



# **Demilitarization Overview for National Academy of Sciences August 2017**

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# Purpose

- **Introduce the Demilitarization Enterprise**
- **Review current Conventional Munitions Demilitarization Stockpile (Study Goal #1)**
- **Identify Munitions for which Open Burning and Open Detonation Demilitarization Methods are currently used (Study Goal #3)**
- **Describe Resources for acquiring New Demilitarization Capabilities**

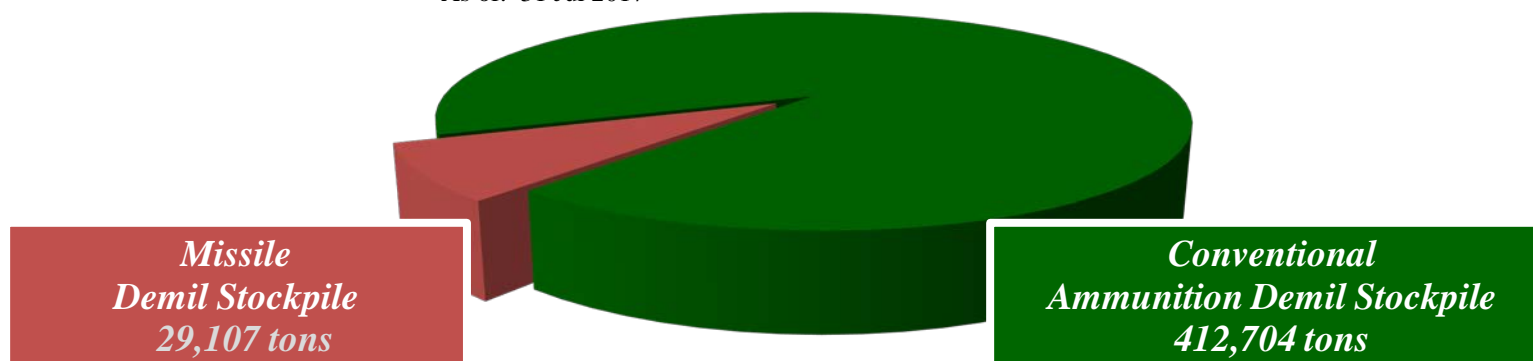


# Demilitarization Stockpile

**DODI 5160.68, Single Manager for Conventional Ammunition, Dec 2008:**  
***Demilitarization & Disposal Mission: Perform Life-Cycle Management for Demilitarization of Conventional Ammunition for the Department of Defense***

***Total Demilitarization Stockpile***  
***441,811 tons***

As of: 31 Jul 2017



## **Demilitarization Enterprise Strategic Goals**

- Efficiently reduce the Demil stockpile by maximizing use of the capacity of the organic and commercial industrial base
- Continuously improve the efficiency and effectiveness of Demil capabilities within the Enterprise
- Implement Design for Demilitarization (DFD) for all new and modified conventional ammunition products
- Increase the use of closed disposal, resource recovery, and recycling consistent with continuing to ensure minimal exposure of personnel to explosive safety risks



# US Army Demilitarization Management & Execution Structure

- Program Management
- Requirements
- Acquisition Discipline
- Cost, Schedule, Performance



**Product Director  
Demil**



- Program planning support
- Missile & Conv Ammo Execution
- RDT&E solutions

**JMC HQ  
Rock Island**

- Planning
- Execution

**JMC-South  
McAlester**

- MIDAS
- R&D
- Environmental

**ARDEC – R&D  
Picatinny Arsenal**

**AMCOM  
Redstone Arsenal**

**AMRDEC – R&D  
Redstone Arsenal**

**Demil enterprise - 88 total**



# Other Demilitarization Enterprise Members



Army Contracting Command - link to the Industry Partners in the Demilitarization Enterprise. They facilitate mission accomplishment while ensuring we are complying with federal acquisition laws and regulations

Army G-4 - has the primary responsibility for planning, programming and budgeting for resources necessary for conducting the demilitarization mission

Industry Partners - They have primarily been used to increase capacity beyond what organic depots can execute. In the future, we will asking them to also increase capability through developing procedures for demilitarizing munition items for which an approved procedure has yet to be demonstrated.



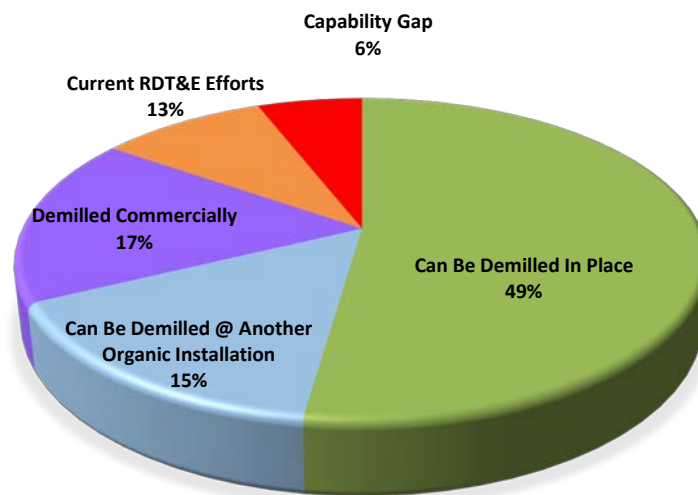
# Demilitarization Planning



- Develop Requirements
  - Safety/Emergency Demil
  - Policy Mandates
  - Contractual
  - Environmental Permitting
  - Depot Mission Changes
  - Readiness
  
- Prioritize Workload
  - Cost/Ton
  - Top 400 (85~90% of stockpile)
  - Policies (Current and Future)
  - Storage Efficiency (pending future readiness state)



# Overview of Stockpile top 400 (380,198 tons, 86% of B5A)

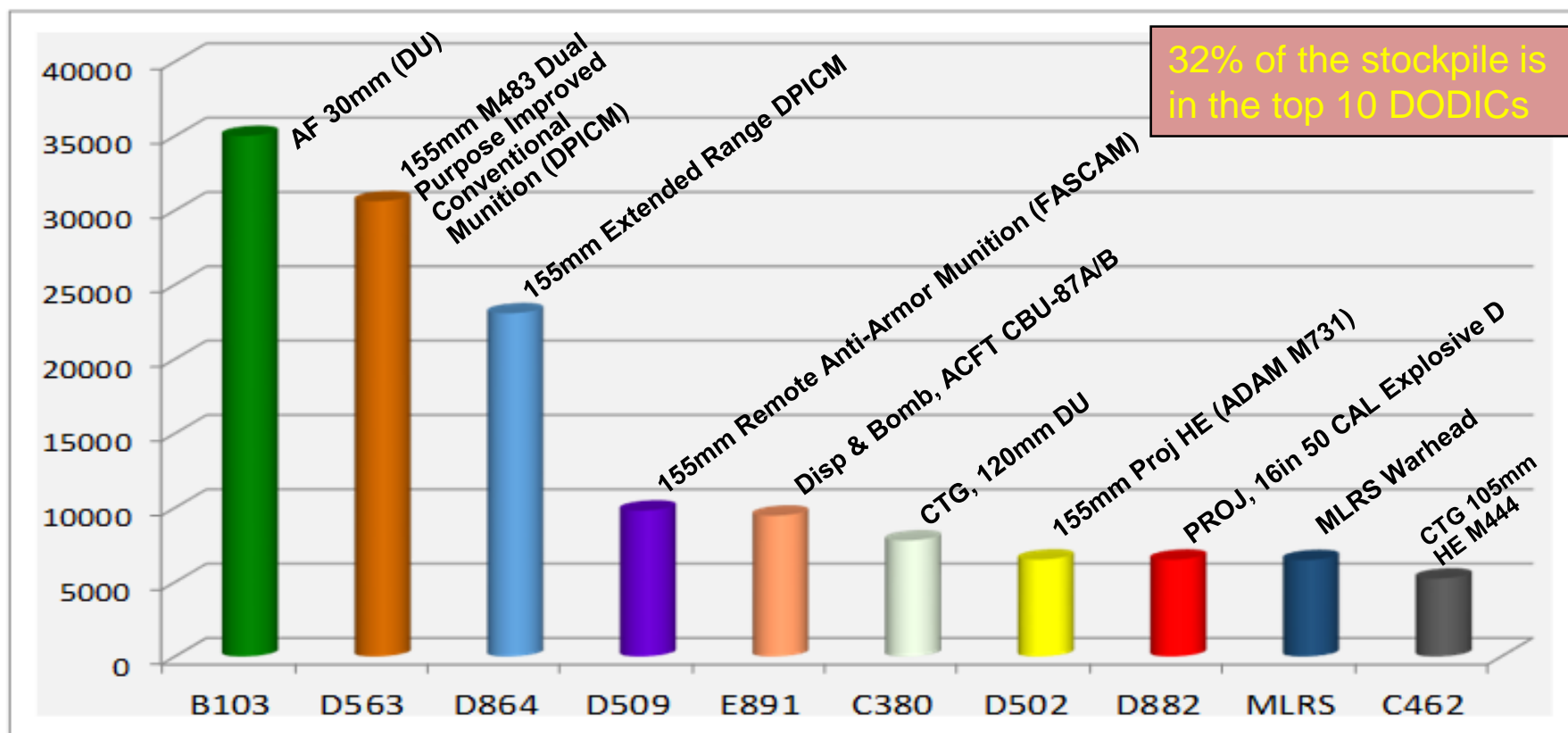


- Currently have Proven Capability to Demilitarize 335 DODICS
- Active RDT&E efforts to address 15 additional DODICS
- 50 DODICS in Capability Gap – Diminishing Returns for Item Specific Methods



# Major Demil Stockpile Items (Tons)

*----Over 7,000 DODICs in the Demil Account----*



Concentrate on major stockpile munitions

- Best opportunity for recoupment of facility costs
- Establish multiple capabilities; maximize cost efficiency

Data as of July 2017





# Items Warranting Special Attention

- Improved Conventional Munitions and other Cluster Munitions
  - Dominate the Stockpile – Ten of the Top 15 (D563 and D864 constitute over 10% of the stockpile)
  - Currently restricted to Demilitarizing Unserviceable Munitions
- Depleted Uranium
  - Require Special Disposal procedures
  - 30-mm and 120-mm in top 10
  - Adequate Facilities exist in Organic and Commercial Base
- Smoke Producing
  - Range from grenades through artillery projectiles, bombs and bulk material
  - White Phosphorous Capability in Organic Base
  - Current RDT&E efforts for Red Phosphorous and Riot Control Agents
  - Commercial Contract HC Smoke
  - Efficacy of Procedures has not been Fully Demonstrated



# Items Warranting Special Attention

- Obsolete Rockets and Missiles
  - Munitions which have been Stored for Decades now present Safety Risk
  - Obsolete Rocket Motor Working Group has Identified 10 candidates in Near Future
  - Priority Not Based on Prevalence in Stockpile, None of these missiles exist in large quantities



# Munitions Characterization

- **40 CFR**
  - ✓ §260 through §271
- **JCAPP 7**
- **EPCRA Section 313**
- **Resource Conservation and Recovery Act (RCRA)**
- **Resource Recovery and Disposition Account (RRDA)**
- **DA PAM 700-16**





# MIDAS

## Munition Items Disposition Action System

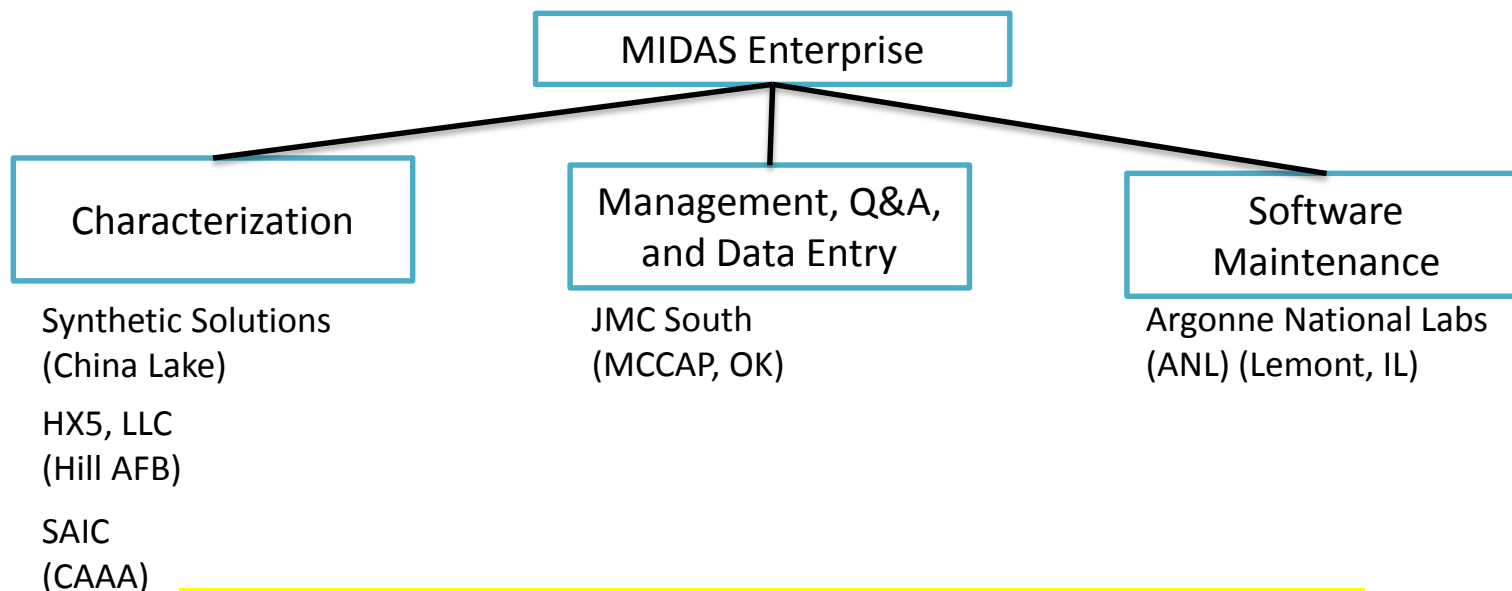


- MIDAS is an On-line database that details Munition items to meet requirements of 40 CFR and R3
- B5A (Army, Navy, Air Force and Marines) and field service accounts
- Over 30,000 NSN's characterized
- Proprietary and Classified Off-line
- Digitization and storage of TDP's



# MIDAS Background

- MIDAS is a management tool which provides a central source of information on the structure and composition data for conventional munitions
  - Contains detailed historical information on the structure and composition of munitions in a hierarchical format that enables users to quickly and clearly discern the construction
  - Supports open burning (OB) and open detonation (OD) while identifying alternatives
- MIDAS currently runs on a server at MCAAP, software maintained by commercial contract



Total cost in FY 17 approx. \$ 4.3M (\$ 2.4M for contractors)



# Demilitarization Methods

Organic Capabilities (Processes)	Organic Location						
	MCAAP	CAAA	HWAD	ANMC	TEAD	LEMC	BGAD
Open Detonation	A	A	A	A	A	A	A
Open Burn	A	A	A*	A	A	A	A
Static Fire	A	A			A	A	
Rotary Kiln (APE 1236 or RF-9)	A	A	A		A		
Flashing Furnace			A	A			A
Autoclave Meltout	IO		A				
Hot Water Washout			A				
APE 1400 White Phosphorous to Phosphoric Acid Conversion		A					
Explosive D Conversion to Picric Acid		A					
Hot Gas Decontamination System			A				
Base Hydrolysis					A		
	Legend:						
	A. Active and Currently Operational Capabilities (Processes)						
	IO. Inactive but Fully Developed Capabilities (Could be operational with limited effort)						



# Open Burning

- Items Demilitarized by Open Burn in FY 16 and 17 (total over two years)

ITEM	ANMC	CAAA	HWAD	LEAD	MCAAP	TEAD
Bulk Propellant		168 Tons	7 Tons			2387 Tons
Propellant Charges (155mm & 8 inch)	956 Tons	4716 Tons		1757 Tons	520 Tons	

- New Items Planned for FY 18
  - 30-mm propellant at CAAA and TEAD

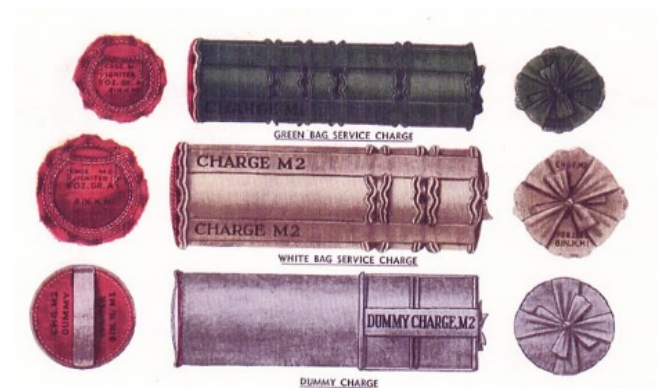


Figure 6-- Color Identification of Artillery Propelling Charges

RA PD 97766



# Missile Open Burn/Static Firing

- Items Demilitarized by Open Burn in FY 16 and 17 (total over two years)

ANMC	CAAA	HWAD	LEAD	MCAAP	TEAD
117 Tons Motors/ Components: TOW, Stinger, Sparrow, Sidewinder	52 Tons Motors/ Components: Standard Sidewinder Sparrow, TOW	54 Tons Motors/ Components: Maverick, Standard, Sparrow, Sidewinder TOW	119 Tons Motors/ Components: Standard, HAWK, Sparrow, Sidewinder, TOW	285 Tons Motors/ Components: Maverick, Standard, Honest John, Stinger, Hawk, Chaparral, Sparrow, Sidewinder	20 Tons Motors/ Components: Nike, Maverick, TOW, Sidewinder, Standard, Sparrow

- New Items Planned for FY 18
  - Tomahawk Boost Motors (MCAAP)
  - Patriot Motors (MCAAP)





# Open Detonation

- Items Demilitarized by Open Detonation in FY 16 and 17 (total over two years)

ITEM	ANMC	BGAD	CAAA	HWAD	LEAD	MCAAP	TEAD
60-mm Mortar Cartridge				2856 Tons			
Large Caliber Cartridges		243 Tons 105-mm	469 Tons 90-mm	7510 Tons 105-mm submunitions		1693 Tons 90-mm	
155-mm Projectiles			5685 Tons Submunitions		114 Tons	9109 Tons Submunitions	
CBU-87 Submunitions				5000 Tons			
Mines		337 Tons					
Fuzes					207 Tons		
Other	81 Tons File Destroyers			789 Tons Adapter Boosters	122 Tons Projectile Bursters 86 Tons Navy Spotting Charges, arming devices and igniters	42 Tons Percussion Primers	117 Tons Engine Starters



# Open Detonation

- Additional Items Planned for Open Detonation in FY 18
  - 81-mm Mortar Cartridges at ANMC
  - Supplementary Charges at MCAAP
  - 40-mm Tracers at MCAAP
  - Walleye Guided Bombs at MCAAP
  - Underwater Signals at LEMC
- Additional Items at TEAD if South Range Becomes Available (3341 Tons)
  - General Purpose Bombs
  - 60 and 81-mm Mortar Cartridges
  - 75, 90, 105, 120 and 155-mm High Explosive and High Explosive Anti-Tank Cartridges
  - 3 inch Warheads and Cartridges
  - 2.75 inch Warheads



# Missile Open Detonation

- Items Demilitarized by Open Detonation in FY 16 and 17 (total for two years)

ANMC	CAAA	HWAD	LEAD	MCAAP	TEAD
124 Tons Warheads/ Components: Hellfire, TOW, Stinger, Sparrow, Sidewinder	40 Tons Warheads/ Components: Standard Sidewinder Sparrow, TOW	61 Tons Warheads/ Components: Maverick, Standard, Sparrow, Sidewinder TOW	252 Tons Warheads/ Components: Standard, HAWK, Sparrow, Sidewinder, TOW	290 Tons Warheads/ Components: Maverick, Standard, Honest John, Stinger, Hawk, Chaparral, Sparrow, Sidewinder	22.5 Tons Warheads/ Components: Nike, Maverick, TOW, Sidewinder, Standard, Sparrow

- New Items Planned for FY 18
  - Tomahawk Warheads (MCAAP)



# Resources for Acquiring New Demilitarization Capabilities



- **Research, Development, Test and Evaluation (RDT&E) Program**
- **Ammunition Peculiar Equipment (APE)**
- **Reclamation, Recycling and Reuse**



# Demil RDTE Focus

- **Address the Capability Gaps within the Top 400 Demil Stockpile**
  - ✓ Proven technologies preferred
- **Omnivorous Capability**
  - ✓ Width – ability to demilitarize a variety of cartridges
  - ✓ Depth – ability to demilitarize at higher rates (2K tons annual target)
  - ✓ Minimize Disassembly / Maximize throughput
  - ✓ Decrease Labor Hours
- **Efficiency Increase in Existing Operations**
  - ✓ Increase the industrial efficiency of current organic operations
- **Increased Safety in Operations**
  - ✓ *DoD 4145.26-M* DOD Contractor's Safety Manual For Ammunition and Explosives
  - ✓ DA PAM 384-64 Ammunition and Explosives Safety Standards
  - ✓ Emphasis on Comprehensive Risk Analysis/Management
  - ✓ Prevent stockpiling of residuals materials sell on a routine basis



# APE Program

- Description:
  - The APE program was established in 1955 with the mission of developing uniform standard equipment in support of maintenance, renovation, repair, and demilitarization of munitions returned to the wholesale (depot and ammo plant) level.
  - APE program supports installations and depots regularly along with Ammunition Supply Points (ASP) via a HQDA approved ASP initiative.
  - The program provides a worldwide, centralized source of standard, modern, safe, reliable and environmentally acceptable equipment for ammunition maintenance, surveillance and Demil operations.
  - The program ensures the prevention of damage to ammunition or related facilities, as well as injury to personnel as a result of unauthorized or improper equipment design, use or modification.



# APE

## Recent Accomplishments and Initiatives

### Accomplishments

- Delivered and installed linking and delinking machines for 20mm program at LEMC.
- APE 1114M1 and M2 delivered to ARDEC for SOCOM program
- Delivered and installed equipment for 60mm program at CAAA
- Delivered, installed and recapitalized APE 1408M1 and 1410 equipment at Joint Base Lewis McCord, Ft. Hood, Camp Greenleaf, Camp Atterbury and Ft. Pickett.
- Continued support on APE 1236 RKI Improvement Projects
  - ✓ Burner Upgrade at CAAA completed
  - ✓ Controls and Instrumentation Upgrade at TEAD Completed

### Initiatives

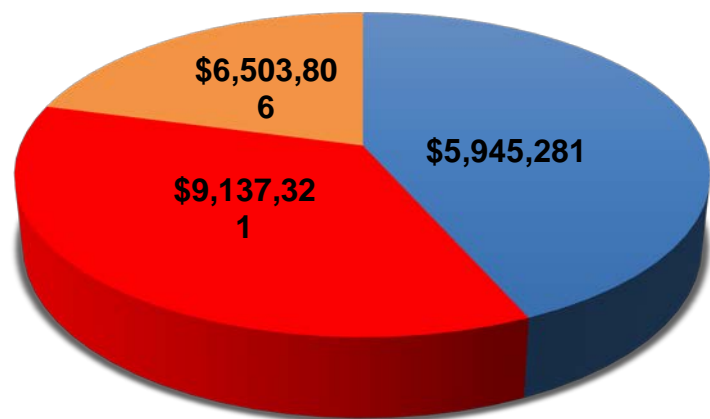
- APE 2271 Super Pull Apart Machine (SPAM)
  - .50 cal to 40mm
  - Automated High end system
- APE 1400 White Phosphorus Plant start up
- Phase two of pollution abatement system contract award
- Providing APE equipment to industry



# Reclamation, Recycling, & Reuse (R3) Total Funding Status

FYs 14-17

- The R3 program authorizes the sale of usable residual materials resulting from demilitarization projects and allows the funds received to be used by the Army to expand R3



■ Projects Funded ■ 60% Balance ■ 40% Balance

Balances as of 11 APR 17

R3 Program collected \$13,828,207.13 in scrap sale proceeds from FY14 to FY17

On average, the R3 Program collects \$5.6M in proceeds each year

Example purchases include 76mm/105mm/120mm White phosphorous breakdown workload at CAAA, and HVAC support for missile demil at LEMC.

Re-investment of R3 proceeds into demil projects, facility upgrades that further enhance R3

- ✓ Large current balance is being looked at for future investment into an omnivorous demil capability

**\$6.5M of R3 balance executed in FY16 to further the demil mission**





# Summary

- **Demilitarization Enterprise consists of multiple organizations committed to Safely and Efficiently eliminating the Stockpile**
- **Demilitarization Stockpile is very Large, but Decreasing...Slowly**
- **Stockpile is very Diverse, with a Relatively few Items that Demand Significant Attention**
- **Open Burning and Open Detonation are just some of the Methods used for Demilitarization**
- **RDT&E, APE and R3 Efforts provide Important new Capabilities**