

Similarities and Differences

A Comparison of CWM vs. Conventional MEC Response Operations

Chris ten Braak, M2S2 Webinar, September 18, 2019

Agenda

- Definitions
- Planning
- Personnel
- Training
- Field Work Phases
- Summary



Non-compliant Suspect CWM Assessment

Definitions

- What is Chemical Agent (CA)?

- A compound producing lethal or other damaging effects on human beings that is intended for use in military operations to kill, seriously injure, or incapacitate a person through its physiological effects

- What is Chemical Warfare Materiel (CWM)?

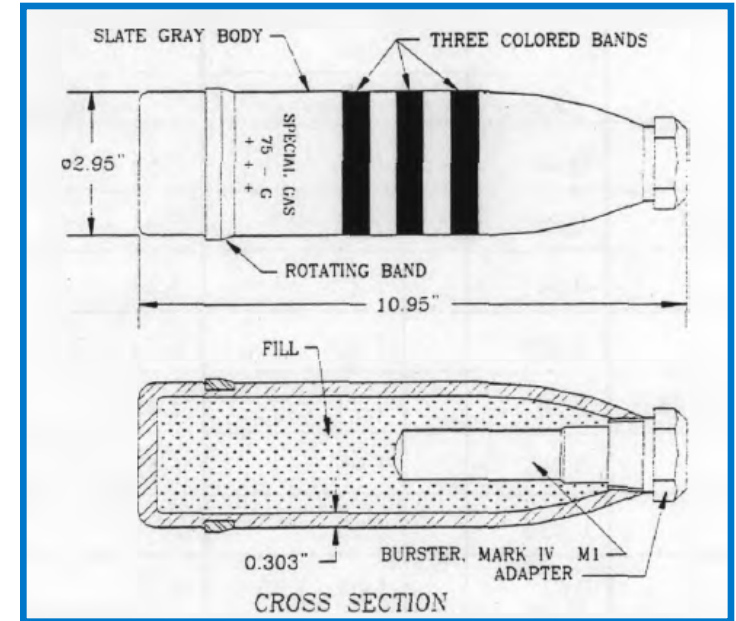
- Munitions containing CA
- Bulk CA containers (e.g., 55-gallon drums and 1-ton containers)
- Miscellaneous containers (e.g., laboratory bottles) that, based on location, may contain CA
- Munitions with unknown liquid fills

- What is not CWM?

- Riot control agents, chemical herbicides, smoke- and flame-producing items, recovered soil, and debris contaminated with CA
- CAIS containing dilute CA or industrial chemicals

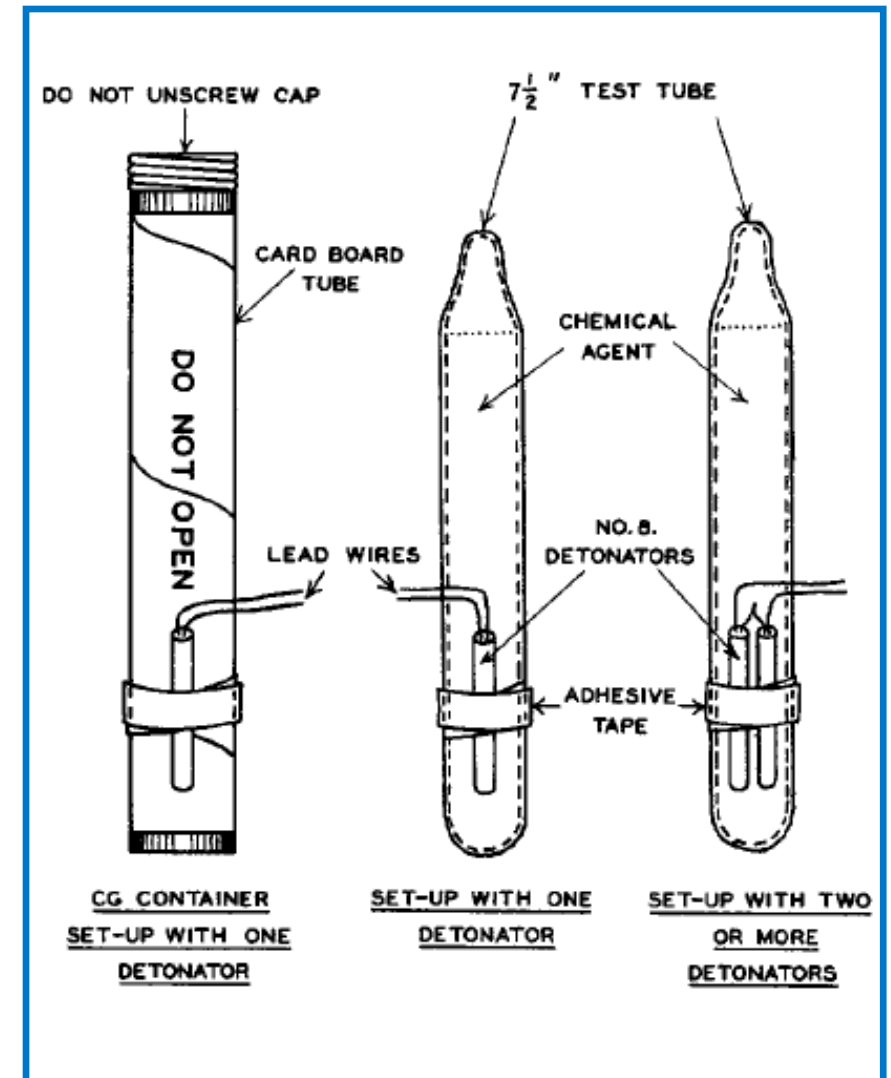
- CWM items must be addressed by DoD

Compound	Classification
Distilled Mustard (HD)	blister agent
Nitrogen Mustard (HN-1)	blister agent
Lewisite (L)	blister agent
VX	nerve agent
Sarin (GB)	nerve agent
Cyanogen Chloride (CK or CC)	Industrial Chemical
Phosgene (PS)	Industrial Chemical
Chloropicrin (PS)	Industrial Chemical



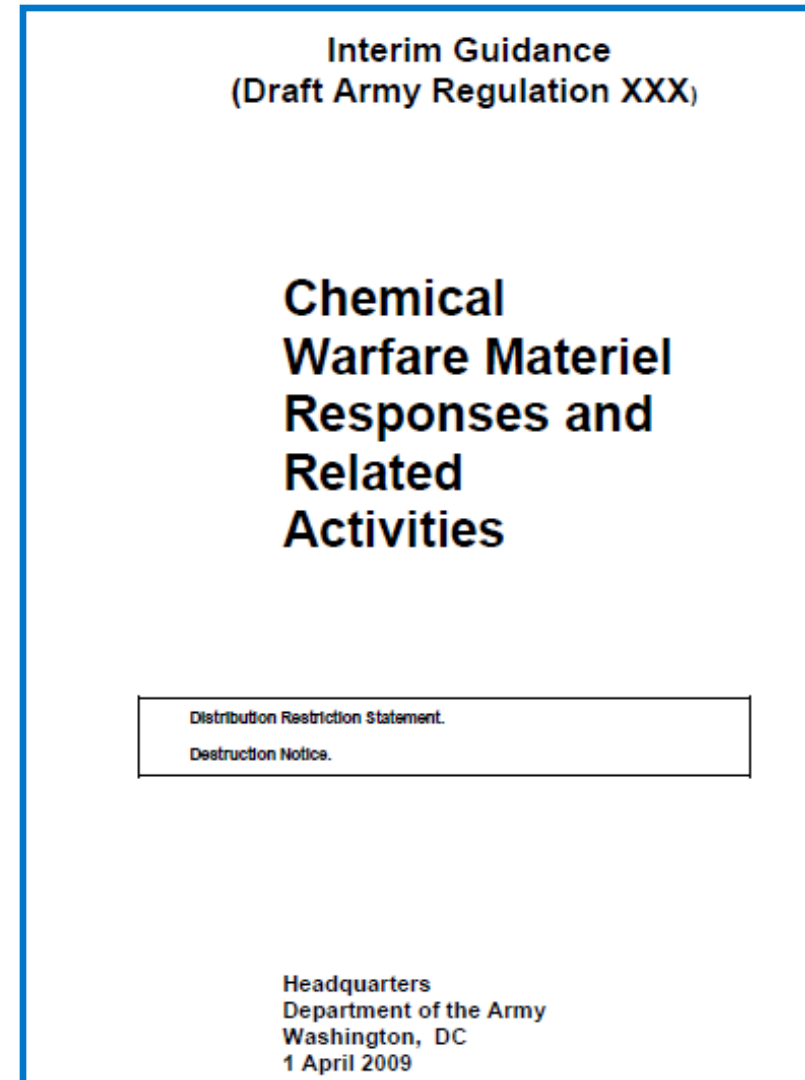
Chemical Agent Identification Sets (CAIS)

- CAIS: Issued for training until mid-1960s
- CAIS that contain dilute CA or industrial chemicals are hazardous waste
- CAIS that contain neat CA (i.e., CAIS K941 and CAIS K942) and any CAIS found to contain dilute nerve agent are CWM



What is a CWM Site?

- Do you have a CWM site?
 - Refer to Guidance Document (the “CWM Bible”)
 - 10+ years old; identifies conduct of CWM responses
- Probability of encountering CWM
 - Installation or District Commanders approve an assessment of the probability of encountering CWM prior to intrusive where there is evidence (e.g., historical or physical) that CWM may be present
 - Documented per DA PAM 385-30, Mishap Risk Management
 - CWM site if MRS known or suspected to contain CWM – “Occasional” or higher probability
- CWM sites require CEHNC involvement
- Some CWM sites may also have MEC, HTW, or all three

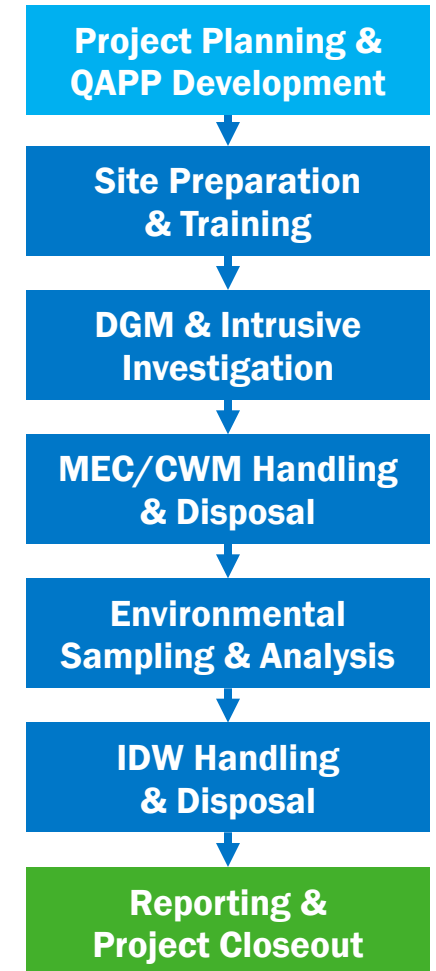


Mishap Risk Management Probability Categories

Probability	Symbol	Definition
Frequent	A	Occurs very often known to happen regularly.
Likely	B	Occurs several times; a common occurrence
Occasional	C	Occurs sporadically, but is not uncommon
Seldom	D	Remotely possible; could occur at some point
Unlikely	E	Can assume will not occur but not impossible

Overview: Project Phases for Conventional and CWM Sites

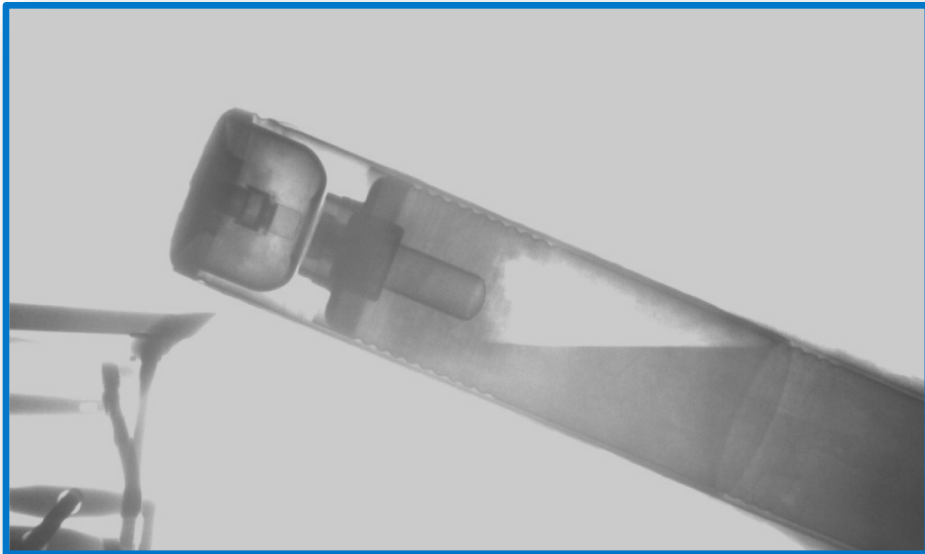
- To highlight the differences between conventional and CWM sites, we will review the different fieldwork phases
 - Project Planning & QAPP Development
 - Field Operations
 - Reporting & Project Closeout
- Most of these phases require extra activities for CWM sites



Planning & QAPP Development

Conventional Site

- QAPP
- ESP/ESS
 - MGF/HFD/MFD
 - Magazine siting
- APP/SSHP



CWM Site

- QAPP
- CSP/CSS
 - MCE/1% Lethality/NOSE
 - MGF/HFD/MFD
 - Magazine & Interim Holding Facility (IHF) siting
- APP/SSHP
 - Site Layout Plan (EZ and work zones)
 - Decontamination (Personnel & Eqpt)
 - Respiratory Protection Plan
 - Hazard Communication
 - Emergency Response & Contingency Plan
 - Medical Support Plan
 - Radiation Plan (x-ray)

Project Planning & QAPP Development

Site Preparation & Training

DGM & Intrusive Investigation

MEC/CWM Handling & Disposal

Environmental Sampling & Analysis

IDW Handling & Disposal

Reporting & Project Closeout

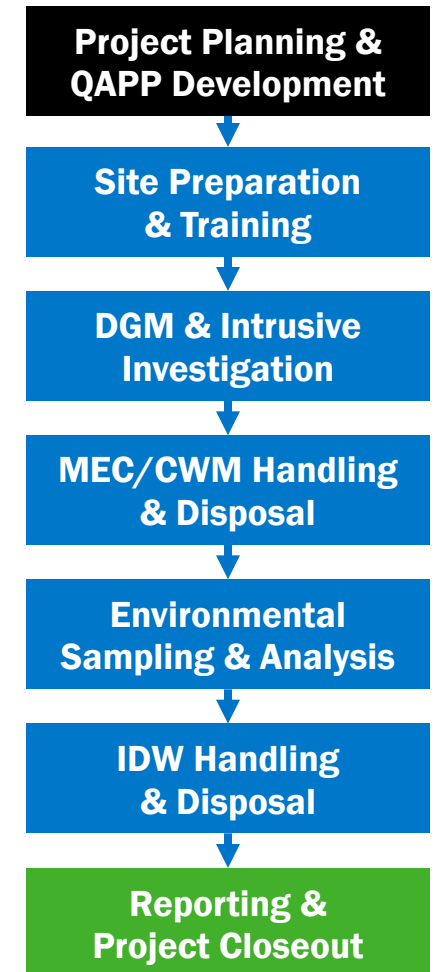
Planning & QAPP Development – Additional Plans & Activities

Additional Supporting Plans

- IDW Plan
 - Extra complications
- Interim Holding Facility (IHF) Plan
- Air Monitoring Plan (CCDC-CBC)
- Vulnerability Assessment
 - Identification and Description of Potential Threats
- Physical Security Plan
- Public Protection Plans

Additional Planning Activities

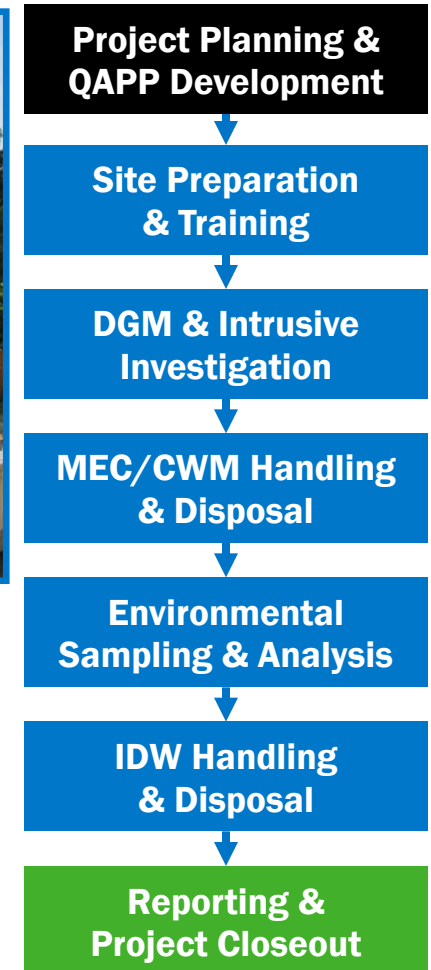
- Medical Support Agreements
 - Hospital and onsite ambulance
- Toxic Chemical Training Course for Medical Support Personnel
- Medical surveillance
- Notify commercial analytical lab in writing that samples may contain CA
- Plans for the establishment of Exclusion Zone (EZ), Contamination Reduction Zone (CRZ), and Support Zone
- Planned egress routes that allow personnel to be removed on a stretcher and access to the ambulance
- Public emergency notification procedures and public evacuation/shelter in place training



Planning & QAPP Development – Exclusion Zones

Maximum Credible Event (MCE)

- Maximum release of CA from a munition, container, or process that might realistically result from an unintended, unplanned, or accidental occurrence
- Uses air dispersion computer model (D2PC)
 - 1% Lethality Distance
 - No Significant Effects (NOSE Distance)
 - EZ based on greater of “Hazardous Fragmentation Distance” (MGFD-based) or the 1% Lethality Distance (MCE-based)
- EZs can be quite large without costly engineering controls



Model Inputs (partial)
 Wind Speed
 Air Stability Factor
 Atmospheric Pressure
 Mixing Height

EXAMPLE

D2PC Model Calculations⁽¹⁾

Scenario	Munition Type	Agent	Source Strength	Temp	Release Type	1% lethality m (ft)	No Deaths m (ft)	No Effects m (ft)
1) Intact VX-filled 155mm Projectile (M121A1)	155	VX	6 LB	95°F	Evaporative	0	1 (3)	12 (39)
2) Intact GB-filled 105mm Cartridge	105	GB	1.6 LB	95°F	Evaporative	48 (157)	65 (213)	417 (1,368)
3) Intact VX-filled M56 warhead	M55	VX	10.3 LB	95°F	Evaporative	1 (3)	2 (6)	17 (56)
4) CG-filled 8LB Cylinder	Non	CG	8.0 LB	95°F	Instantaneous	179 (587)	199 (653)	1,444 (4,738)

Planning & QAPP Development – Personnel Requirements

Conventional Site

- SUXOS, UXOSO/UXOQC
- Geophysics (as needed)
- Intrusive team(s) (~5-7 persons)



CWM Site

- SUXOS, UXOSO, UXOQC
- Geophysics (as needed)
- Downrange Team(s) (2 each; min. 3 each)
- Sample Coordinator
- PDS Team (3 persons min.)
- Rescue Team (2 persons)
- Air Monitoring (4+ persons)
- Package/Assessment/Transport team (4+ persons)
- Medics (2 persons)

Project Planning & QAPP Development

Site Preparation & Training

DGM & Intrusive Investigation

MEC/CWM Handling & Disposal

Environmental Sampling & Analysis

IDW Handling & Disposal

Reporting & Project Closeout

Field Operations: Site Preparation & Training

Conventional Site

- Magazine (fence & lightning protection)
- Site Specific Training (1/2 day)



CWM Site

- IHF (fence & lightning protection)
- Site-Specific Training (up to 2 weeks)
 - Run through scenarios
- Huntsville Readiness Review (3 days)
- DA Pre-Operational Survey (3 days)
 - Evaluate response operations
- Table Top Exercise (1/2 day)
 - Coordination meeting with response agencies
- Medical Training (1 day)
 - Hospital staff and Ambulance EMTs

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Field Operations – DGM & Intrusive Investigation

- Geophysics
 - No significant difference; PPE upgrade as needed
- PPE Levels
 - Level B
 - Level C
 - Modified Level D



Level B



Level C



**Level D – Modified
Slung Mask**

Project Planning &
QAPP Development

Site Preparation
& Training

**DGM & Intrusive
Investigation**

MEC/CWM Handling
& Disposal

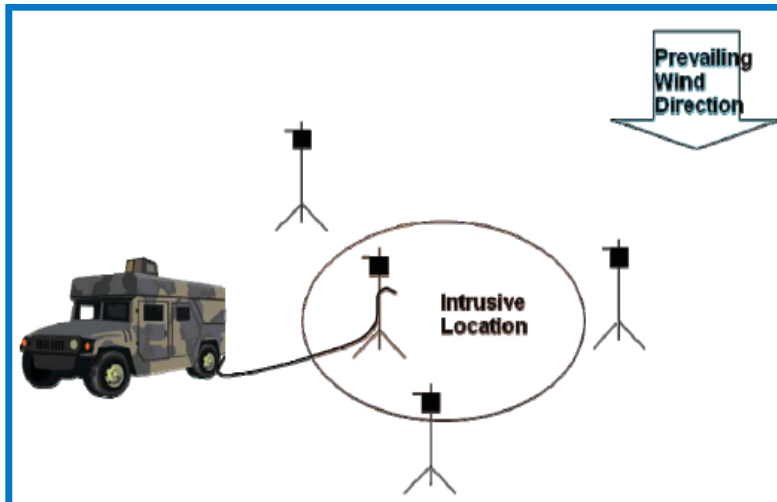
Environmental
Sampling & Analysis

IDW Handling
& Disposal

Reporting &
Project Closeout

Field Operations – DGM & Intrusive Investigation, cont'd.

- Medical Support
 - Ambulance onsite during intrusive
 - Both ambulance and hospital require special training and special medication
 - Closest capable hospital may not be the one that is closest to site
- Air Monitoring
 - Calibration & challenge
 - At work zone and site perimeter



Project Planning & QAPP Development

Site Preparation & Training

DGM & Intrusive Investigation

MEC/CWM Handling & Disposal

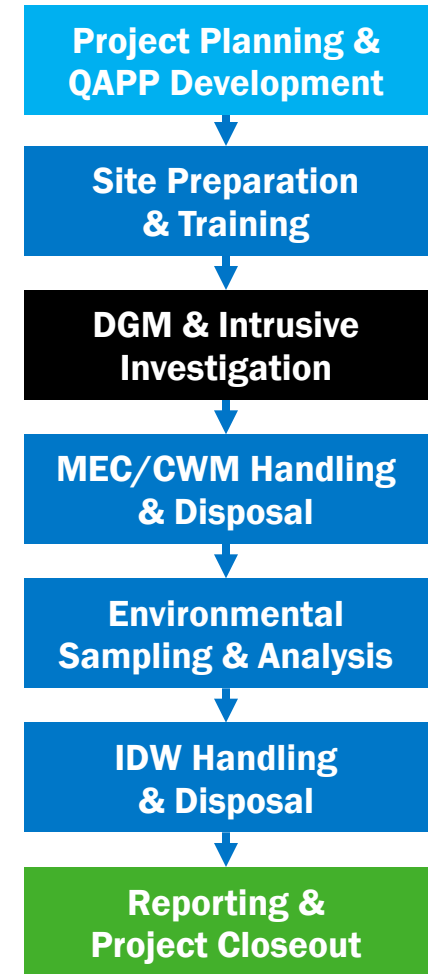
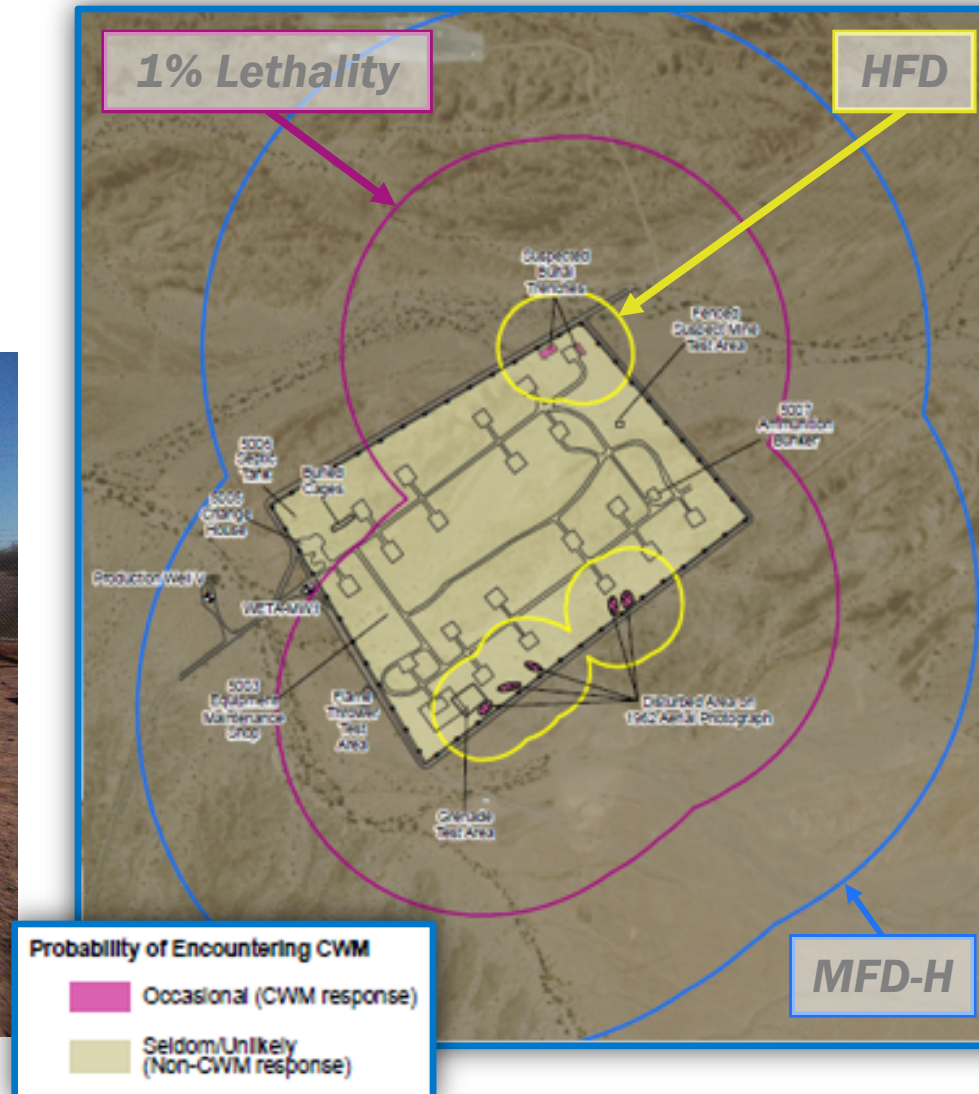
Environmental Sampling & Analysis

IDW Handling & Disposal

Reporting & Project Closeout

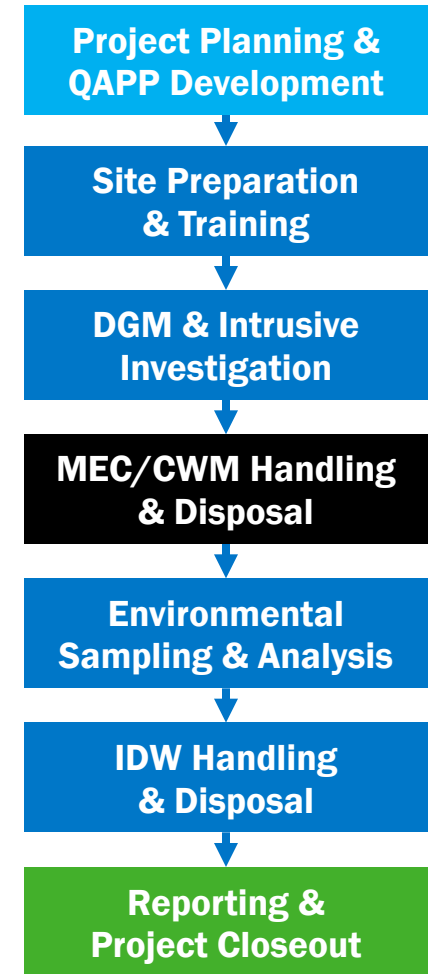
Field Operations – DGM & Intrusive Investigation, cont'd.

- EZ/engineering control structure
- CA filtration system



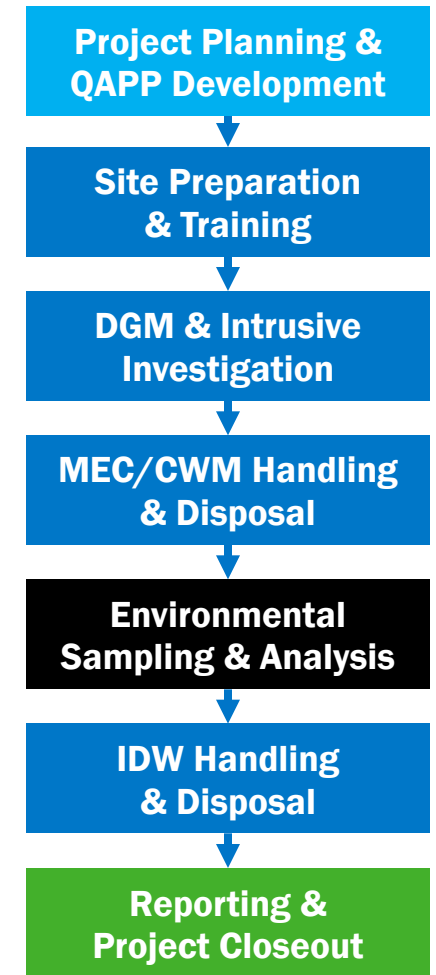
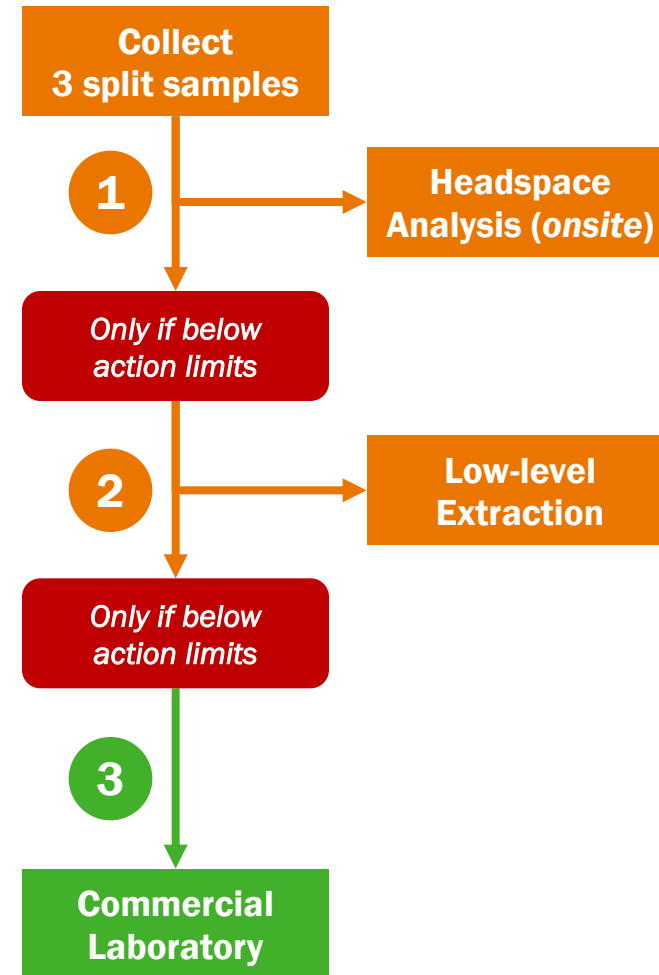
Field Operations – MEC/CWM Handling & Disposal

- Response to finding item with suspected liquid filler
 - Assess using nonintrusive means (e.g., X-ray, portable isotopic neutron spectroscopy [PINS])
 - Assessment data analyzed by review board (MARB)
- If positive determination cannot be made, most hazardous potential CA fill for munition type is assumed
- Place in IHF
- Implement security measures
 - 24-hour guard and Intruder Detection System



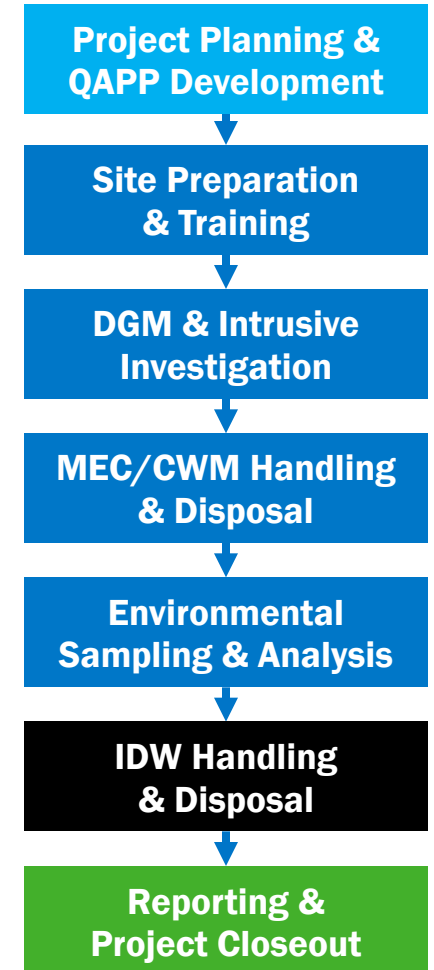
Field Operations – Environmental Sampling & Analysis

- CA-specific analytical methods
 - Specified by gov't agency
- Sample splits required for screening
 - Headspace analysis & low-level extraction
 - Have to clear samples for CA before sending to commercial laboratory



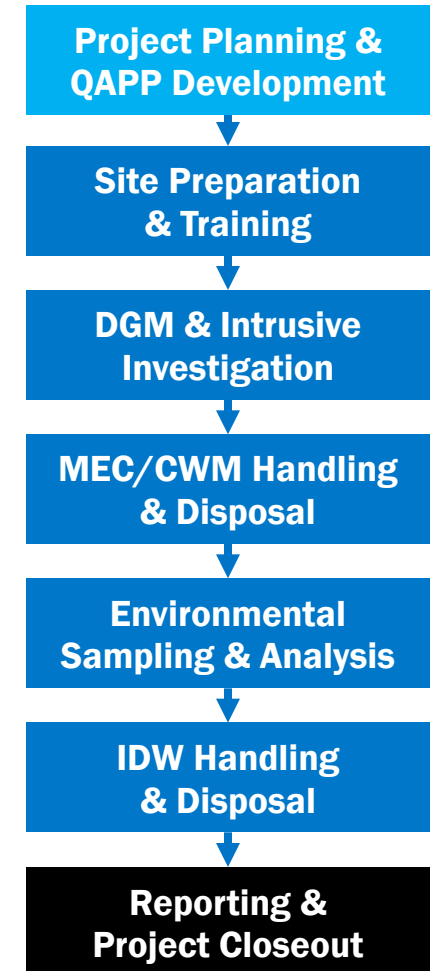
Field Operations – IDW Handling & Disposal

- Bleach/Decon Solutions
- CAFS filters
- MDAS and range-related debris
 - Requires headspace analysis
- Laboratory waste
 - Lab line cleaning solution
 - SHARPS
 - DAAMS Tubes
- Intact Containers with substance determined not to be CA
- Challenges with onsite demilitarization
- CA contaminated media
 - Incineration vs landfill disposal



Reporting and Project Closeout

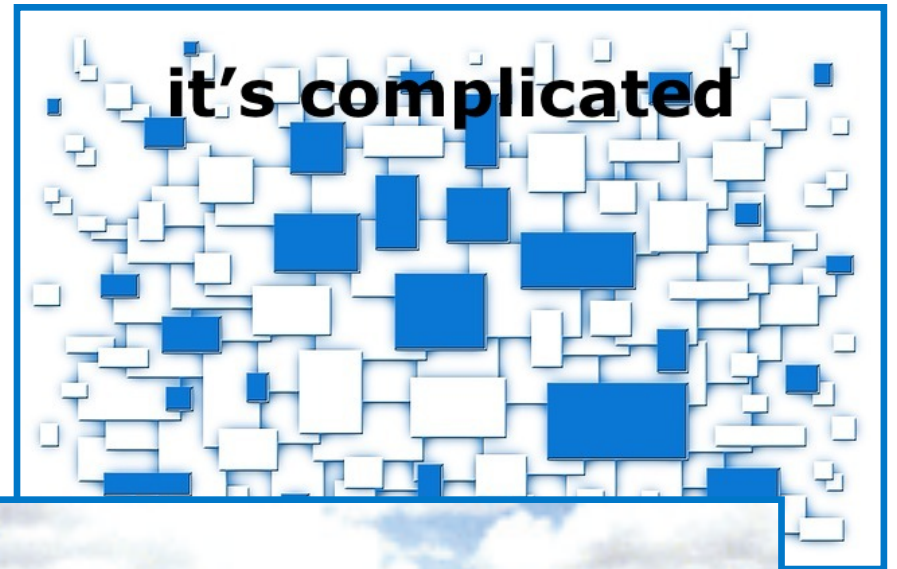
- No major differences with final report requirements
- However, more complex sampling and IDW handling requirements typically result in more supporting information
 - Bigger reports
 - Need to address standard munitions constituents AND CA, and agent breakdown product contaminants
- Risk Analysis
 - Screening/comparison values exist for CA, but many consider any CA is unacceptable
- Closeout differences
 - Once identified, more likely the need to prove the negative at CWM sites



Summary

Major differences for CWM Response

- Many more agencies involved
- Greater prescriptive requirements
- Much more planning (and training) needed
- Greater public involvement
 - Increased concern and stigma with CWM
- More onsite personnel
- More/different unknowns
- Potential for greatly increased costs
 - Complications and risks are amplified



Questions?

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