PLASMA ORDNANCE DEMILITARIZATION SYSTEM (PODS) FOR THE DESTRUCTION OF PYROTECHNIC ORDNANCE

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PRESENTATION OUTLINE

- Program Objective
- Background
- PODS System Description
- Testing Overview
- Project Status
- Technical Solutions
- Program Schedule
- Items to be Processed
- Operating Cost Estimate
- Summary
To develop an effective/efficient alternative method of demilitarization for small, fully assembled, smoke and pyrotechnic ordnance - a task which had previously been accomplished by Open Burning/Open Detonation (OB/OD) and conventional incineration.
The Surgeon General Imposed a Moratorium on OB/OD of Smoke and Dye Munitions

Problems Have Been Reported with the Use of Existing Incinerators for the Demilitarization of Smoke and Pyrotechnic Items

- Heat damage to incinerators from flares
- Filters clogging with particulate matter
- Incinerator ash has been classified as a hazardous waste
- Fugitive emissions

In general, the DOD is Reducing Dependence on OB/OD and is Increasing the Use of Closed Disposal Technologies (CDT), Including R3
Plasma Arc Technology Offers Several Advantages Over Conventional Incineration:

- Non-hazardous solid slag output instead of hazardous ash
- Clean gaseous effluents at lower mass flows
- No fugitive emissions
- Capability to demilitarize the assembled end item without furnace damage
- More uniform and reliable DRE
CANDIDATE ITEMS

Major Focus: Pyrotechnic Items

Other Items:
- Riot Control
- Incendiary
- Phosphorous
- Propellant & Cartridge Increments
- Cartridge an Propellant Actuated Devices
- By-Products of R³ (e.g. Mortar Ignition Cartridges
- Fuzes
- Small High Explosive Components & Items
PLASMA ARC FURNACE
PODS FACILITY
HAWTHORNE ARMY DEPOT, HAWTHORNE, NV
Ordnance Up

Soil In

Ordnance In
Ordnance/Soil Conveyors & PODS Furnace
Slag Collection Chamber & Slag Crane
Pollution Abatement

Equipment
Cooling Towers & Water Storage Pond
Water Treatment System & Evaporation Pond
## PODS Testing Overview

<table>
<thead>
<tr>
<th>Testing Type</th>
<th>Weeks Completed</th>
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<tbody>
<tr>
<td><strong>Operational Verification Testing (OVT):</strong></td>
<td>7/7</td>
</tr>
<tr>
<td><strong>Preliminary Testing (PT) aka “Miniburns”:</strong></td>
<td>6/10</td>
</tr>
<tr>
<td>Establishes reliable operation in preparation for the Comprehensive Performance Test (CPT).</td>
<td></td>
</tr>
<tr>
<td><strong>Feed Rate Determination</strong></td>
<td>5/6</td>
</tr>
<tr>
<td><strong>Feed Rate Verification</strong></td>
<td>1/1</td>
</tr>
<tr>
<td><strong>CEMS/COMS</strong></td>
<td>0/2</td>
</tr>
<tr>
<td><strong>CPT/Risk Burn Pre-Run</strong></td>
<td>0/1</td>
</tr>
<tr>
<td><strong>Performance Verification Testing (PVT):</strong></td>
<td>1/2</td>
</tr>
<tr>
<td>1 week-long, 24 hour per day test with ordnance. Verifies duration performance.</td>
<td></td>
</tr>
<tr>
<td><strong>CPT / Risk Burn Test:</strong></td>
<td>0/1</td>
</tr>
<tr>
<td>3 replicate 1-day tests. Establishes environmental compliance under MACT &amp; RCRA.</td>
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</table>
Performance Verification Testing (Sept. 2006):
- ~100 Hours of Torch Operation
- 24,697 lbs. of HC Smoke Canisters Processed
- Sustained Ordnance Feed Rate: 735 lbs./hr
- Highlighted Key Technical Issues Attributable to Continuous Operation (i.e. Plugging, Tapping Efficiency)

Feed Rate Determination Testing (April 2007):
- 67 Hours of Torch Operation
- 16,511 lbs. of HC Smoke Canisters Processed
- Sustained Ordnance Feed Rate: 1368 lbs./hr
- Evaluated 4 Different Solutions to Mitigate Plugging.
- Evaluated Slag Mold Redesign
## TEST ITEMS

<table>
<thead>
<tr>
<th>DODIC</th>
<th>NOMENCLATURE</th>
<th>TYPE</th>
<th>Weight (lbs.)</th>
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</thead>
<tbody>
<tr>
<td>D450</td>
<td>Canister, 155mm HC M2 Smoke</td>
<td>Pyro. (Smoke)</td>
<td>62,455</td>
</tr>
<tr>
<td>G960</td>
<td>Grenade, Hand Riot, CN,M7</td>
<td>Riot Control</td>
<td>660</td>
</tr>
<tr>
<td>G930</td>
<td>Grenade, Hand Smoke HC AN-M8</td>
<td>Pyro. (Smoke)</td>
<td>70.4</td>
</tr>
<tr>
<td>G932</td>
<td>Grenade, Hand Smoke Red M48</td>
<td>Pyro. (Smoke)</td>
<td>57</td>
</tr>
<tr>
<td>L592</td>
<td>TOW Missile Blast Simulator Assembly</td>
<td>Pyro. (Simulator)</td>
<td>42.85 lbs. ~710 (items)</td>
</tr>
<tr>
<td>D445</td>
<td>Canister, 155mm HC M1 Smoke</td>
<td>Pyro. (Smoke)</td>
<td></td>
</tr>
<tr>
<td>L366</td>
<td>Simulator, Projectile, Airburst, M74A1/M74</td>
<td>Pyro. (Simulator)</td>
<td></td>
</tr>
<tr>
<td>L602</td>
<td>Simulator, Flash, Artillery, M21</td>
<td>Pyro. (Simulator)</td>
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<tr>
<td>F989</td>
<td>Fuze, Bomb, Tail, M905</td>
<td>HE Fuze</td>
<td></td>
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<tr>
<td></td>
<td>M30/31, XM34/35 Blast Simulators</td>
<td></td>
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</tbody>
</table>

>> Additional Items TBD <<
Technical Solutions

Slag Mold Evolution:
Technical Solutions (cont.)

Pollution Abatement Equipment Modifications:

AIR INJECTION / STAINLESS STEEL ELBOW
Technical Solutions (cont.)

Pollution Abatement Equipment Modifications:

KAOLIN INJECTION
Technical Solutions (cont.)

Pollution Abatement Equipment
Modifications:

MECHANICAL RAMMER
<table>
<thead>
<tr>
<th>TASK</th>
<th>FY 2007</th>
<th>FY 2008</th>
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<tbody>
<tr>
<td>Preliminary Testing &amp; Performance Verification Testing</td>
<td>Apr</td>
<td></td>
</tr>
<tr>
<td>Comprehensive Performance Test/Risk Burn Test</td>
<td>May</td>
<td></td>
</tr>
<tr>
<td>Data Analysis, Report, &amp; Obtain NDEP/RIX Approval</td>
<td>Jun</td>
<td></td>
</tr>
<tr>
<td>Initial Workloading</td>
<td>Aug</td>
<td></td>
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</table>

**FY 2007**

- Apr: Preliminary Testing & Performance Verification Testing
- May: Comprehensive Performance Test/Risk Burn Test
- Jun: Data Analysis, Report, & Obtain NDEP/RIX Approval
- Aug: Initial Workloading

**FY 2008**

- Jan: Preliminary Testing & Performance Verification Testing
- Feb: Comprehensive Performance Test/Risk Burn Test
- Mar: Data Analysis, Report, & Obtain NDEP/RIX Approval
- Apr: Initial Workloading
PODS PLANNED WORKLOAD

One Million Canisters
1.2 Years at 24/5 Shift

PROJ., 155MM, SMOKE, HC, M116A1

CARTRIDGE, 105MM, SMOKE, HC, M84 SERIES

CANISTER 155MM SMK HC M1 & M2

CANISTER 105MM SMK HC M1
TOW Missile Blast Simulator Assembly

- Approximately 54,000 currently located at HWAD
- AMCOM priority to demil
- Will demonstrate synergy between conventional ammo and tactical missile demil
PODS OPERATING COST ESTIMATE

- Item Weight = 92% of PROWT (for White Smoke Canisters)

- Item Weight = 50% of PROWT (for typical pyrotechnic items)

Note: PROWT = “Prorated Weight”, the weight of an item plus its portion of packaging materials.
The Plasma Ordnance Demilitarization System at Hawthorne Army Depot Will Provide the US Army with a State-of-the-Art Demilitarization Capability for Completely Assembled, Small Smoke and Pyrotechnic Ordnance, as well as a Variety of Other Ordnance.

- **PODS:**
  - Is safe
  - Is an environmentally compliant alternative to OB/OD
  - Captures hazardous constituents of the ordnance in a low-leachable, non-hazardous final waste form
  - Is cost effective