



From Agent Contaminated to Site Closeout

The RCRA Facility Investigation of SWMU 13
US Army Pueblo Chemical Depot

UNCLASSIFIED

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TETRA TECH

**M2S2 Webinar, CWM Response
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Key Participants

- US Army Engineering and Support Center, Huntsville (USAESCH)
- US Army Environmental Command (AEC)
- Base Realignment and Closure (BRAC)
- US Army Pueblo Chemical Depot (PCD)
- US Army Corps of Engineers – Omaha District (CENWO)
- Colorado Department of Public Health and Environment (CDPHE)
- Edgewood Chemical Biological Center (ECBC)
- CBRNE Analytical & Remediation Activity (CARA)
- Tetra Tech, Inc. (Tetra Tech)
- Parkview Medical Center
- American Medical Response



US Army Corps
of Engineers®
Omaha District

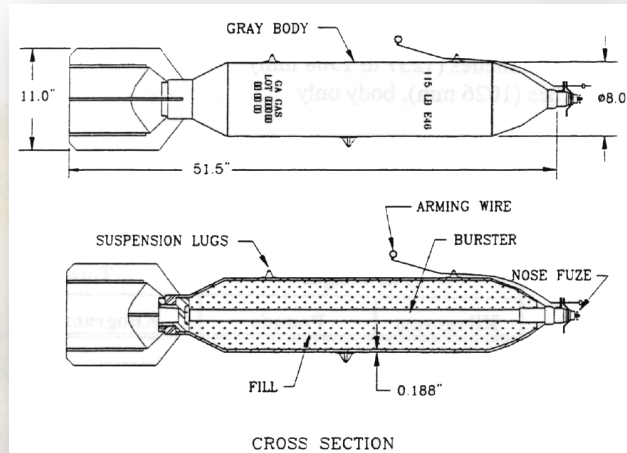


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Objective of the RCRA Facility Investigation (RFI) at SWMU 13

- Conduct an RFI in accordance with Pueblo Chemical Depot's RCRA Part B permit and the State of Colorado regulations that:
 - Characterize the nature and extent of munitions and explosives of concern (MEC), including chemical warfare materiel (CWM)
 - Collect data to meet project data quality objectives as defined during the Technical Project Planning process, and to perform a human health and ecological baseline risk assessment
- SWMU 13 required 100% characterization by intrusive investigation to classify all materials disposed within the project site
- Ability to demonstrate that all agent and agent breakdown products are below action levels based upon confirmatory soil sampling/analysis following characterization/removal of the disposal material

Brief History of SWMU 13



- Suspected to be used for the destruction of intact and leaking chemical bombs from 1942 to 1946.
- Following completion of disposal operations, the approximate one acre site was backfilled, fenced, and posted.
- The RFI confirmed the historical destruction of HS-filled and L-filled M70 115-pound chemical bombs at SWMU 13.

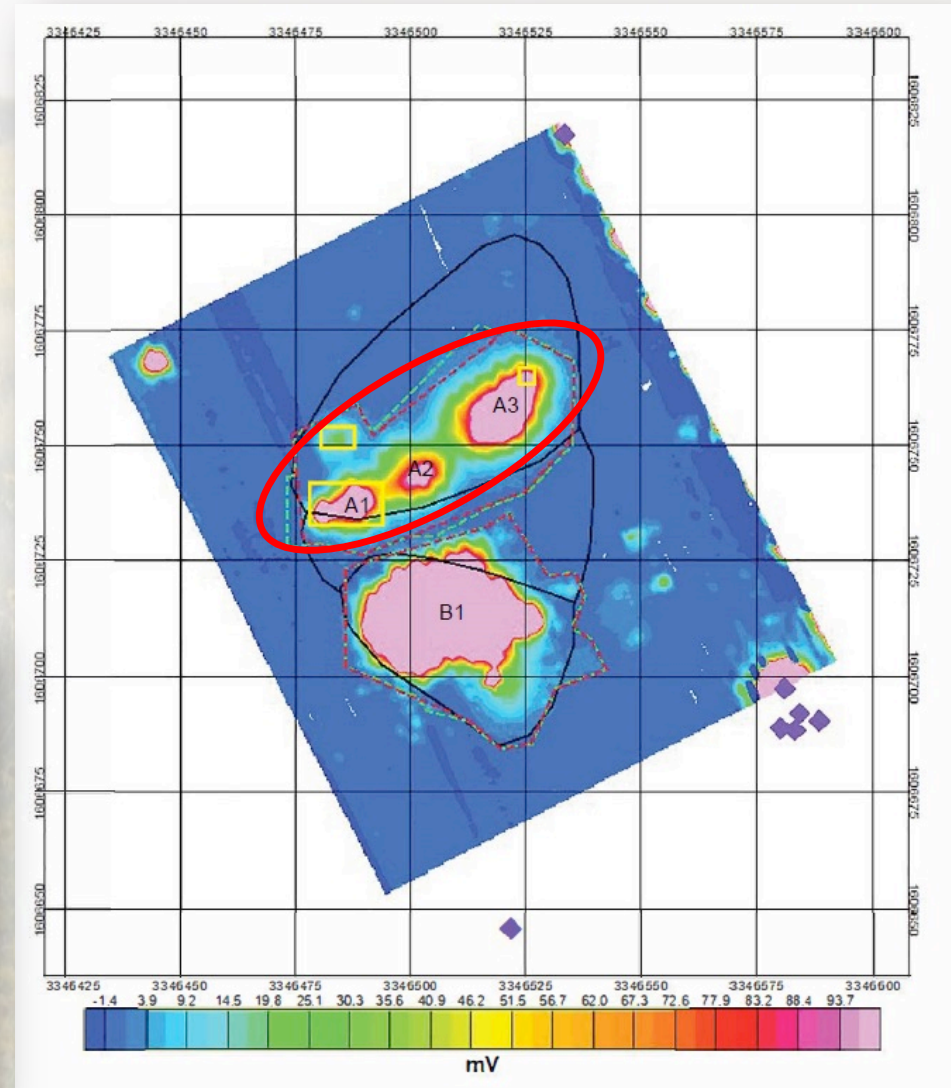
Mobilization and Preparation at SWMU 13

- Initial mobilization and site setup began at the end of August 2017
- Personnel and team training followed establishment of site infrastructure
- Conducted and completed following site establishment and training:
 - Huntsville Survey
 - Tabletop Exercise
 - DA Preoperational Survey
- After receiving notice to proceed, began intrusive operations at SWMU 13 on 16 October 2017



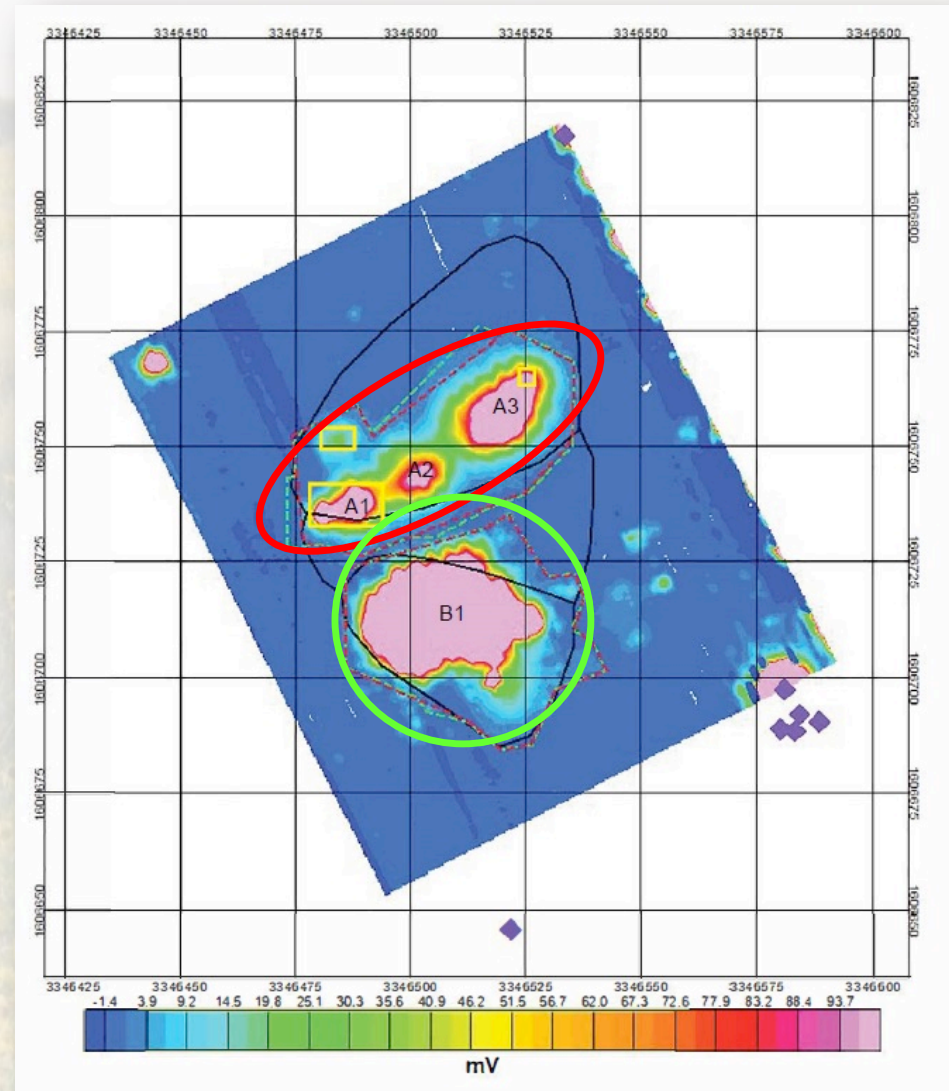
Intrusive Investigation at SWMU 13

- From 16 - 31 October 2017, removed top three to five feet of soil from the surface of the anomalous area footprint
- Focused removal in the northern area of SWMU 13 first and encountered first two M70 bombs on 1 November 2017

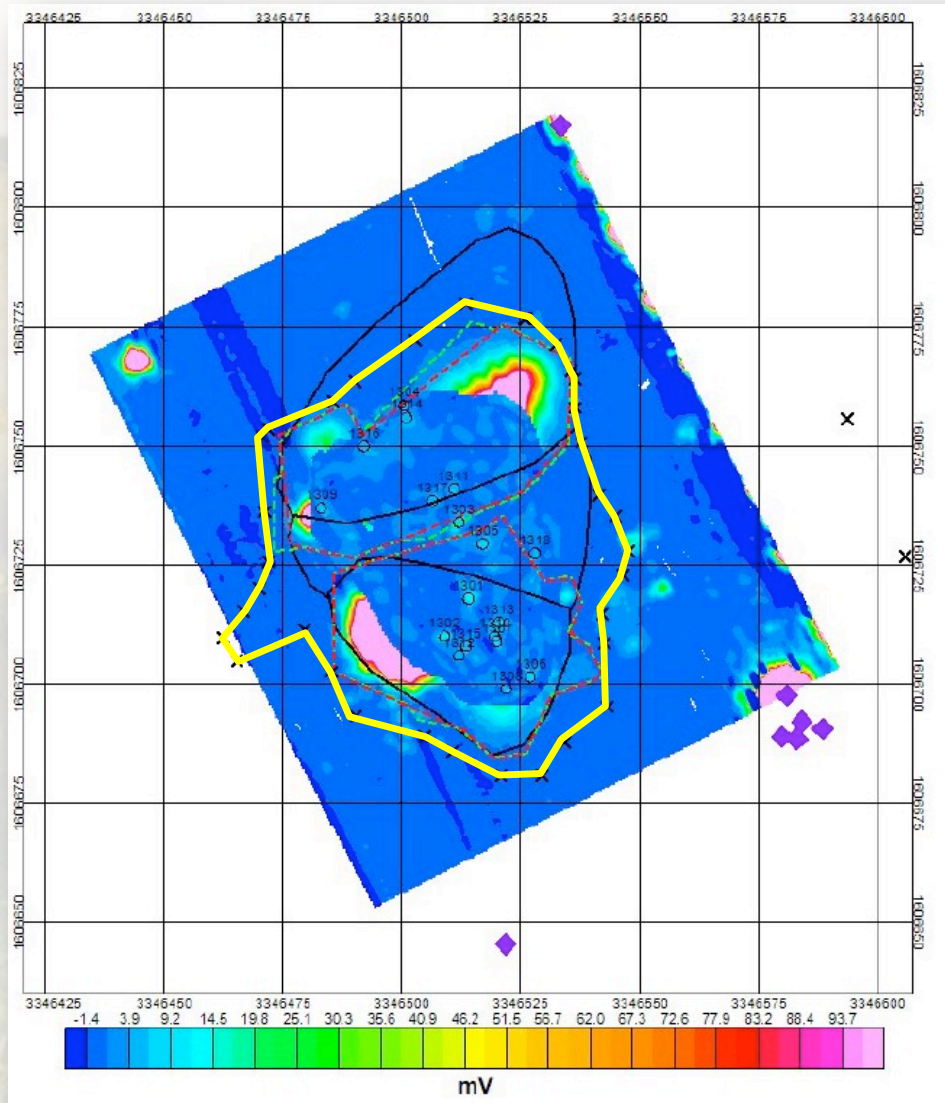


Intrusive Investigation at SWMU 13

- Removal operations were completed in the northern area in early December prior to shutting down for the holiday demobilization
 - Sixty (60) M70 bombs were recovered
 - Seven (7) of the M70s were considered suspect CWM and stored in IHF C-510
- Preparations were made for removal of the southern anomalous area beginning in January 2018



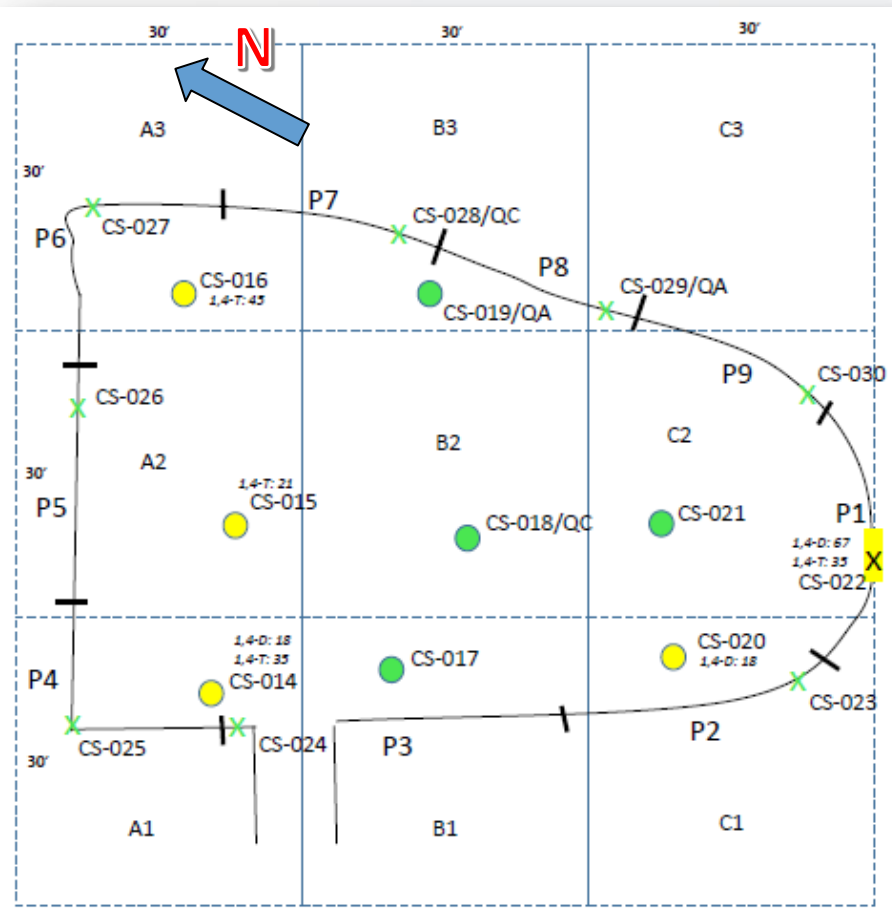
Intrusive Investigation at SWMU 13




Soil removal was completed at SWMU 13 the week of 12 February 2018 and a DGM survey of the bottom of the excavation was completed the same week


- Eighteen (18) small anomalies were identified from the DGM survey (14.5 mVs being the largest target)
 - Intrusively investigated the targets and found nails, small pieces of metal, wire, and expended shotgun shell bases
 - No contacts due to the uneven terrain
- Perimeter of excavation surveyed with GPS


Intrusive Investigation at SWMU 13




Confirmatory samples collected from the excavation floor and toe of the excavation wall (16 February 2018)

 = Non-detect for CA/ABP (floor sample)

 = Non-detect for CA/ABP (toe sample)

 = Low-level detection of ABP (floor sample)

 = Low-level detection of ABP (toe sample)

17 samples collected: 12 non-detect for CA/ABP and 5 with low-level detections of HD ABP. Highest detection of 1,4-dithiane was 67 $\mu\text{g}/\text{kg}$ and highest detection of 1,4-thioxane was 45 $\mu\text{g}/\text{kg}$

Project Action Limits for HD ABPs

1,4-dithiane (1,4-D): 1,200,000 $\mu\text{g}/\text{kg}$

1,4-thioxane (1,4-T): 1,200,000 $\mu\text{g}/\text{kg}$

Summary of Investigation at SWMU 13

Seventy-five (75) M70 bomb bodies recovered – sixty (60) from the northern area and fifteen (15) from the southern area of SWMU 13

- Sixty-eight (68) M70 bomb bodies deformed, drummed, headspaced non-detect or below VSL requirements for CA, and shipped for incineration
- Seven (7) M70 bombs assessed onsite as suspect CWM and stored in IHF C-510 awaiting further assessment and disposal



Summary of Investigation at SWMU 13

One hundred sixty-three (163) 20 yd³ roll-offs of soil removed from the excavation (each filled approximately halfway) totaling approximately 2,000 tons of soil

- Sixty-one (61) roll-offs characterized as non-hazardous and disposed at local, approved landfill
- Other roll-offs characterized as hazardous based on State of Colorado's K902 listing
 - One (1) roll-off shipped for incineration due to elevated CA levels (1,200 µg/kg for HD)
 - Remaining roll-offs shipped to hazardous waste landfill for disposal
 - HTW analytical for soils showed spoils were RCRA non-hazardous



Summary of Investigation at SWMU 13

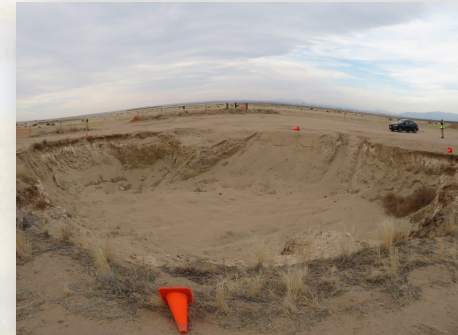
- The suspect CWM M70s stored in the IHF were further assessed and determined by the MARB to be five (5) CWM items (HS residue) and two (2) non-CWM
 - All seven (7) items were transferred to PCD's Chemical Limited Area on 23 June 2018
 - These seven (7) items were destroyed in the Explosive Destruction System at PCD between 10-16 July 2018
- Thirty-four (34) drums containing all sixty-eight (68) M70 bomb bodies shipped for incineration
- Forty-one (41) IDW liquid drums shipped as hazardous waste for offsite disposal
- Fourteen (14) solid waste (PPE, soil, etc.) shipped as hazardous waste for offsite disposal



SWMU 13 Closeout

Restoration and Documentation

- After receiving approval from the Colorado Regulator, the excavation at SWMU 13 was backfilled with 2,227 tons of clean soil from a local borrow area and completed on 11 June 2018
- Final SWMU 13 RFI Report submitted on 8 February 2019
- Draft Justification Document for No Further Action at SWMU 13 submitted on 17 May 2019



Challenges

- Condition of rounds upon discovery
- Elevated PPE (Level C and Level B)
- Air monitoring times and clearance of PPE
- Access and restrictions at SWMU 13 due to active, small arms range south of site
- Decontamination requirements for many of the recovered bomb bodies
- Primary lab filing bankruptcy at end of project



Lessons ~~Learned~~ Confirmed

- Document conversations with follow-up emails to avoid miscommunications between organizations
- Develop a strong heat stress monitoring program and follow closely to avoid heat casualties
- Constant tracking and scheduling disposal for IDW as soon as it is generated
- Consider additional contractor support staff





Questions/Comments/Discussion