Using Waterjets to Safely Process MPPEH

Paul L. Miller
Sr. Staff Scientist
Gradient Technology
MPPEH

- Universal problem
- Items often too big to be put into a flashing furnace
- Most qualified scrap dealers won’t handle metal in this shape
- Needs to be cut and certified as safe
Oxyfuel Torch Cutting

• Oxyfuel torch
  – Traditional cutting method
  – Low capital
  – Minimal training req’d

• Could be a problem if this was a live projectile, had residues, or if the filler reacted
Bitten by an Inert

• “Inert projectiles are sometimes filled with a waxy hydrocarbon material, and the cutting operation has apparently resulted in one recent explosive incident, when an energetic overpressure event occurred from torching an inert filler which ignited and burned rapidly enough to explode a 5-inch shell” – DDESBS 2004
Exothermic Torch

- Exothermic torch
  - Traditional cutting method
  - Low capital
  - Minimal training req’d

- Could be a problem if this was a live bomb, had residues, or if the filler reacted
Abrasive (Hot) Saw

- Abrasive Saws
  - Traditional cutting method
  - Low capital
  - Minimal training req’d

- Could be a problem if this was a live bomb or had residual explosives
Hydraulic Shear

- Shears
  - Traditional cutting method
  - High capital
  - Training req’d

- Could still be a problem if this was a live bomb or had residual explosives
Shear Problems

• “Recently, a hydraulically operated shear initiated a spotting charge while cutting a BDU-45/B 500 lb practice bomb and caused four injuries” – DDESB 2004
Residual Explosives?

PELAN detection limit is ~500 grams

However, the Mk2 anti-personnel hand grenade contains only 57 grams of TNT
Abrasive Waterjet Cutting

Non-traditional technology cuts through metals

Doesn’t initiate explosives
Waterjet Demil Line at CAAA

- Waterjet line at CAAA designed to cut live HE projectiles w/ corroded fuzes
- Cutting MPPEH is even easier
Mattawoman Creek - NSWC-IH
MPPEH
МПРЕН
МПРЕН
More MPPEH
Abrasive Waterjet w/ Mk83
Process Control Room
Good Planning Pays Off

Starting with the seventh item the team found live explosives.
Loading Mk84 2000lb Bomb
Placing Mk84 Bomb in WJ
Mk84 Bomb in Position
Waterjet Cut Mk84
2000lb Sea Mine
Missile in Waterjet Cutter
3000lb EX??
Loading 16-in/50 HC
16-in/50 HC Post-Cut
16-in/50 HC Details
20mm Phalanx Ammo Drum
Cut Items
Loading Certified Scrap
Container Sealed
Job Well Done!
Conclusions

• MPPEH can be quickly handled by high pressure abrasive waterjets in a safe and reliable manner
  – Waterjet system designed to process explosive items
  – Unusual configurations can be easily accommodated
    • Very large bombs to 20mm
    • Items with fins and badly deformed items