

Actodemil®

The Solution to Munitions Waste Disposition

Energetics - Chemical Agents - Biological Agents

SAFE:

Permanently Destroys Energetics, Chemical and Biological Agents

ENVIRONMENTALLY SOUND:

Non Polluting and Non Hazardous Product

COST EFFECTIVE:

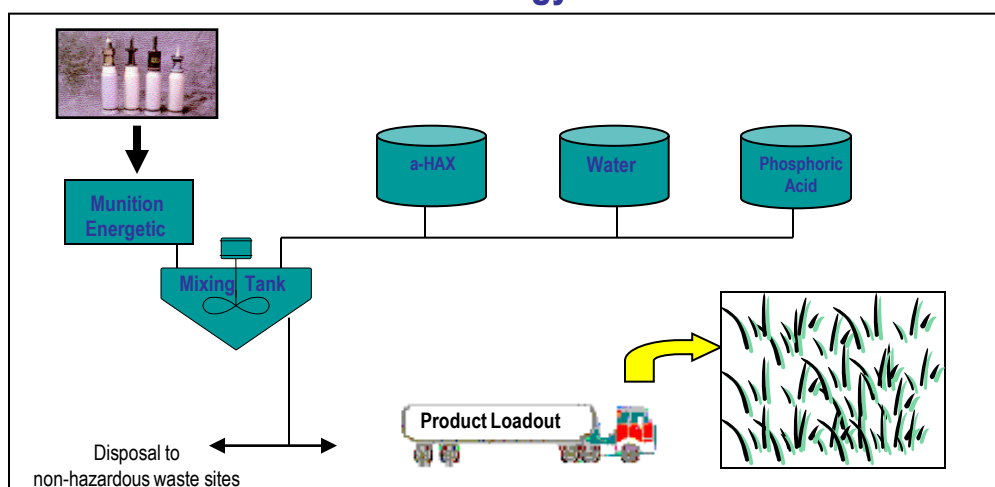
Lower Cost Than Thermal Destruction Methods
Recycles Energetic Into Saleable Fertilizer

**A CLEAR CUT ALTERNATIVE TO
INCINERATION AND OB/OD.**

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 reaction is carried out in a reaction vessel operating at atmospheric pressure and at a temperature of 160 to 180°F. Following completion of reaction (between 2 to 4 hours), the product is neutralized and is then ready for application as a fertilizer or safe disposal.

Actodemil® 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: 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Turnings, Dust, Overcast, Off Spec, Rejected Propellants, Explosives, Filters contaminated with Explosives, Unstable, Out of Date Materials, Floor Sweepings, Expended Samples from Lab, Manufacturing Wastes, etc.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 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

Fertilizer Product Enhances Alfalfa Growth



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.

INDUSTRY IMPLEMENTATION

- Disposal of Energetic Manufacturing Waste
- Recycling of Nitrocellulose Fines and
- Recycling of Scrap Propellant into Fertilizer.

Actodemil® Mobile Production Unit





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.



Preserving tomorrow's world... today

For Your Specific Munitions Application Needs, Please Contact:

Dr. Daman Walia

**ARCTECH, Inc.
14100 Park Meadow Drive
Chantilly, VA 20151-2217**

Phone: (703) 222-0280 Fax: (703) 222-0299

E-mail: dwalia@arctech.com • Website: www.arctech.com