



U.S. Army Research, Development and Engineering Command



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

2015 Global Demilitarization Symposium
Munitions Cryofracture Demil Facility for the Area
Denial Artillery Munition (ADAM) 155MM Projectile

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US Army ARDEC

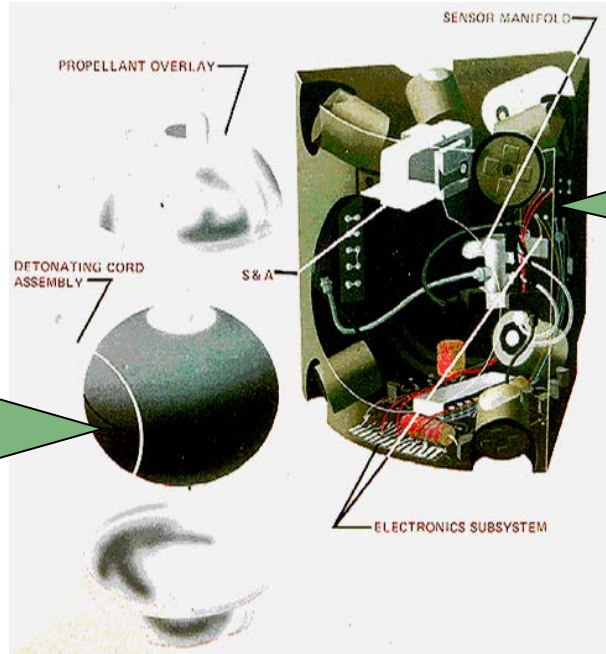
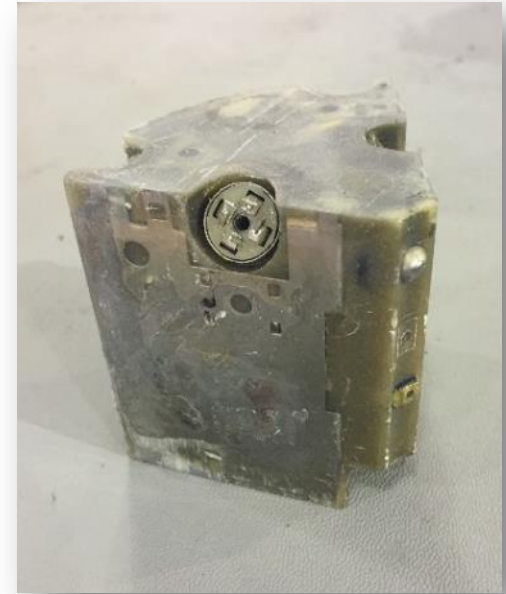


- Project Driver
- ADAM Projectile
- Process Description
- Test Operations
- Future Plans
- Project Team



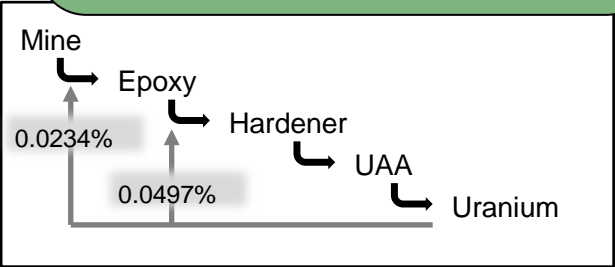
- Global pressure to ban anti-personnel landmines
 - 1997 Ottawa treaty initiated, over 160 countries signed to date (US has not)
 - 2004 US policy eliminated use of persistent landmines
 - 2014 US policy eliminated use of all landmines, directed to destroy stockpile
- Ongoing inquiry & scrutiny on demil status from the Administration, OSD, & Army G-4
- OPM Demil priority to establish a demil capability

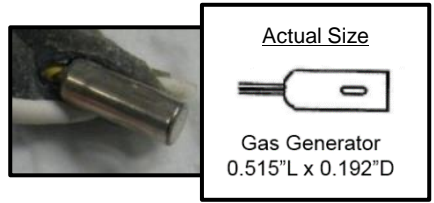




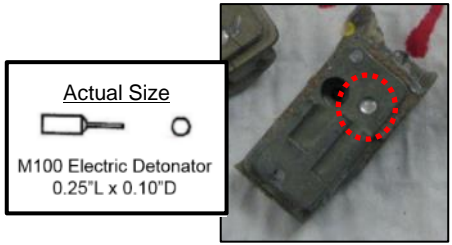
OVERLAY/KILL MECHANISM (O/KM): Golf ball sized kill mechanism with double walled aluminum overlay.

MINE HOUSING: Parts encased in an epoxy that contains the compound Uranyl Acetylacetonate – 0.0974 grams uranium per mine.

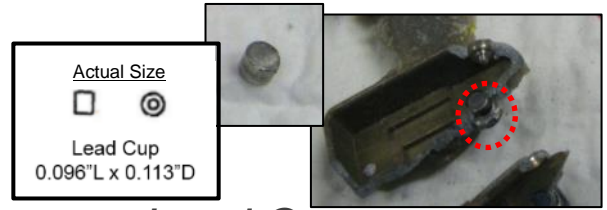




Gas Generator
(not shown in diagram)



M100 Electric Detonator



Lead Cup



Delay Detonator

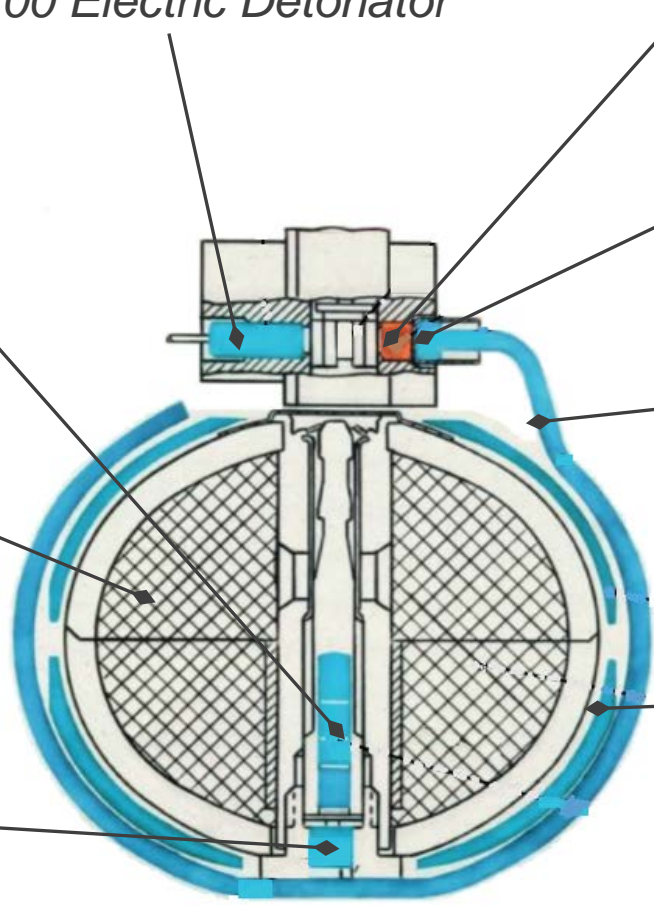


Booster Cup

Kill Mechanism



Propellant Nut



Detonating Cord

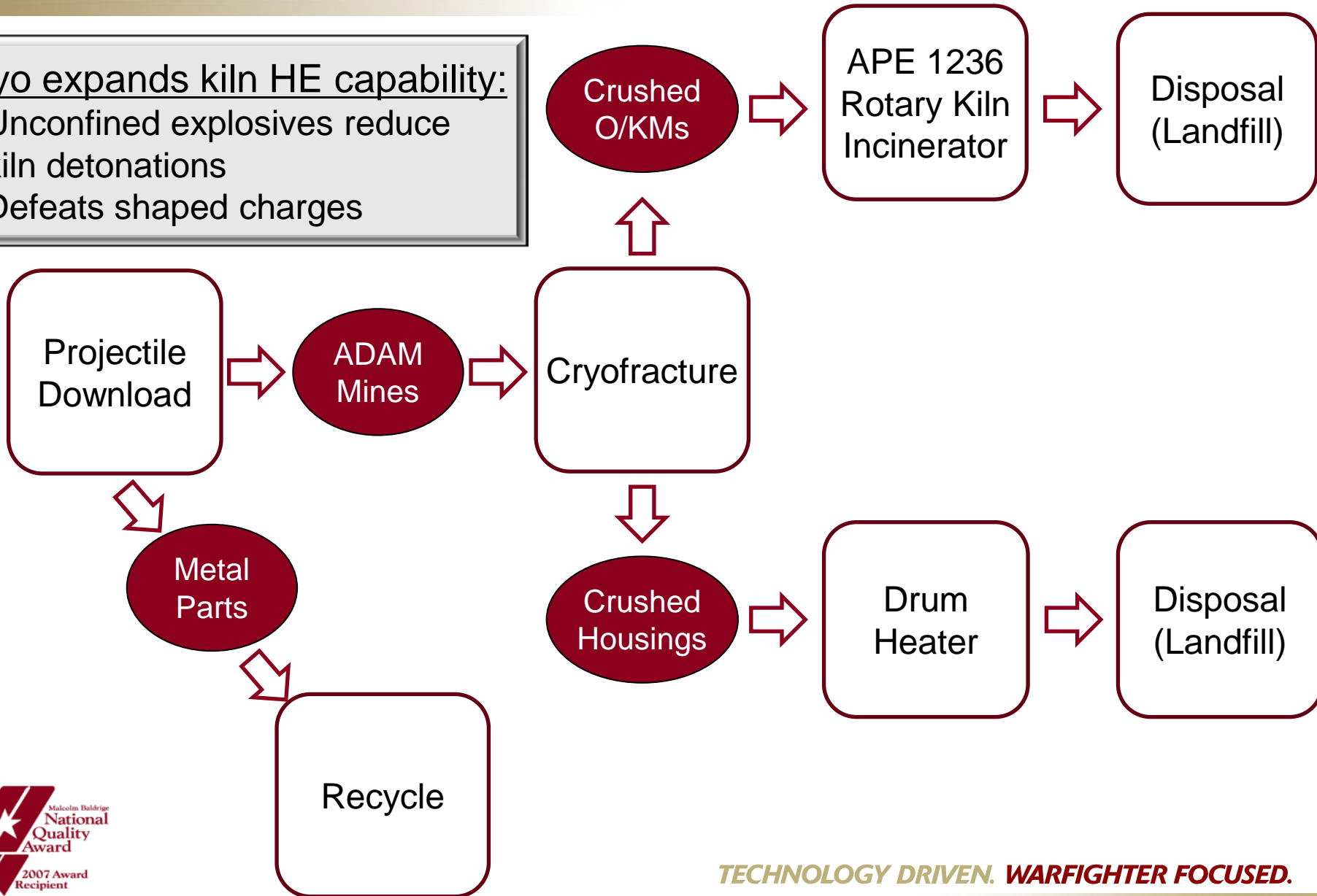
Overlay





Cryo expands kiln HE capability:

- Unconfined explosives reduce kiln detonations
- Defeats shaped charges





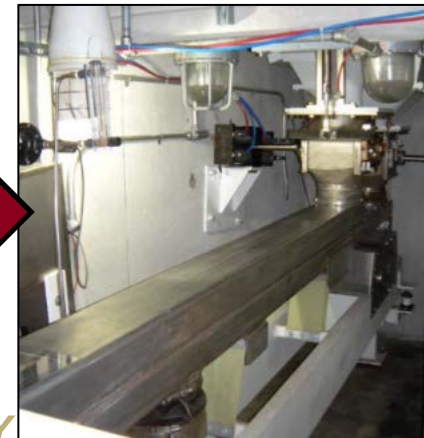
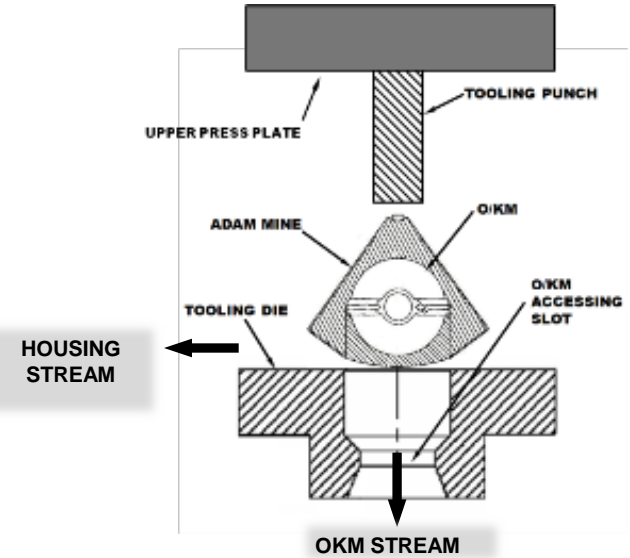
- Manual stations
- Existing Ammunition Peculiar Equipment (APE) and Commercial equipment.



- Individual mines are loaded into trays, then soaked in a liquid nitrogen bath.



- Mines are placed on a press, punched/crushed & separated.



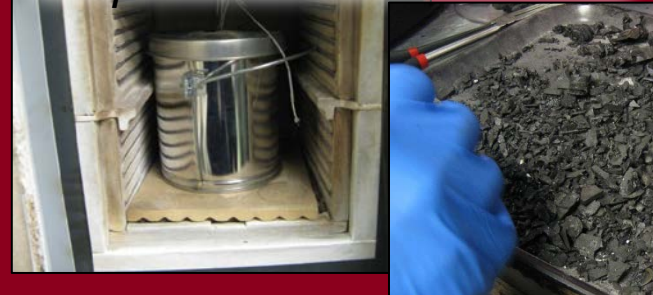
- Crushed OK/Ms are directed into the APE 1236 Rotary Kiln incinerator.



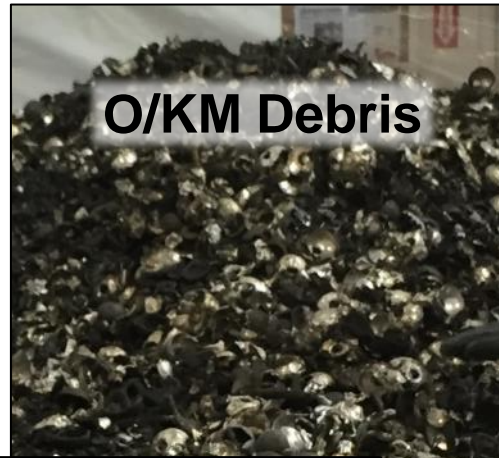
- Crushed mine housings are directed into a drum heater.



ARDEC support testing done to determine deactivation temperature



- Enclosed negative pressure inspection tent to verify “Material Declared as Safe” (MDAS).
- Temporary measure, collecting data to support DDESB “approved means” determination.





- Initial testing and low rate initial production (LRIP) conducted with loose (already downloaded) mines.
- Recent (2015) testing and LRIP demonstrated the download line and cryofracture reliability improvements.

Test	Non-Haz Mines	Live Mines	Total Mines	Projectiles Downloaded
Initial testing/LRIP	-	-	122,297	0
2015 testing/LRIP	4,313	67,536	71,849	304 @ TEAD 1,572 @ MCAAP
Total			194,146	1,876



- MCAAP APE 1236 rotary kiln incinerator pollution abatement upgrade project will be conducted Jan 2016 – Jun 2017.
 - Cryofracture transition to production is on hold until this is completed.
- Remaining tasks to transition to production:
 - Conduct training of MCAAP personnel on control room operations and maintenance activities. (MCAAP is already operating the download line, munitions feeding, and debris handling.)
 - Pursue DDESB “approved means” designation to lift inspection requirement.
 - Obtain NRC license.
 - Documentation and transition to production.



- **Product Manager for Demilitarization**

- Sponsor & Program Management



- **US Army RDECOM-ARDEC**

- Project Management
- Hazard classification & packaging
- Radiological analysis
- Lab testing
- Item engineer



- **Joint Munitions Command**

- Workload coordination
- Radiological support
- Historical download knowledge



- **McAlester Army Ammunition Plant**

- Site operations, engg, env, safety
- Ammunition Peculiar Equipment (APE)



- **Tooele Army Depot**

- APE, test download & cryofracture, kiln support



- **General Atomics**

- Cryofracture design, installation, test operations



- **IPS Custom Automation**

- Download line design, installation, start-up



- **Coterie Environmental**

- Environmental permitting



- **Safety Management Services**

- Hazard analysis



- **US Army Public Health Command**

- Radiological monitoring, health risk assessment



- **Corps of Engineers, Huntsville**

- Safety analysis



- **DoD Explosive Safety Board**

- Approved means review



- **Defense Ammunition Center**

- Approved means liaison