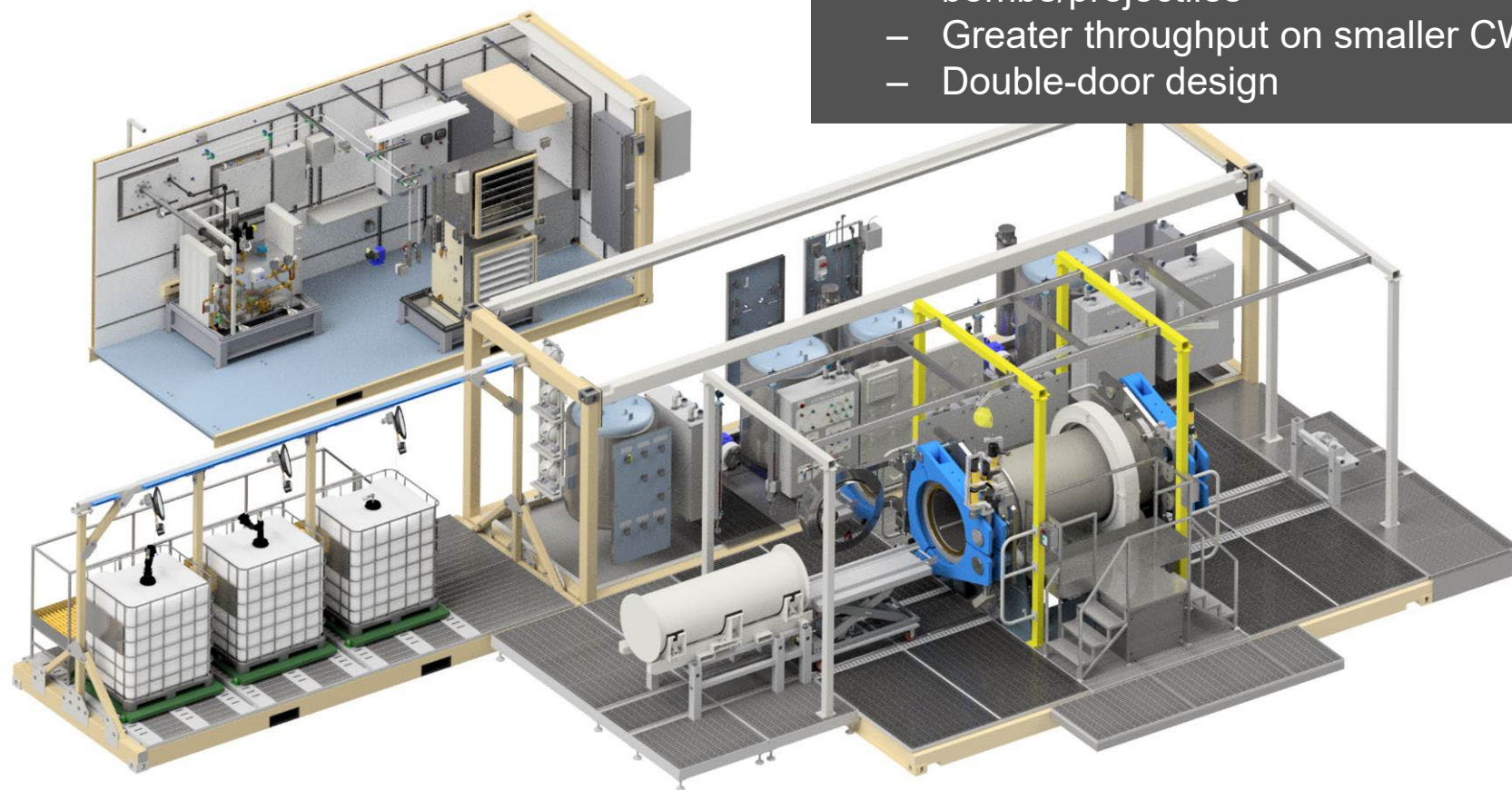


U.S. ARMY

# RDT&E – EDS P3

**Twice the internal volume of the P2**

- Designed to treat larger bombs/projectiles
- Greater throughput on smaller CWM
- Double-door design



Distribution Statement A: Approved for public release. Distribution unlimited.



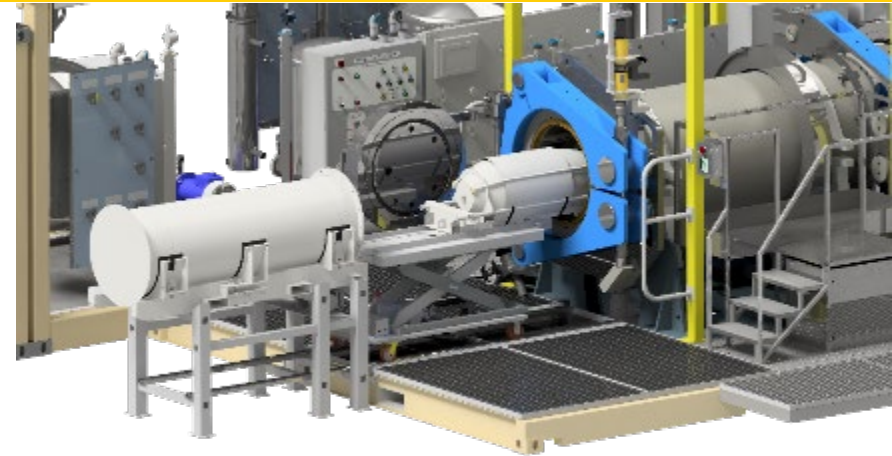




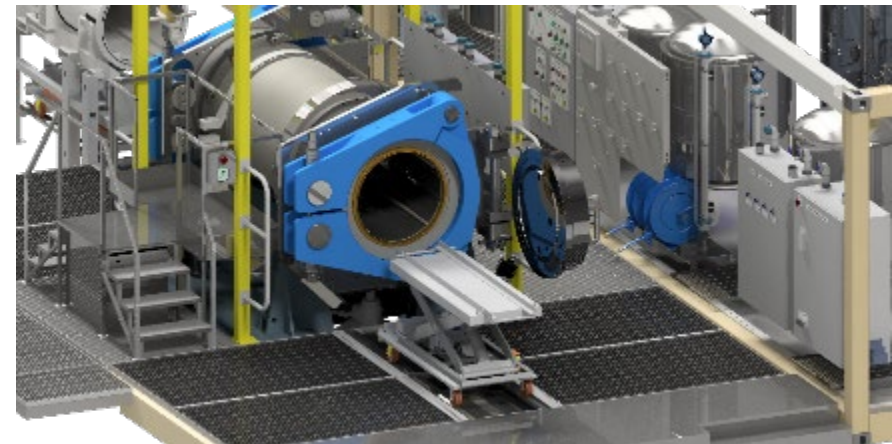
# RDT&E – EDS P3

## Front and rear doors

- Allow loading/unloading from both ends
- Reduce processing time
- Facilitate debris removal/vessel decontamination



**Front Door**



**Rear Door**





# Research and Development

## EDS Phase 3 Vessel (24 lbs TNT Eq)



**Suspect M79 bomb**

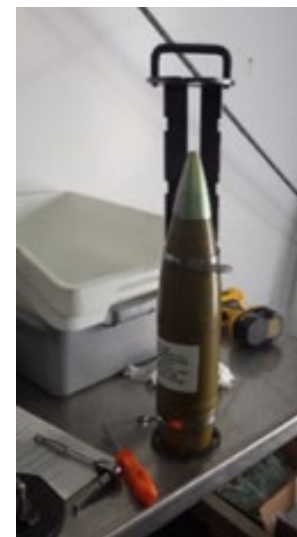
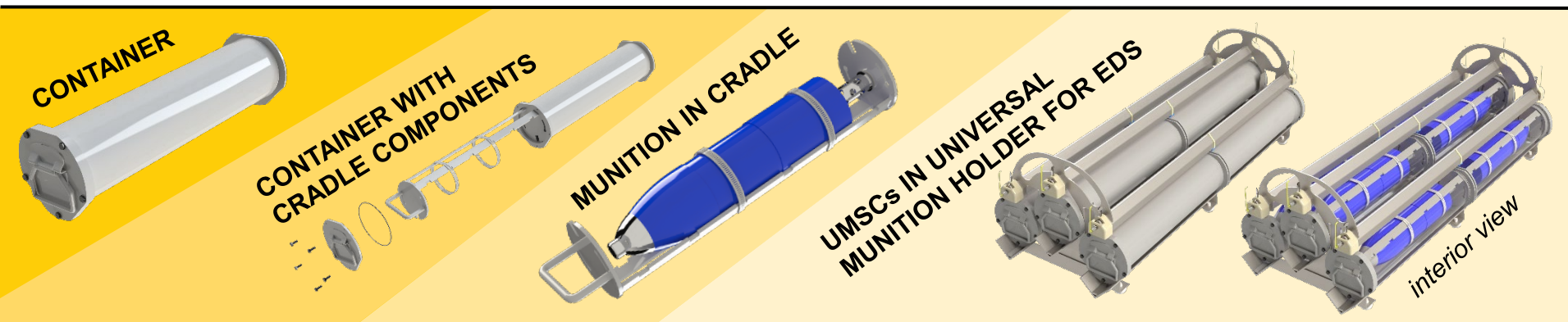






UNCLASSIFIED

# RDT&E – Universal Munition Storage Container (UMSC)



Distribution Statement A: Approved for public release. Distribution unlimited.

UNCLASSIFIED

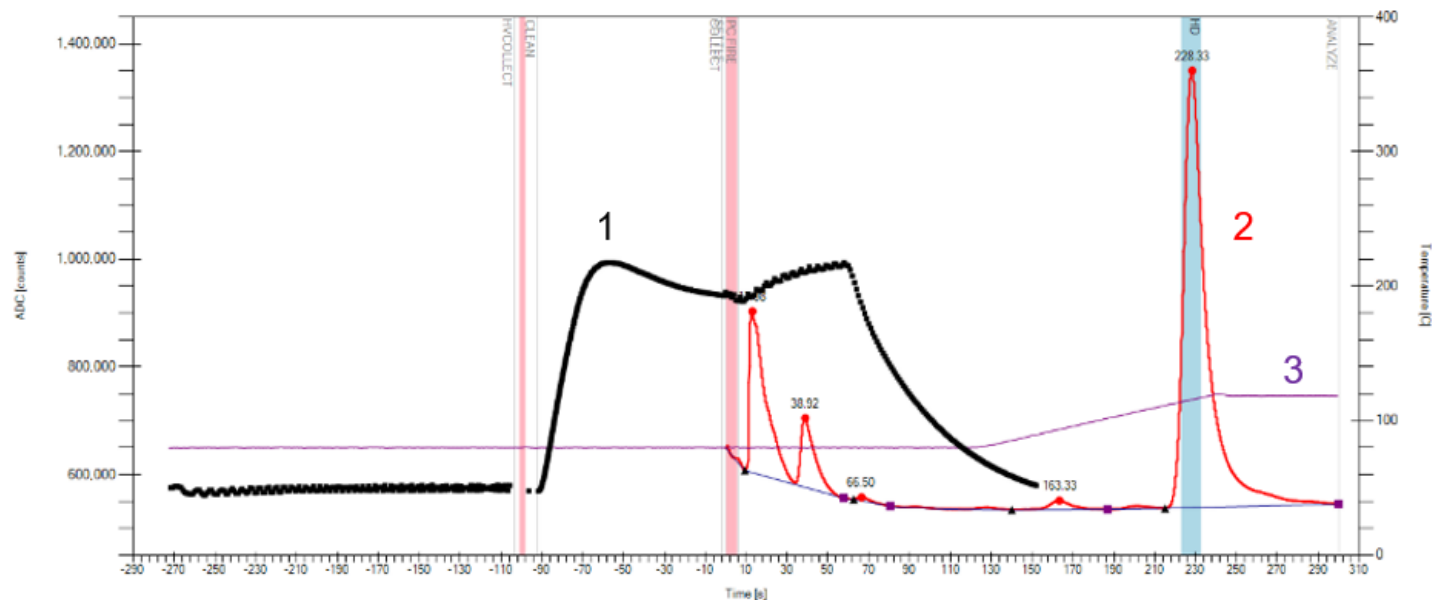






UNCLASSIFIED

# RDT&E – Vapor Monitoring System



Distribution Statement A: Approved for public release. Distribution unlimited.

UNCLASSIFIED





# Logistics & Maintenance



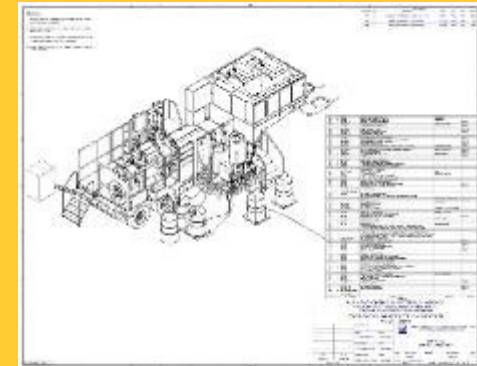
Equipment procurement  
and maintenance



Spare parts and  
consumables



Workforce  
training



Technical drawings  
and manuals





## RCWM Program Needs

---

# Predictable and Consistent Funding







# Questions?

Dr. Candace Rock  
Chemical Materials Activity  
Director, Recovered Chemical Materiel  
[candace.a.rock.civ@army.mil](mailto:candace.a.rock.civ@army.mil)

Sarah West Lobos  
Chemical Materials Activity  
Public Affairs Officer  
[sarah.w.lobos.civ@army.mil](mailto:sarah.w.lobos.civ@army.mil)



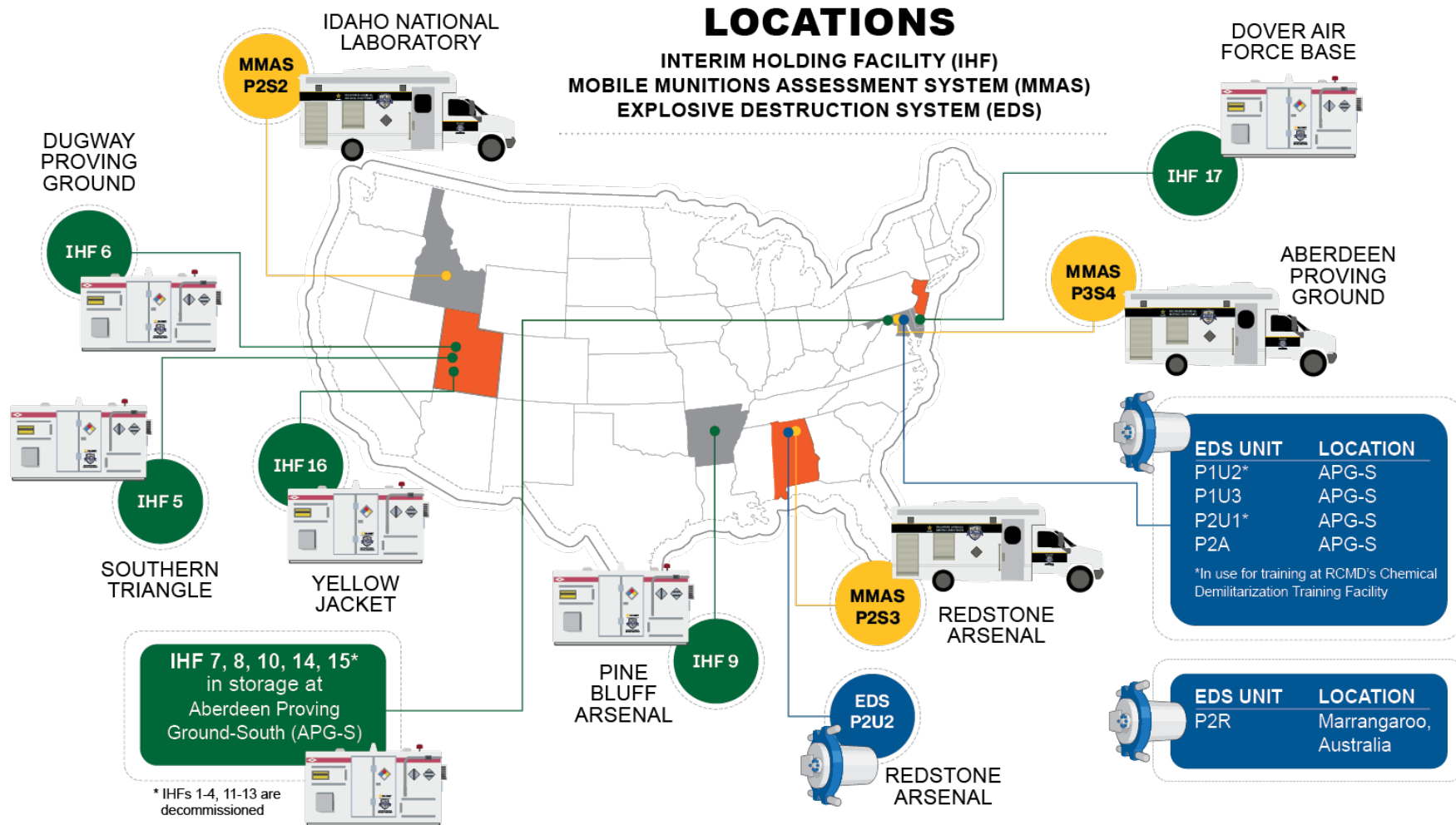


# BACK UP SLIDES





# 2025 RCMD Location Map



REV: 20250602

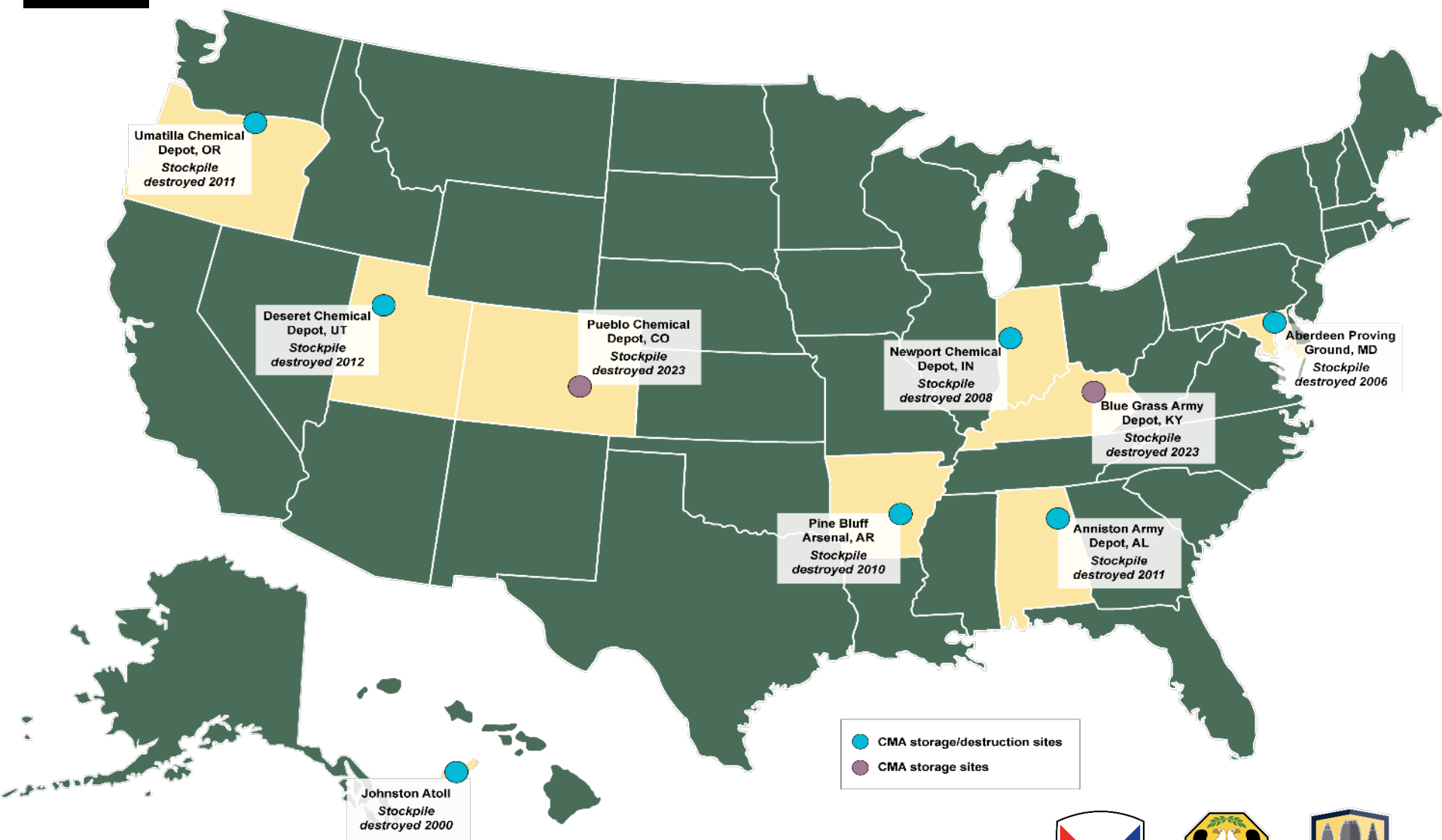
Distribution Statement A: Approved for public release. Distribution unlimited.





U.S. ARMY

# CMA Storage/Destruction Sites



Distribution Statement A: Approved for public release. Distribution unlimited.







# Waste Disposal

- RCMD maintains on-site management of solid and liquid hazardous waste from EDS operations
- RCMD disposes of secondary hazardous waste at permitted commercial treatment, storage and disposal facilities

