U.S. ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND

ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

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

PROGRAM OBJECTIVE

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.

BACKGROUND

- 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

BACKGROUND (cont.)

- 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

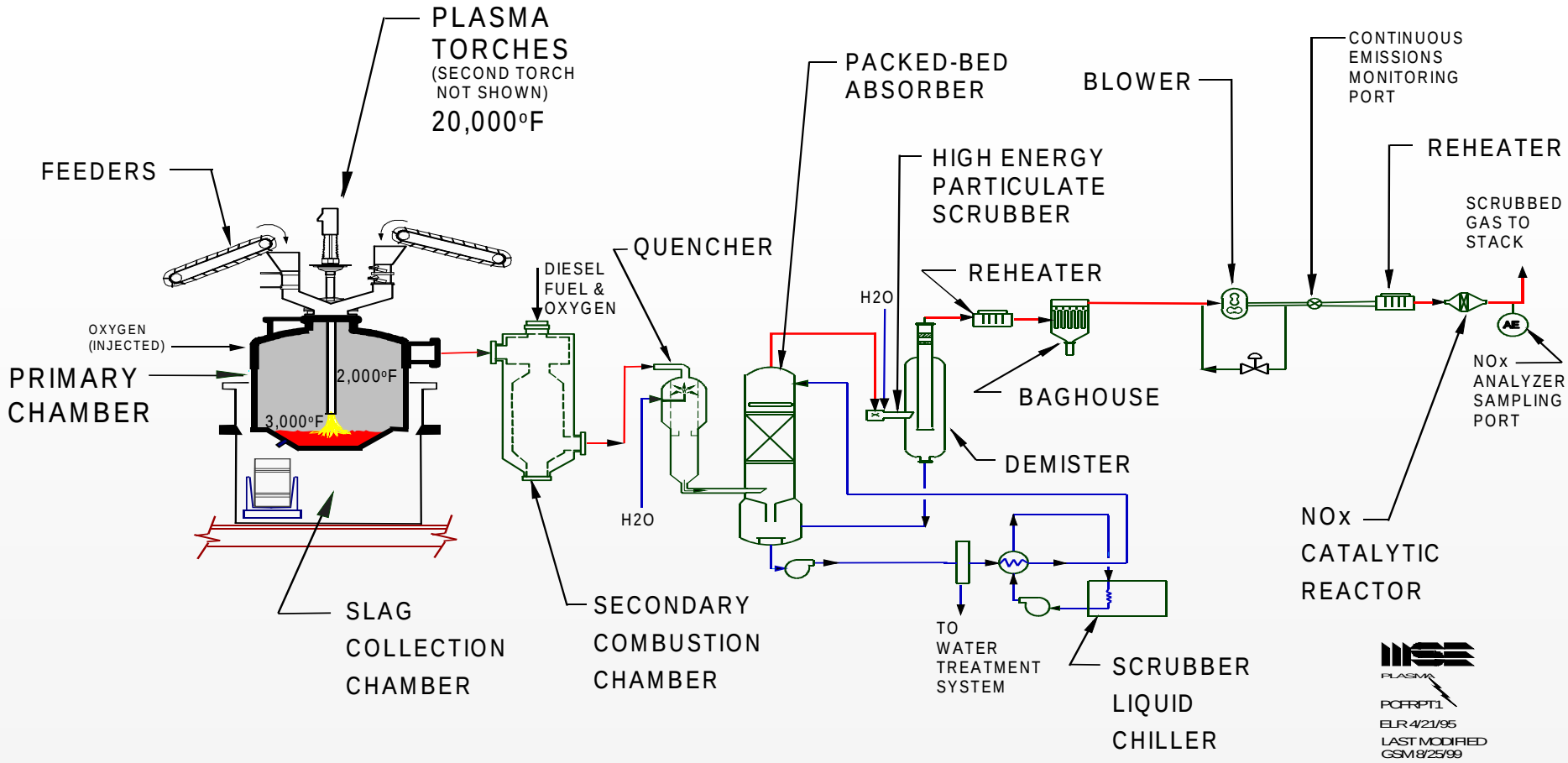
CANDIDATE ITEMS

Major Focus: Pyrotechnic Items

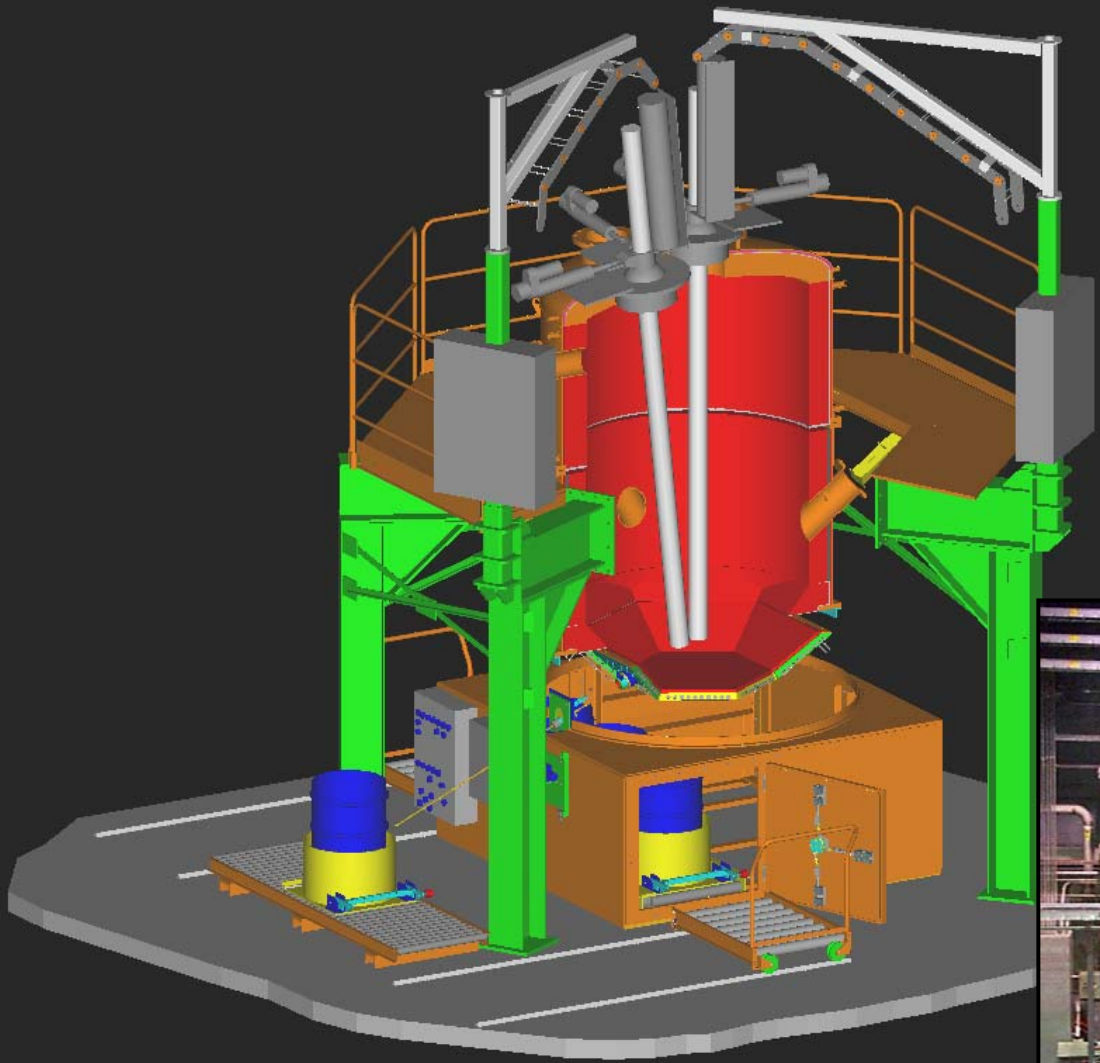
Other Items:

- Riot Control
- Incendiary
- Phosphorous
- Propellant & Cartridge Increments
- Cartridge an Propellant Actuated Devices
- By-Products of R^3 (e.g. Mortar Ignition Cartridges
- Fuzes
- Small High Explosive Components & Items

PODS PROCESS FLOW DIAGRAM



PLASMA ARC FURNACE



SLAG: PLASMA FURNACE OUTPUT

PODS FACILITY

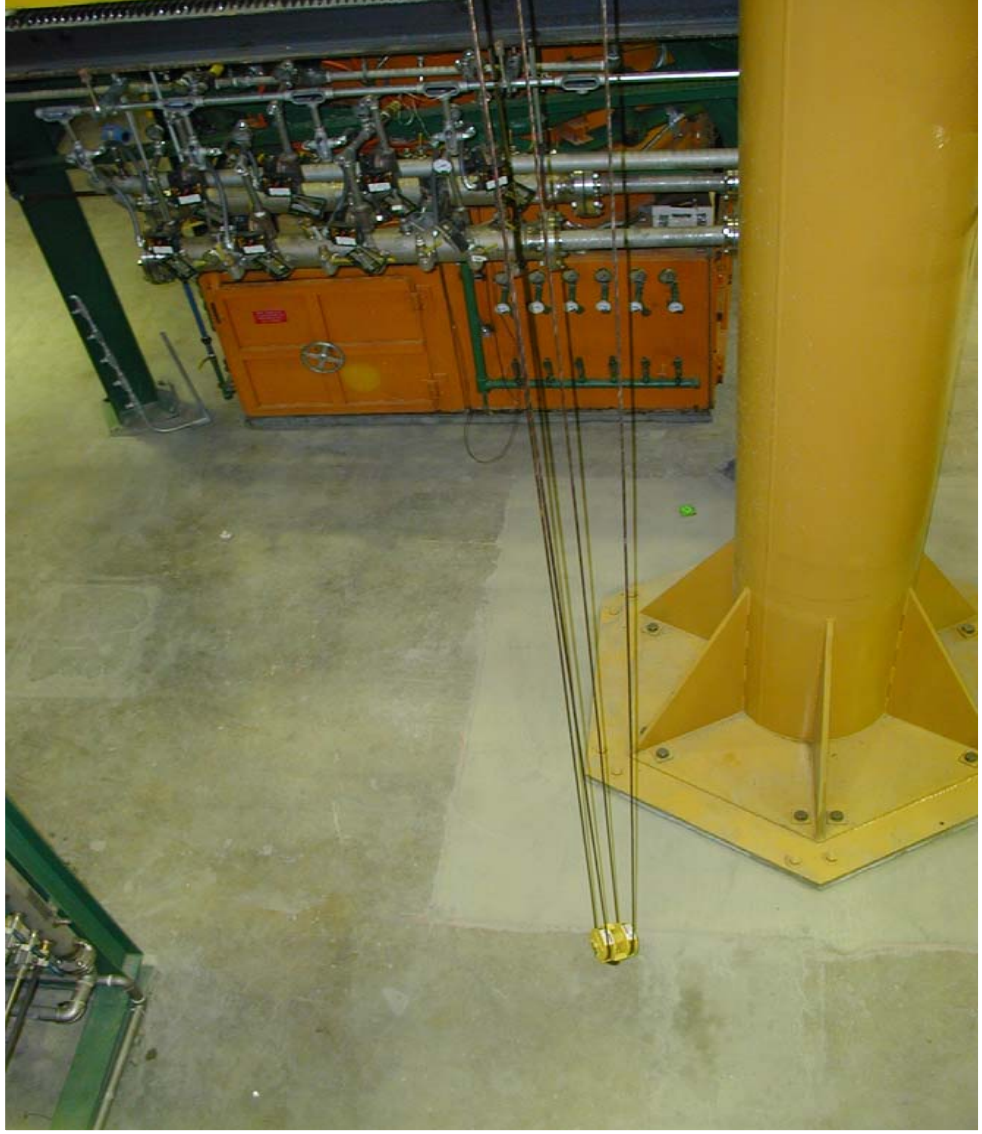
HAWTHORNE ARMY DEPOT, HAWTHORNE, NV

Ordnance Up

Soil In

Ordnance In

Ordnance/Soil Conveyors & PODS Furnace

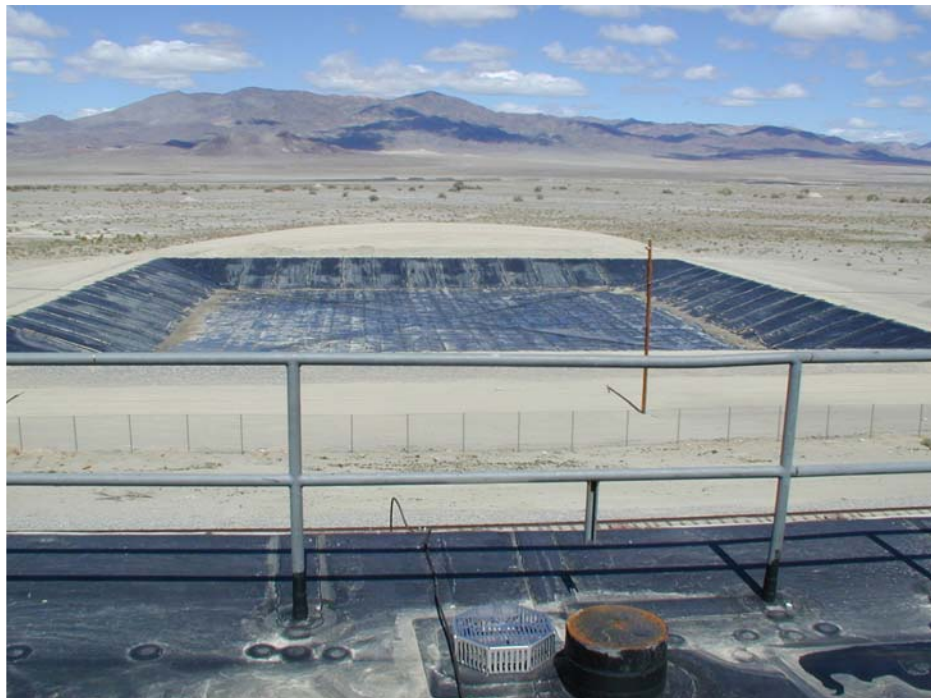


Slag Collection Chamber & Slag Crane

Pollution Abatement Equipment

Cooling Towers & Water Storage Pond

Water Treatment System & Evaporation Pond



PODS TESTING OVERVIEW

Operational Verification Testing (OVT):	7/7 Weeks Completed
Preliminary Testing (PT) aka "Miniburns": Establishes reliable operation in preparation for the Comprehensive Performance Test (CPT).	6/10 Weeks Completed
Feed Rate Determination	5/6 Weeks Completed
Feed Rate Verification	1/1 Weeks Completed
CEMS/COMS	0/2 Weeks Completed
CPT/Risk Burn Pre-Run	0/1 Weeks Completed
Performance Verification Testing (PVT): 1 week-long, 24 hour per day test with ordnance. Verifies duration performance.	1/2 Weeks Completed
CPT / Risk Burn Test: 3 replicate 1-day tests. Establishes environmental compliance under MACT & RCRA.	0/1 Weeks Completed

PODS TESTING ACCOMPLISHMENTS

- 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)**

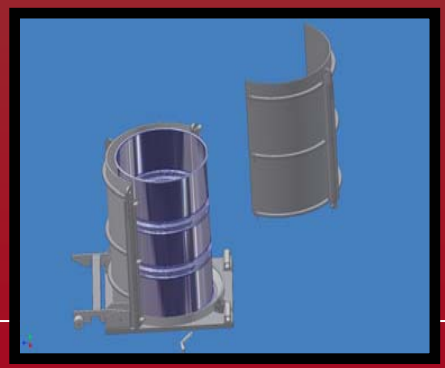
- Feed Rate Determination Testing (April 2007):
  - **67 Hours of Torch Operation**
  - **16,511 lbs. of HC Smoke Canisters Processed**
  - **Sustained Ordnance Feed Rate: 1368 lbs./hr**
  - **Evaluated 4 Different Solutions to Mitigate Plugging.**
  - **Evaluated Slag Mold Redesign**

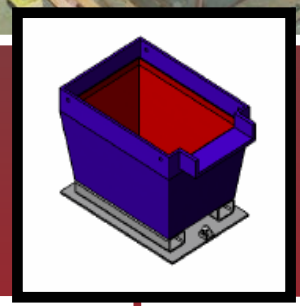
TEST ITEMS

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

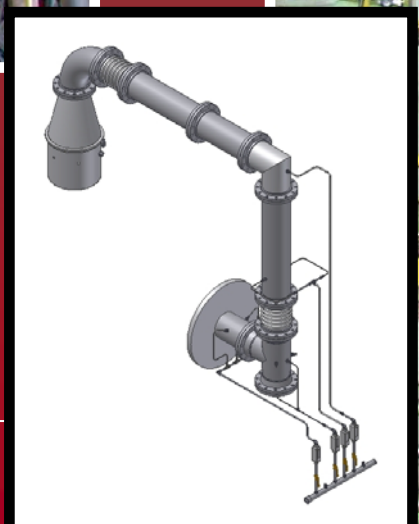
Technical Solutions

Slag Mold Evolution:





Technical Solutions (cont.)



Pollution Abatement Equipment Modifications:

AIR INJECTION / STAINLESS STEEL ELBOW

Technical Solutions *(cont.)*

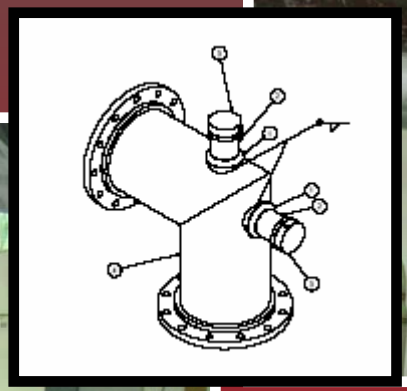
Pollution Abatement Equipment Modifications:

KAOLIN INJECTION

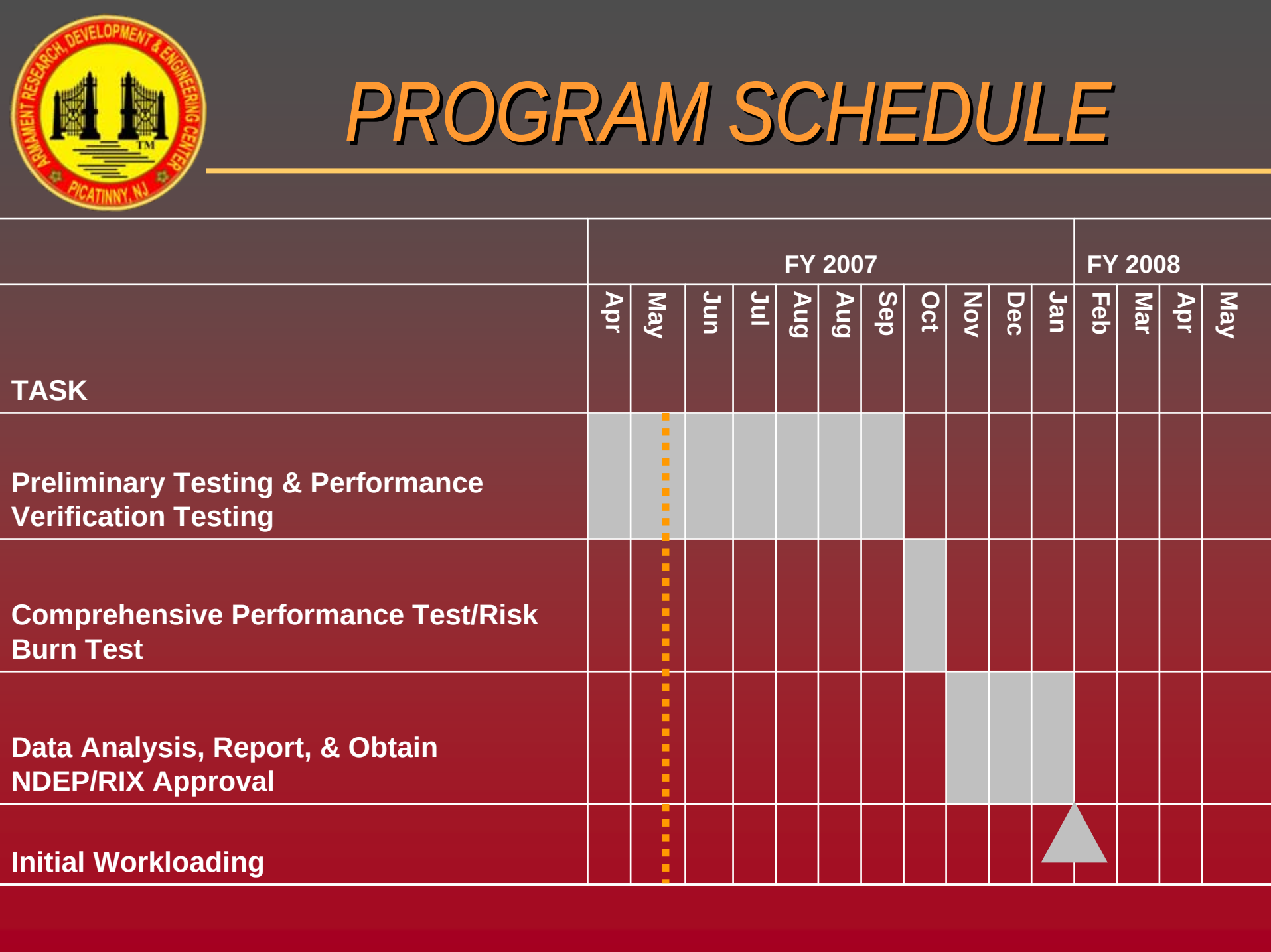
Technical Solutions (cont.)

Pollution Abatement Equipment Modifications:

MECHANICAL RAMMER



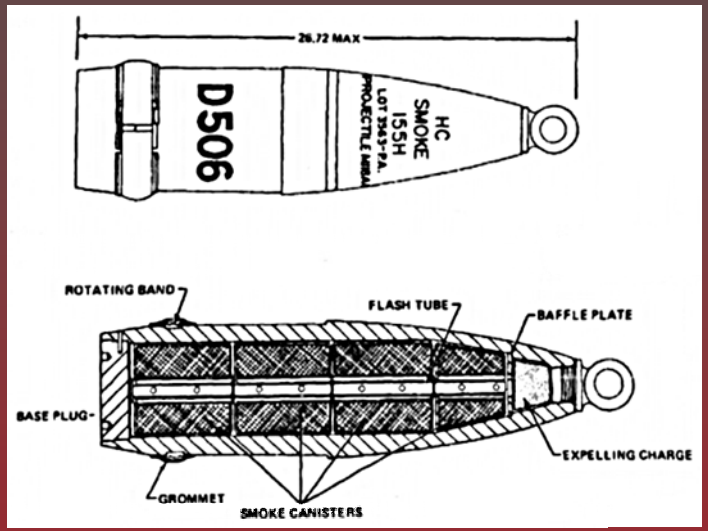
PROGRAM SCHEDULE



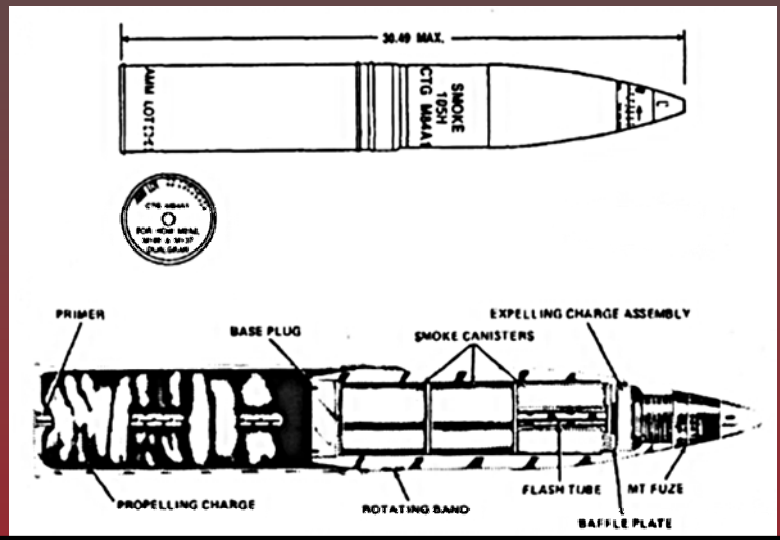
PODS PLANNED WORKLOAD

One Million Canisters
1.2 Years at 24/5 Shift

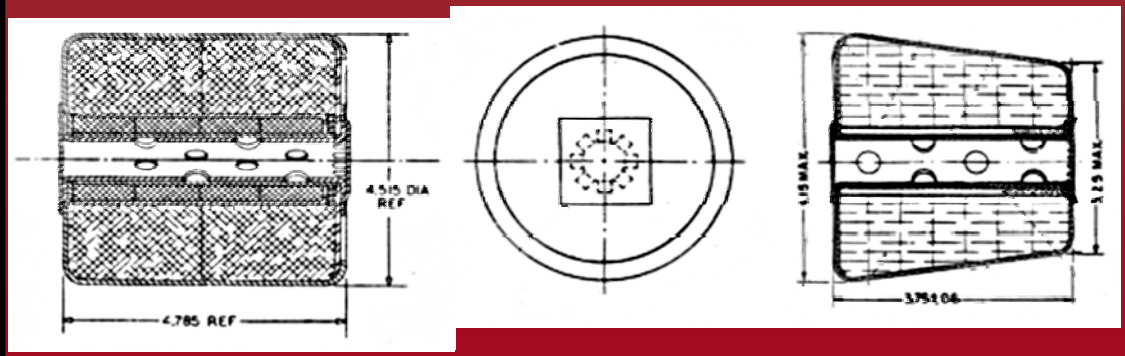
PROJ., 155MM, SMOKE, HC, M116A1



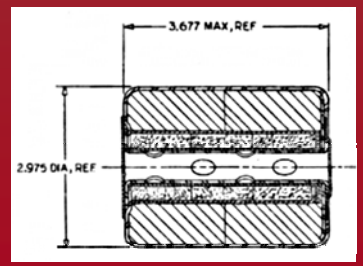
CARTRIDGE, 105MM, SMOKE, HC, M84 SERIES



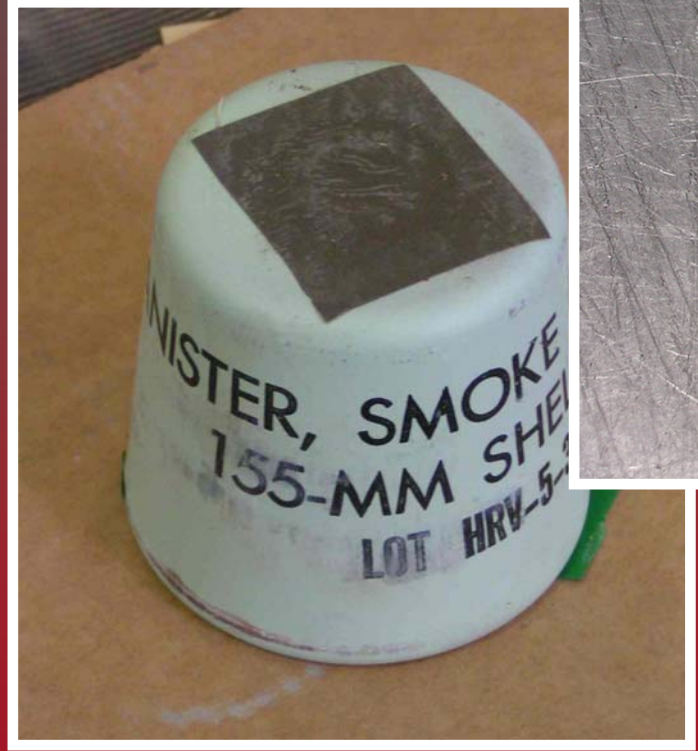
CANISTER 155MM SMK HC M1 & M2



CANISTER 105MM SMK HC M1



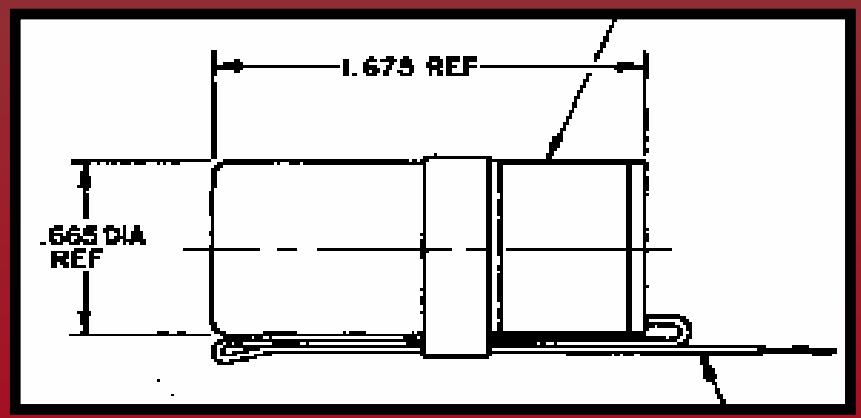
WORKLOAD ITEMS



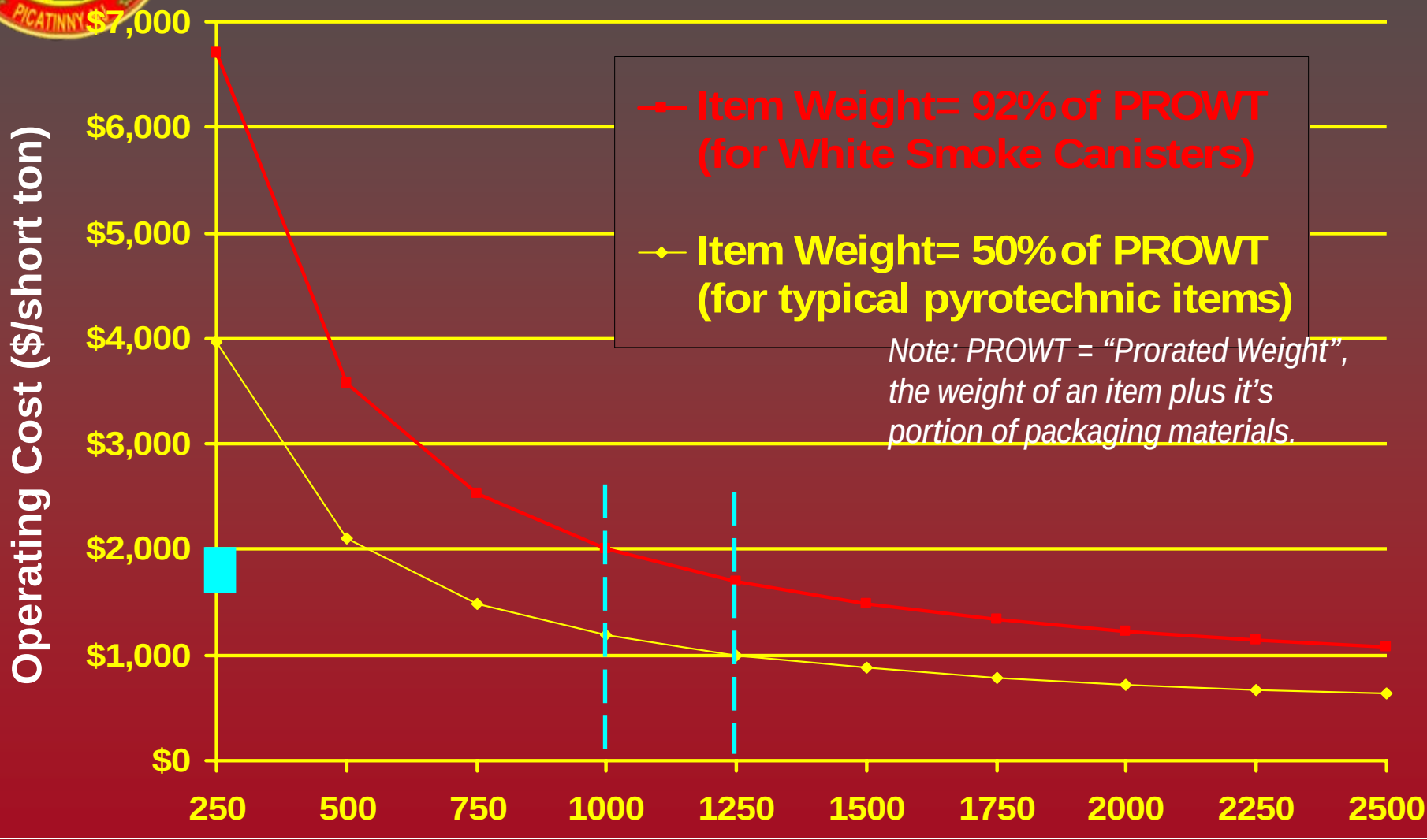
ADDITIONAL POTENTIAL WORKLOAD

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



SUMMARY

- 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