White Phosphorus Demilitarization
Industriepark Spreewerk Lübben GmbH

Disposal of ammunition and explosive substances
Acquired by General Atomics in 1992

- Converted the once small arms ammunition manufacturing plant into a state of the art demilitarization plant incorporating a highly modified Rotary Kiln System (RKS)

- Over fifteen (15) years of excellent demilitarization experience

- Have optimized existing technologies as well as develop new and improved methods for dismantling munitions

- Employs the most environmentally-friendly processing while extensively focusing on Resource, Recovery and Recycling (R3)
Lübben, County Brandenburg

Harbor Wismar 350 Km
Harbor Rostock 300 Km
SPREEWERK

Management

Administration

Marketing

Quality Management

Contract Management

Production
Additional services

Demilitarization

Design/Development

Post Design Services

Modification

Consulting

Conventional caliber ammo
Missiles / rockets
Demolition charges / hand grenades
Mines & bombs
Unexploded ordnance (UXO)
Air-bag systems
What is White Phosphorus?

White Phosphorus (WP) is a chemical element used in conventional ammunition used for signaling, screening, and incendiary purposes, as well as for its anti-personnel (AP) capabilities.

Primarily used in bombs, artillery shells, and mortar shells, grenades, flares tracers, etc.

- can be fired with fuzed timer to obtain an airburst

Ignites when exposed to oxygen (spontaneously flammable)
- produces Phosphorus Pentoxide (highly hygroscopic)

However, WP is also used in many non military items
- from toothpaste to soft drinks to cleaning solutions
White Phosphorus issues

- **Ignites when exposed to oxygen**
  - Will only extinguish after all elements have expired OR, when submerged in H₂O

- **Highly Hygroscopic – will impact a person**
  - Inhaled – will destroy lung tissue resulting in agonizing death
  - Contact with clothing – will burn through to skin unless treated immediately
  - Contact with skin – will burn down to the bone if not treated immediately

- **Processing/demil must be controlled and safe**

- **All personnel who handle WP must receive special training (and certification) prior to work.**
  - Local Government office must have copy of training & certification

- **Some WP items contain problematic felt pads/wedges**
  - M825 WP 155mm Projectile
  - Special care must be taken
White Phosphorus demil

Safety first!

Special safety clothing:

- Respiratory protection
- Rubber gloves with long cuffs and cotton lining (or protective leather gloves)
- Flame retardant jacket and trousers with bib
- Leather welders apron
- Cotton undersuit
- Rubber boots

Safety boots soaked in Copper Sulphate solution before and after each shift.
White Phosphorus demil

Safety first!

Course sand is always within the processing area in the event of any spill within processing area.

Safety tub full of water and Copper Sulphate solution. Copper Sulphate neutralizes WP.
White Phosphorus items demilled

60mm Mortar

Other WP items

155mm

81mm

4.2” Mortar

SPREEWERK
White Phosphorus demil

M825 155mm WP munition
White Phosphorus demil

Shell is placed on a lathe
- Predetermined groove cut into external steel body
- Cut/groove does NOT penetrate WP

After the cutting process, round is moved to a hydraulic press
- Functionality of the press checked by no-load stroke.
- Broken under water.
White Phosphorus demil

Safety shielded employee and control panel min. 1m from press

Separated parts removed from water - immediately put on feeding mechanism for melt out
White Phosphorus melt out

WP round is loaded onto the melt out conveyor line
- Submerged into hot water bath. (water temp. 158 ° - 176 °F) for approx 3-4 mins.
- WP “melts” out - sinks to the bottom (WP is 1.8 times heavier than water)
- Bath/trough inclined so WP can drain into collecting tank for recycling

WP items with felt pads/wedges (i.e. M825/M825A1)
- Pads are removed separately (under water)
- Pads are pressed through rollers (under water) to remove WP, then placed in special containers for transport to incineration
White Phosphorus melt out

Base ends from the WP round

After melt out
- Any trace of WP is burned off.
- Resulting Phosphorous Pentoxide forms a white mist

Empty WP rounds are collected for scrap/recycling
White Phosphorus Recycling

Collected WP*

- Put into 55 gallons drums
- Hot water is added prior to WP
- Reclaimed WP added
  - (approx 120 litres or 31 gallons)
- Hot water topped off
- Vent screw removed for cooling
- After cool down, drum is sealed
- Packed for transport to recycler

*Note – felt pads/wedges cannot be recycled.
- collected and sent to incineration
Over 160,000 White Phosphorus items demilled:

Hand Grenades
Rifle Grenades

Mortars:
- 60mm
- 81mm
- 4.2”
- 120mm

Artillery rounds/Projectiles:
- 25mm
- 76mm
- 105mm
- 155mm
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