



Global Leader in Munitions Response

Case Study

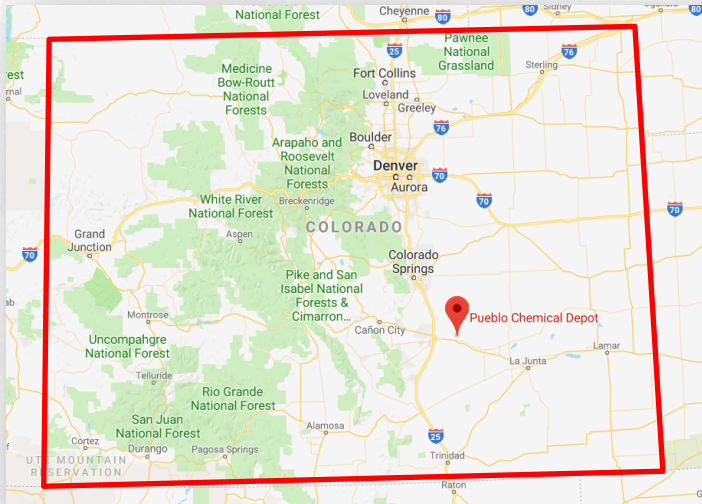
Pueblo Chemical Depot

**RCRA Facility Investigations
for SWMUs 13 & 12**

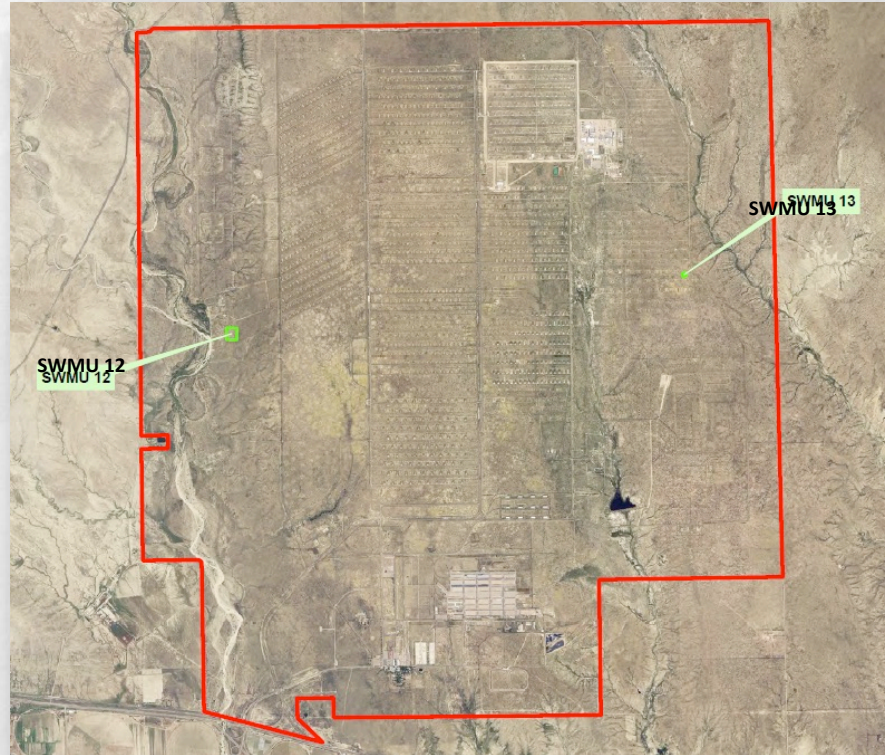
“A Tale of Two SWMUs”

3 April 2019

Site and SWMU Locations

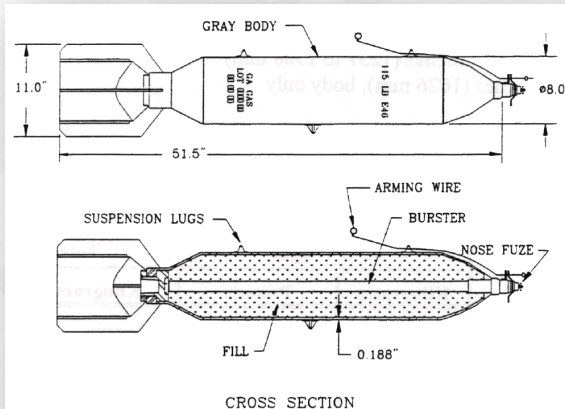


Location: Approximately 25 miles east of Pueblo, CO



Red Line is the PCD Boundary

Overview of SWMU 13



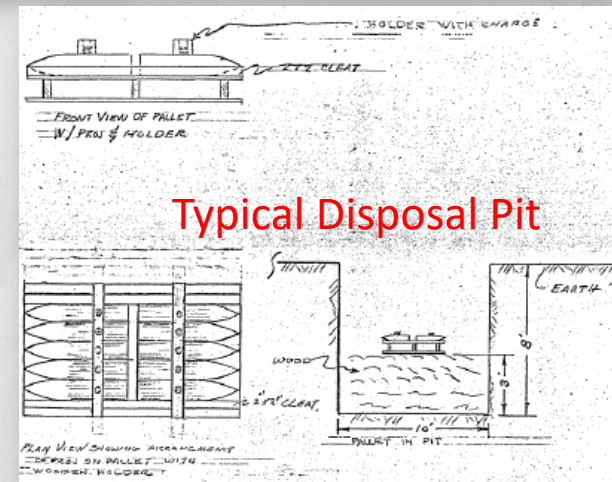
- Fenced location approximately one acre in size on the eastern side of PCD.
- Used for the destruction of intact and leaking chemical weapons from 1942 to 1946.
- Confirmed destruction of HS-filled and L-filled M70 115-pound chemical bombs (mustard).
- Investigation at SWMU 13 was a removal action defined as a 100% characterization of the disposal pits.

- Fenced location, approximately 6 acres in size on the western side of PCD, selected for RFI/CMS
- Location used for the destruction of defective chemical shells (including HD-filled) from 1953 to 1969
- Potential disposal of over 6,000 chemical projectiles or mortars, some explosively configured
- Disposal included explosive detonation, chemical decontamination, and burning material with diesel fuel

Items Staged for Destruction

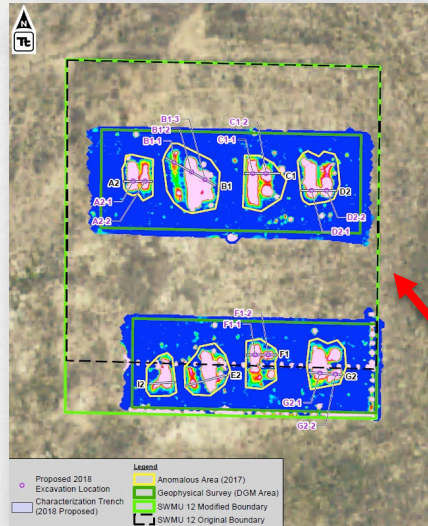


Typical Disposal Pit



SWMU 13

- 100% DGM coverage data over suspected disposal pits
- Excavated entire disposal area indicated to have been disturbed or impacted
- Confirmatory sampled and backfilled



SWMU 12

- Collected DGM data over suspected disposal pits and delineated 8 “anomalous areas”
- Exploratory trenches excavated at each “anomalous area” down to native soil

RFI Results and Conclusions

SWMU 13

- Deemed “clean” following removal action and additional testing
 - No MEC encountered/remaining
 - All CWM removed
 - No CA; No ABP/HTW/MC over standards
- **“Acceptable Risk” for Explosives using RMM**
- Accepted by CDPHE for **No Further Action**



SWMU 12

- Strongly suspected to be contaminated
- RFI investigation defined nature and extent
 - **Presence of MEC** and limited CA residue in munitions confirmed
 - No CA in soil; ABP below standards
 - HTW/MC exceeded standards
- **“Unacceptable Risk” for Explosives with RMM**
 - Note: HTW/MC and possible CWM also of concern
- Recommended for **Corrective Measures Study**



Positive Features of the RMM

- Covers the familiar/traditional risk factors:
 - probability of MEC exposure
 - probability of detonation if encountered
 - consequence of detonation
- More directly linked to the DQO setting process
- Follows a logical progression through the hazard assessment process
- Provides effective, consistent framework for focused communication and discussion with stakeholders



Challenge #1 - Interpreting Exposure Factors

"**Access Conditions (frequency of use)**" in Matrix 1 and the "**Likelihood of Encounter**" in Matrix 2 are related but the linkage is unclear as currently represented

- "**Access Conditions**" seem to address the degree of open or closed access to the site AND the frequency of site access/use
- "**Likelihood of Encounter**" seems to address the frequency of site access/use AND the nature of the activities that create the opportunity for contact
- Distinction/linkage between these two factors is easily blurred

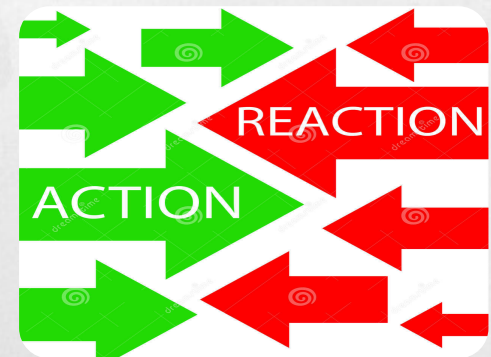
Should the frequency of use/access be the dominant consideration in selecting an assignment for both factors?



Difficulty in assigning the "***Severity Associated with Specific Munitions Items***" factor in Matrix 2

- Choosing between "***Catastrophic/Critical***" and "***Modest***" assignments is not straightforward
 - Extent/severity of the impact of a detonation depends on the circumstance of the incident
 - Depends on factors such as: type/size of munition; manual or mechanical contact; adult or child; unintentional or "encouraged" interaction; and possibly other factors

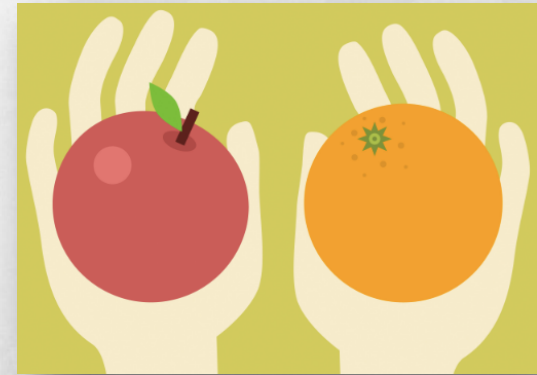
How conservative should one be when selecting an assignment for this factor when faced with unknowns?



Challenge #3 - Consistency with Other Assessments

Maintaining consistency with concurrent risk assessments, MRSP updates, or previous MEC HAs

- The frameworks have different stated purposes and incorporate different levels of conservatism
- Each tool appears to be “similar” to many stakeholders who expect “similar” results/findings
- Uncertainties arise when assigning factors that address similar conditions within the various frameworks
 - MEC Presence/Absence
 - Land Use
 - Exposure Frequency and Duration



Would the RMM scoring be different if completed separately from other assessments?

Can/Should the RMM scoring be influenced by the results of other concurrent assessments?

Challenge #4 - What About CWM?

- RMM was developed to assess explosive hazard, not the potential for direct contact or inhalation exposure to chemical agents (CAs) or agent breakdown products (ABPs)
- Some RMM explosive hazard risk factors may also be relevant and applicable to CWM
 - Amount, Access Conditions, Likelihood to Impart Energy
- Other RMM risk factors are not so relevant or transferable to CWM
 - Severity of a Detonation/Release, Sensitivity: Susceptibility to a Detonation/Release
- The **“Acceptable”** and **“Unacceptable”** RMM Matrix 4 combinations were designed with MEC in mind
- It is conceivable that an RMM-like tool could be developed for CWM, but the current RMM should not be used for that purpose

