Anniston Chemical Agent Disposal Facility (ANCDF) Closure Briefing

17th Annual Chemical Weapons Demilitarisation Conference

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Site Project Manager
Anniston Chemical Agent Disposal Facility (ANCDF)
• The Anniston Chemical Agent Disposal Facility (ANCDF) began construction on June 20, 1997.
• Construction was completed in June of 2001.
• Chemical operations began August 9, 2003.

<table>
<thead>
<tr>
<th>Agent</th>
<th>Type of Weapon</th>
<th>Quantity</th>
<th>Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB</td>
<td>105mm Artillery</td>
<td>74040</td>
<td>120680</td>
</tr>
<tr>
<td></td>
<td>155mm Artillery</td>
<td>9600</td>
<td>62400</td>
</tr>
<tr>
<td></td>
<td>8 inch Artillery</td>
<td>16026</td>
<td>232580</td>
</tr>
<tr>
<td></td>
<td>M55 Rockets</td>
<td>42762</td>
<td>457560</td>
</tr>
<tr>
<td>VX</td>
<td>155mm Artillery</td>
<td>139581</td>
<td>837480</td>
</tr>
<tr>
<td></td>
<td>Mines</td>
<td>44131</td>
<td>463380</td>
</tr>
<tr>
<td></td>
<td>M55 Rockets</td>
<td>35662</td>
<td>356620</td>
</tr>
<tr>
<td>Mustard</td>
<td>HT-4.2 Inch Mortar</td>
<td>183552</td>
<td>1064600</td>
</tr>
<tr>
<td></td>
<td>HD-4.2 Inch Mortar</td>
<td>75360</td>
<td>452160</td>
</tr>
<tr>
<td></td>
<td>HD-105 mm Artillery</td>
<td>23064</td>
<td>68500</td>
</tr>
<tr>
<td></td>
<td>HD-155mm Artillery</td>
<td>17643</td>
<td>206420</td>
</tr>
<tr>
<td></td>
<td>HD-Ton Containers</td>
<td>108</td>
<td>185080</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>661529</td>
<td>2253.6 Tons</td>
</tr>
</tbody>
</table>

• Chemical operations completed September 22, 2011.
Proactive approach to Closure

• Toxic Substances Control Act (TSCA) permit for Polychlorinated Biphenyls (PCB) Closure completed after M55 Rocket campaigns completed.
  – Allowed ANCDF to close the TSCA permit.

• Closure of the ANCDF Main Facility was approached in a planned and deliberate fashion.
  – Integrated Closure Approach
  – Decommissioning Strategy
  – Decontamination Strategy
    • Decontamination of Agent Contaminated Areas
    • Decontamination of Non-Agent Contaminated Areas
    • Decontamination Techniques
  – Demolition Strategy
    • Munitions Demilitarization Building (MDB)
    • Pollution Abatement System (PAS)
    • Pollution Abatement System Filtration System (PFS)

• Implementation of Lessons Learned from other sites.
Based on United States environmental permit requirements, ANCDF had two types of Equipment:

- **Hazardous Waste Management Unit (HWMU) Equipment**
- **Facility Construction Certification (FCC) Equipment**

Only HWMU subject to US permit regulatory closure requirements, certifications and notifications.

<table>
<thead>
<tr>
<th>ANCDF System/Equipment</th>
<th>Type of Unit</th>
<th>HWMU</th>
<th>FCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid Incinerator (LIC) and PAS/PFS</td>
<td>Treatment</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Deactivation Furnace System (DFS) and PAS/PFS</td>
<td>Container Management</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Metal Parts Furnace (MPF) and PAS/PFS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Container Handling Building (CHB) Storage Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Munitions Corridor (LMC) Storage Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buffer Storage Area (BSA) Storage Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxic Maintenance Area (TMA) Storage Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Munitions Corridor (UMC) Storage Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste Transfer Facility (WTF) Storage Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agent Collection System (ACS) Tank System</td>
<td>Tank System</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Spent Decontamination Solution (SDS) Tank System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brine Surge Tank System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brine Treatment Tank System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDB Heating, Ventilation and Air Conditioning (HVAC) Unit</td>
<td>Not Applicable</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Laboratory HVAC Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demilitarization machines by system</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Decontamination Strategy

Main Plant Closure

1. Identify equipment/area for decommissioning
   - Potentially contaminated?
     - Yes
       - Liquid or vapor exposed?
         - Liquid
           - Conduct occluded space survey
         - Vapor
           - Assessment results?
             - Pass
               - Complete decontamination documentation
             - Fail
               - Select contaminated material disposal mechanism
               - Onsite 5X Treatment
               - Offsite TSDF
     - No
       - Conduct headspace monitoring or other characterization (e.g., RBCs)
       - Decontaminate with approved decon method
       - Results acceptable?
         - Yes
           - Perform final unventilated monitoring
           - Unventilated results acceptable?
             - Yes
               - Complete decontamination documentation
               - Remove or leave in place for demolition
             - No
               - Complete decontamination documentation
               - Remove or leave in place for demolition
         - No
           - Potential benefit to decon?
             - Yes
               - Decontamination with approved decon method
               - Results acceptable?
                 - Yes
                   - Complete decontamination documentation
                   - Remove or leave in place for demolition
                 - No
                   - Decontamination with approved decon method
             - No
               - Conduct occluded space survey
               - Assessment results?
                 - Pass
                   - Complete decontamination documentation
                 - Fail
                   - Select contaminated material disposal mechanism
                   - Onsite 5X Treatment
                   - Offsite TSDF
   - No
     - Off-site dispostioning
     - Remove or leave in place for demolition
Areas and buildings to remain and turned over for future U.S. Army use were monitored to General Population Limits (GPL).

Areas and buildings that were demolished were monitored to Short Term Exposure Limits (STEL).

### Airborne Exposure Limits (mg/m³)

<table>
<thead>
<tr>
<th>Standard</th>
<th>GB</th>
<th>VX</th>
<th>HD/HT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPL</td>
<td>0.000001 (24 hr)</td>
<td>0.0000006 (24 hr)</td>
<td>0.00002 (12 hr)</td>
</tr>
<tr>
<td>STEL</td>
<td>0.0001 (15 min)</td>
<td>0.00001 (15 min)</td>
<td>0.003 (15 min)</td>
</tr>
</tbody>
</table>
Decontamination Strategy

Areas were prepared for UMTs to ensure:
- Occluded areas were monitored
- No air exchanges
- Consistent matrix for area being monitored
Blast doors taped off for UMT.
Variety of mechanical and thermal cutting techniques employed

Inside Munitions Demilitarization Building (MDB) Prior to Full-scale Demolition: Concrete Scabbling.
High Reach Demolition Machine Guidance Document
Demolition Equipped Excavator (DEX)

- **Operator Protection**
- **Undercarriage Protection**
- **Catwalks and Equipment Guarding**
- **Hydraulic Enhancements**
- **Quick Couplers**
Demolition continued

DEX with Demolition and Disposal (D&D) Attachments

- **Grapple/Grapplers = DEX-G**
- **Breaker/Rams = DEX-B**
- **Shear Attachment = DEX-S**
- **Concrete Crusher/Cracking = DEX-C**
- **Concrete Pulverizer = DEX-P**
Machines are highly complex and very demanding to operate. They must be operated in a manner so as to avoid any sharp or sudden movements that might undermine the stability of the machine.

The tracked undercarriage is often lengthened, widened, and strengthened. Counterweights are often substantially augmented. Cabs tilt back 0-35° and elevate up to 7 feet. Some UHRDEX-S have Closed Circuit Television (CCTV) and others, with concrete demolition attachments, can be outfitted with a dust suppression system.
Demolition continued

**Metal Cutting D&D**

**Mechanical**
- Hand-Held Hydraulic
- Nibblers and Shears
- Mechanical Saws
- Circular Saws
- Abrasive Cutters
- Wall and Floor Saws
- Wire Saws
- Explosive Cutting

**Concrete Cutting and D&D Techniques**
- Wire, Hole, Wall and Floor Saws
- Scabbing & Scarifying
- Breakers & Pulverizers
- Rock Splitter & Expansive Grout
- Controlled Blasting

**Other**
- Abrasive Water/Nitrogen Jet
- Modular Drive Systems

**Thermal**
- Plasma Arc
- Oxygen Burning
- Arc Saw
Demolition continued

Heating, Ventilation, and Air Conditioning (HVAC) Stack

Common Stack
• At ANCDF the Munitions Demilitarization Building was decontaminated and disposed of in a U.S. Environmental Protection Agency (EPA) approved landfill.

• Pollution Abatement System process piping was removed and disposed of in a U.S. EPA approved landfill.

• Remaining debris generated by the D&D was placed in a U.S. EPA approved construction and demolition debris landfill.

Waste Acceptance Criteria (WAC) and Load Optimization

• Segregation, Densifying by DEX-G and Loaders
• Metal Sizing achieved by DEX-S
• Concrete Sizing achieved by DEX-B, P and C
• Establish minimum tons and soil per load (based on daily average)

Metals were recycled totaling $3.36 Million

• Hastalloy
• Copper
• Stainless Steel
ANCDF’s plan, approach, and implementation of HVAC duct removal was shaped by Lessons Learned at Tooele, Utah, facility (TOCDF).

Because of TOCDF’s history, ANCDF took special pains (Borosope used for visual check and monitoring to confirm lack of contamination).
Programmatic Lessons Learned

- Decontaminating rooms based on a grid pattern.
- Lesson Learned from previous sites’ closure.
- Prevents re-contaminating already cleaned areas.
Conclusion

Any Questions?

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