



Assembled Chemical Weapons Assessment Program

Permitting Concept Neutralization/Supercritical Water Oxidation

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Neutralization/SCWO Process

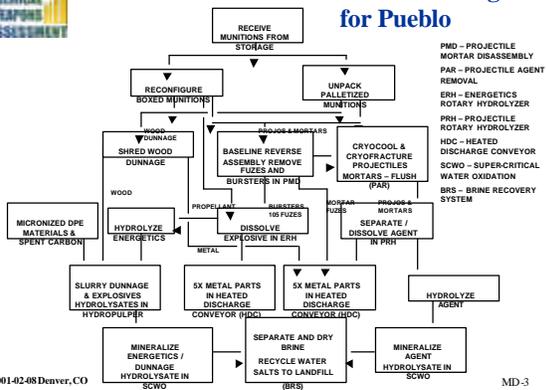
- ◆ Projectile/Mortar Accessing
- ◆ Agent Hydrolysis Reactor
- ◆ Supercritical Water Oxidation (SCWO)
- ◆ Brine Recovery System (BRS)
- ◆ Treaters
 - Energetics Rotary Hydrolyzer(ERH)
 - Energetics Hydrolysis Reactor
 - Projectile Rotary Hydrolyzer (PRH)
 - Projectile Agent Hydrolysis (PAH)

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Neutralization/SCWO Block Flow Diagram for Pueblo

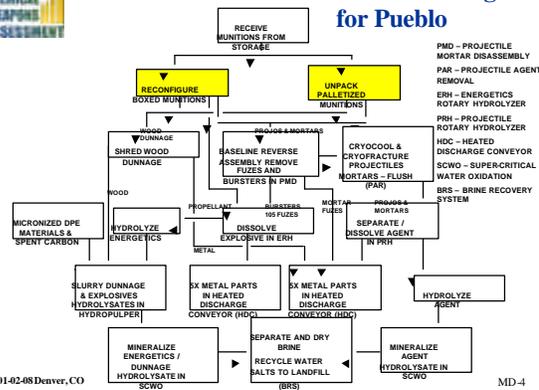


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Neutralization/SCWO Block Flow Diagram for Pueblo



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Neutralization/SCWO Permitting Strategy

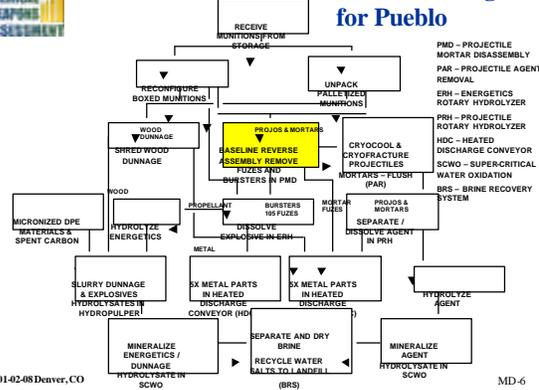
- ◆ Unpack Area And Munition Access Area
 - Waste In
 - Waste Munitions From Permitted Storage
 - Removal of Propellant and Primers
 - Waste Out Area
 - Munitions (Agent And Burster)
 - Propellant
- ◆ Permit Strategy
 - Storage Of Containers (Subpart I)
 - Potential for Containers to Be Held for Greater Than 90 Days
 - Baseline Reconfiguration Not Considered Treatment

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Neutralization/SCWO Block Flow Diagram for Pueblo



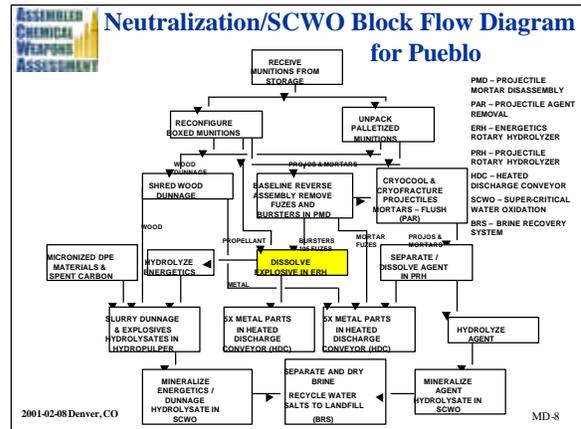
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Neutralization/SCWO Permitting Strategy

- ◆ **Projectile/Mortar Disassembly Machine(PMD)**
 - Waste In
 - Munitions(busters And Fuses) From Unpack Area
 - Disassemble Munitions By Removing Bursters And Fuses
 - Waste Out
 - Energetics
 - Munitions Still Containing Agent
- ◆ **Permit Strategy**
 - Permit As Part Of Storage Permit Subpart I
 - Disassembly Is Not Considered Treatment

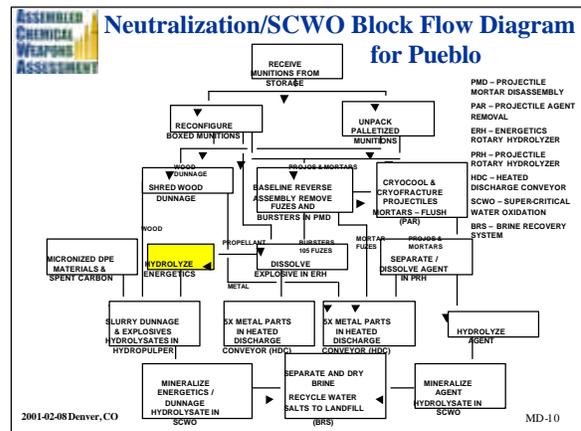
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Neutralization/SCWO Permitting Strategy

- ◆ **Energetics Rotary Hydrolyzer(ERH)**
 - Waste In
 - Energetics
 - And Associated Metal Parts
 - Energetics Dissolved In The Energetics Rotary Hydrolyzer (100° - 110°C) In A Caustic Wash
 - Waste Out
 - Metal Debris
 - Energetic Hydrolysis
- ◆ **Permit Strategy**
 - Treatment In Tanks - Subpart J
 - CHEMICAL TREATMENT in a Tank
 - Metal Parts Will Meet The Treatment Standards For Debris Under 268.45

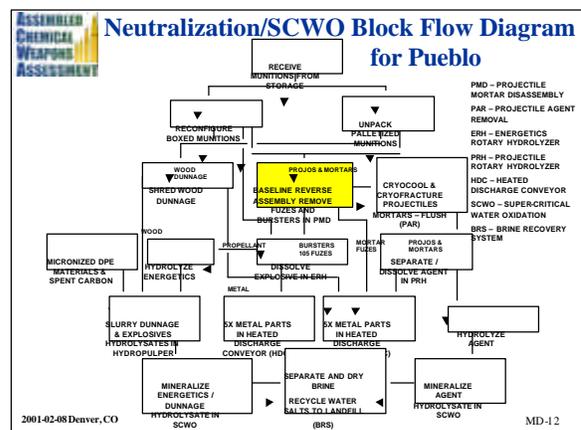
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Neutralization/SCWO Permitting Strategy

- ◆ **Hydrolyzed Energetics Tank**
 - Waste In
 - Hydrolyzed Energetics From The Energetics Rotary Hydrolyzer
 - Energetics Dissolved In The Energetics Rotary Hydrolyser (100° - 110°C) In A Caustic Wash
 - Waste Out
 - Energetic Hydrolysis
- ◆ **Permit Strategy**
 - Treatment In Tanks – Subpart J
 - Chemical Treatment Followed By Acid To Adjust The pH

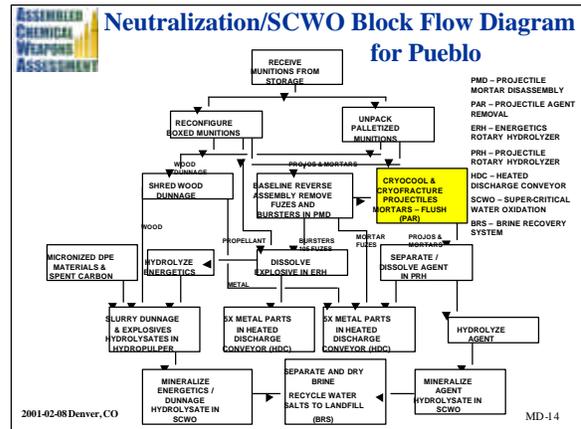
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Neutralization/SCWO Permitting Strategy

- ◆ **Projectile/Mortar Disassembly Machine(PMD)**
 - Waste In
 - Munitions(busters And Fuses) From Unpack Area
 - Disassemble Munitions By Removing Bursterns And Fuses
 - Waste Out
 - Energetics
 - Munitions Still Containing Agent
- ◆ **Permit Strategy**
 - Permit As Part Of Storage Permit Subpart I
 - Disassembly Is Not Considered Treatment

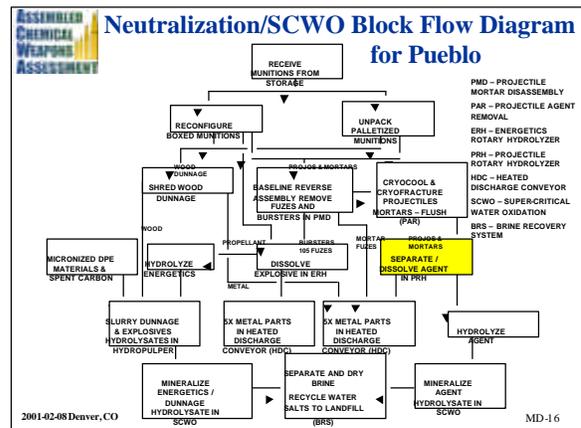
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Neutralization/SCWO Permitting Strategy

- ◆ **Projectile Agent Removal (PAR)**
 - Waste In
 - Projectile/mortar Containing Agent
 - Cryobath With Cryocooling Conveyor And Cryofracture Press
 - Freezes And Fractures Munition
 - Waste Out
 - Metal Debris
 - Chemical Agent
- ◆ **Permit Strategy**
 - Physical Treatment Of The Waste In Containers
 - Not a Permitted Activity
 - Munitions Held Less Than 90 Days

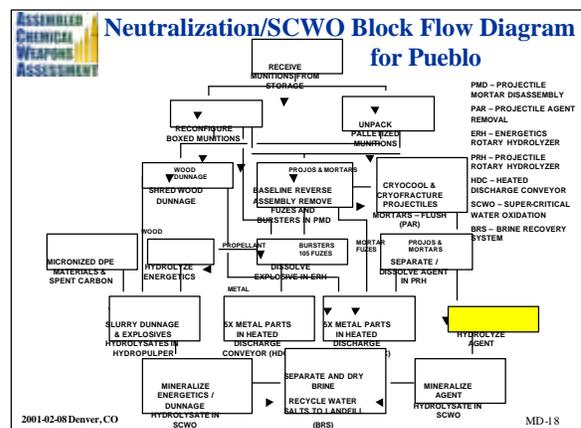
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Neutralization/SCWO Permitting Strategy

- ◆ **Projectile Rotary Hydrolyzer (PRH)**
 - Waste In
 - Metal Debris
 - Chemical Agent
 - Hot Water & Caustic ~ 194°C Dissolves Agent
 - Waste Out
 - Treated Metal Debris
 - Hydrolyzed Agent
- ◆ **Permit Strategy**
 - Treatment In A Tank – Subpart J
 - Chemical Treatment In A Tank System
 - Meets The Debris Treatment Standard In 268.45

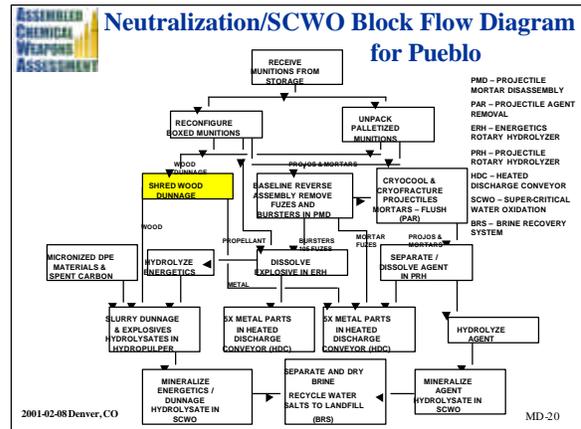
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Neutralization/SCWO Permitting Strategy

- ◆ Agent Hydrolysis Tanks
 - Waste In
 - Hydrolyzed Agent
 - Agent Neutralization Reactors
 - Waste Out
 - Hydrolyzed Agent
- ◆ Permit Strategy
 - Treatment in A Tank System – Subpart J
 - Chemical Treatment Of Agent In A Tank Followed By Caustic To Adjust pH

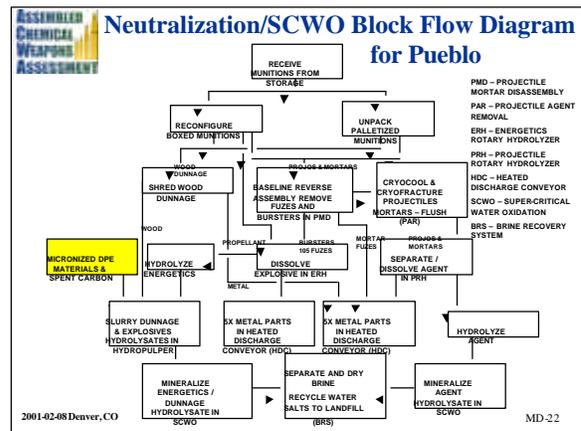
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Neutralization/SCWO Permitting Strategy

- ◆ Dunnage Separator And Shredder
 - Waste In
 - Dunnage
 - Demilitarization Protective Ensemble Suites
 - Spent Carbon Filters
 - Shreds Waste Entering
 - Waste Out
 - Shredded Dunnage Mix
- ◆ Permit Strategy
 - Either 90 Day Area Or Permitted Storage

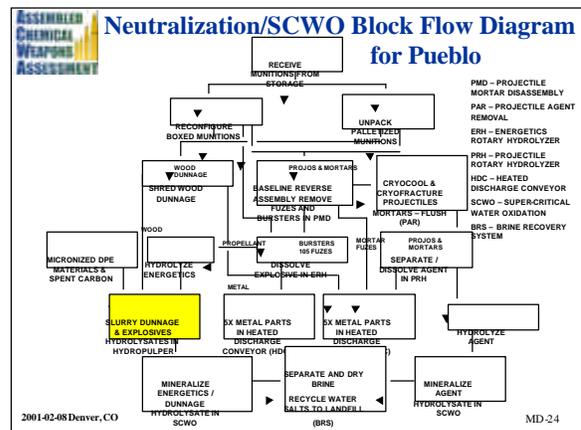
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Neutralization/SCWO Permitting Strategy

- ◆ Dunnage Micronizer
 - Waste In
 - Shredded Dunnage Mix
 - Micronizes Shredded Dunnage To Allow Processing Through The Super Critical Water Oxidation System
 - Waste Out
 - Micronized Dunnage
- ◆ Permit Strategy
 - Either 90 Day Area Or Permitted Storage

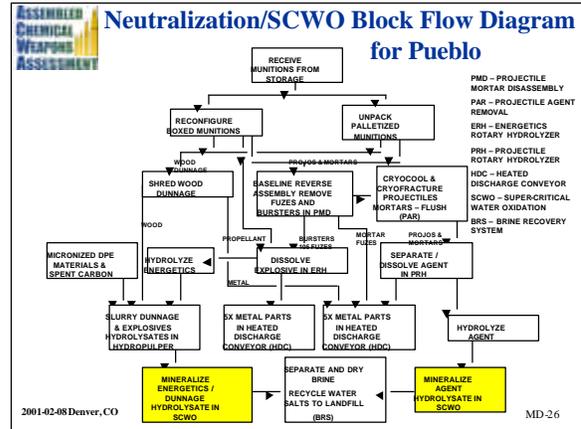
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Neutralization/SCWO Permitting Strategy

- ◆ **Hydrolpulper**
 - Waste In
 - Dunnage Slurry
 - Explosives Hydrolysates
 - Mixes The Explosives Hydrolysates And The Dunnage Slurry
 - Waste Out
 - Dunnage And Explosive Hydrolysate Slurry
- ◆ **Permit Strategy**
 - Storage in a Tank System - Subpart J
 - Tank System Used To Mix Explosives And Slurry
 - Potential For Storage to Exceed 90 Days

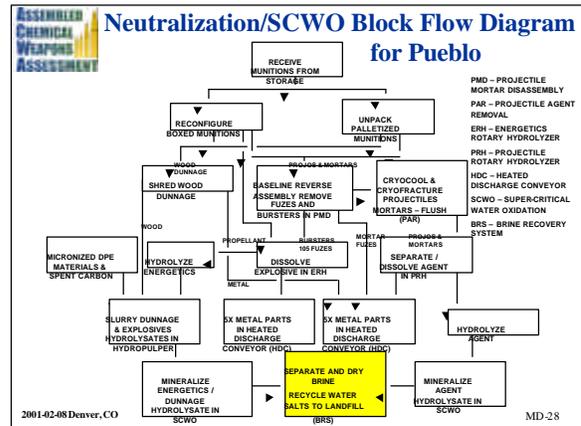
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Neutralization/SCWO Permitting Strategy

- ◆ **Super Critical Water Oxidation (SCWO) System**
 - Waste In
 - Agent Hydrolysate
 - Dunnage Slurry
 - Oxidizes Agent Hydrolysate & Dunnage Slurry In The Super Critical Water Oxidation Reactors
 - Waste Out
 - Waste Not Considered Hazardous
- ◆ **Permit Strategy**
 - Army Will Pursue Delisting Of The Agent Hydrolysate Prior To Entering The Super Critical Waste Oxidation Reactor
 - Preliminary Results Indicate That The Dunnage Slurry Is Not Hazardous

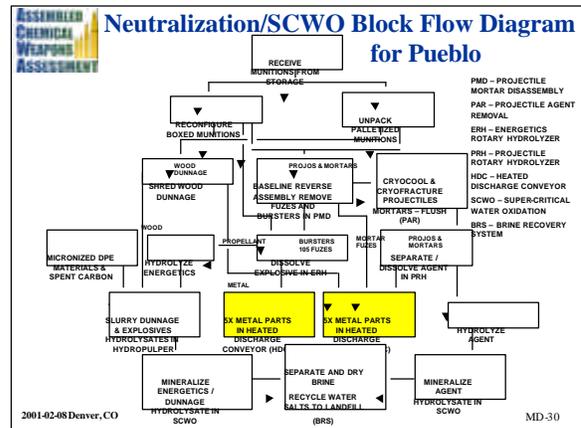
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Neutralization/SCWO Permitting Strategy

- ◆ **Brine Recovery System (BRS)**
 - Waste In
 - Waste Entering From SCWO Is Non-hazardous
 - Brine Recovery System
 - Brine Concentrator
 - Evaporator/crystallizer
 - Solids Separation System
- ◆ **Permit Strategy**
 - Waste Entering Is Not Hazardous Waste

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Neutralization/SCWO Permitting Strategy

- ◆ Heated Discharge Conveyors (HDC)
 - Waste In
 - Metal Debris
 - Thermal Treatment For Army Requirements
 - Electric Heating Coils, Swept With Nitrogen Blanket
 - Required To Release From Army Control
 - 1000°F At 15 Minutes
 - Waste Out
 - Scrap Metal To Be Sent For Recycling 261.6(a)(3)(ii)
- ◆ Permit Strategy
 - Not A Permitted RCRA Unit
 - Metal Debris Entering Meets The Treatment Standards For Hazardous Debris Under 268.45 Prior To Entering
 - Scrap Metal Will Be Sent For Recycling

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Pueblo Chemical Agent Pilot Plant Process Effluent

- ◆ Solids
 - Brine Cakes
 - To Be Sent For Further Treatment If Required
 - Metals
 - To Be Recycled
 - Air Emissions
- ◆ No Liquid Wastes
 - Water Will Be Recycled And Reintroduced Into The Process

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Neutralization/SCWO Permitting Strategy

- ◆ Format Will Follow the "A.T. Kearney" Canned Comments

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