

Actodemil[®] Decon

The Solution to Decontamination of Energetic Wastes

Energetics - Chemical Agents - Biological Agents

SAFE:

Permanently Destroys Energetics and
Decontaminates to 5X Levels

ENVIRONMENTALLY SOUND:

Non Thermal, Non Polluting and
Non Hazardous Product

COST EFFECTIVE:

Lower Cost Than Thermal Decon Methods
Fertilizer Product Produced from Process

**A CLEAR CUT ALTERNATIVE TO
THERMAL APPROACHES**



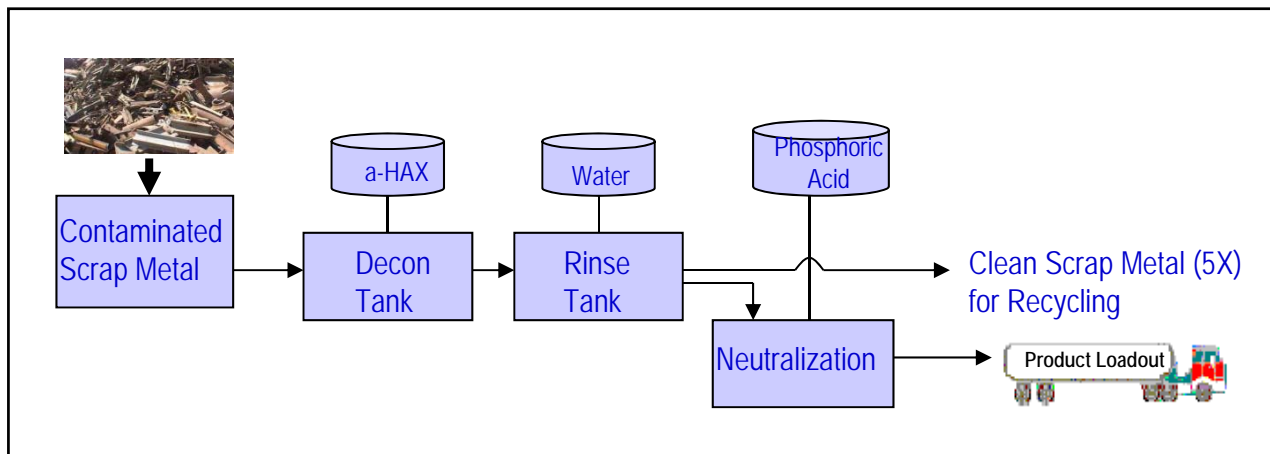
ARCTECH

Preserving tomorrow's world... today

Actodemil® technology - Description and Applicability

Actodemil® technology is based on naturally occurring coal-derived humic acid for accomplishing a series of useful reactions to decompose highly toxic and hazardous chemicals. Humic acid is a water soluble colloidal solution. It is a reducing agent and thus it promotes reductive hydrolysis. In addition, it has a strong affinity for organic molecules and metal ions, and is thus effective for absorption of reaction products. The key reactant material in the reaction is the ARCTECH proprietary a-HAX™ reagent. The decontamination process is conducted in a batch mode wherein the scrap metal pieces are immersed in a-HAX™ liquid contained in a decon tank. After the reaction is complete (usually within minutes), the treated metals are taken to a rinse tank for final cleaning. The reaction product is then ready for land application as a fertilizer supplement. The decontaminated metals are ready for transportation to a recycling facility.

Actodemil® Decon Technology Flow Sheet



Actodemil® TECHNOLOGY SUCCESSFULLY TESTED ON:

Energetics

Large-Bore Gun Propellants

- 3"/50, 6"/47, M6 (NC based)
- 105 MM (NC/NG based)
- 106 MM - M30, M30A1(NC/NG/NQ)

Rocket Propellant

- 2.75" AA (NC/NG based)

Other Explosives - HMX, RDX, TNT, DNT, Lead Azide, PETN, and AP

Chemical Agents

Nerve Agents

GB, VX

Blistering Agents

HD, HT, H

Biological Agents

E. coli

In addition, a variety of energetic wastes treated such as: Contaminated Soils, Rags, Turnings, Dust, Overcast, Off Spec, Rejected Propellants, Explosives, Filters contaminated with Explosives, Unstable, Out of Date Materials, Floor Sweepings, Expended Samples from Lab, Manufacturing Wastes, etc.

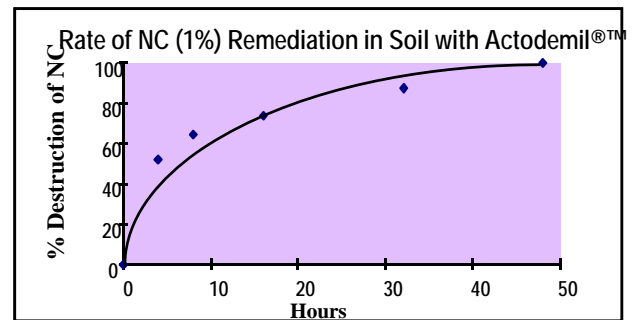
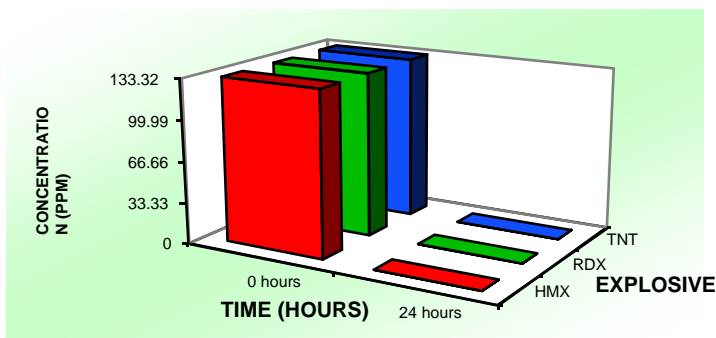
Actodemil® TECHNOLOGY FOR ENERGETIC WASTES

- Treatment of solid energetic wastes
- wastes included lead azide filters, PETN and HMX charge filters
- Scrap wastes, dust sweepings
- Residual solid and liquid analyzed for energetics (SW 8330/DSC)
- In all cases no energetics detected.



Actodemil® Technology for Treatment of Explosives-Contaminated Soils

Explosive in Soil Removed After 24 Hours Of Exposure



Actodemil® TECHNOLOGY TREATED PRODUCT:

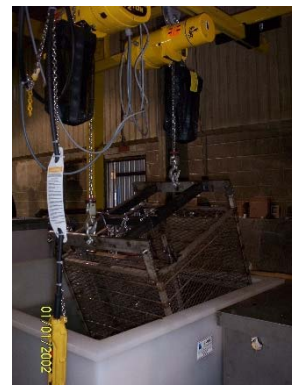
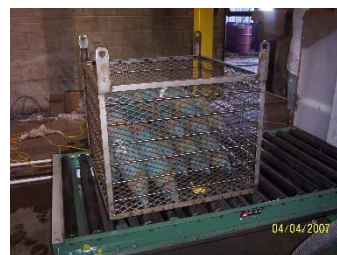
- Complies with EPA Toxicity Characteristic Leaching Procedure (TCLP) Requirements
- Is Not Reactive (as defined by RCRA Requirements)
- Complies with EPA Universal Treatment Standards
- Is Not Mutagenic as Determined by Ames Assay Test
- Showed no Energetic Response (friction and impact tests)
- Is Not Phytotoxic to Plants

REGULATORY ACCEPTANCE

- Compliance with 1997 EPA Munitions Rule Permits Recycling of Energetics to Fertilizer as Non- RCRA Activity
- Nevada EPA in 1999 Approved Use of Recycled Fertilizer and Commended Actodemil® Approach.

Actodemil® DECON TECHNOLOGY FOR EGYPTIAN AA:

- Turnkey project for Decon/demil of Projectiles
- Actodemil® Technology for Destruction of Residual TNT (5X levels)
- Cutting of Projectiles for Demil
- Projectiles sizes from 37mm to 155 mm can be processed
- Non-thermal Approach Integrated into Existing demil Operations
- Is Not Phytotoxic to Plants





Our Bench-Scale Unit is Available for Specific Technology Application Studies

In Addition, Pre-Designed Units are Available:

- 100 Pounds per Batch - 50 gallon unit
- 200 Pounds per Batch - 100 gallon unit
- 1,000 Pounds per Batch - 500 gallon unit

ARCTECH, Inc. is a diversified company that provides technologies, services and products to meet growing needs of clean energy and for preserving the environment. Formed as a spin-off company from the Environmental Science and Technology division of the Atlantic Research Corporation, the ARCTECH group through 25 years of experience in energy, energetics, environment and agriculture, has created holistic solutions in these interrelated market sectors. The entrepreneurial scientists and engineers at ARCTECH have pioneered the use of vast resources of coal and coal-derived humic acid products such as actosol® fertilizer; HUMASORB®, a multipurpose contaminant adsorber; ACTODEMIL®, described herein for cost-effective disposal of munition; and an overall encompassing MicGAS™ technology for production of clean energy while reducing the build up of greenhouse CO₂ emissions. For additional information about our outside the box solutions, please visit our Web Site: www.arctech.com.



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