



Pueblo Chemical Agent-  
Destruction Pilot Plant

# PCAPP Design Alternatives

## A Partnership for Safe Chemical Weapons Destruction

The Bechtel Pueblo Team has completed early stages of designing the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP). In response to concerns over cost, Bechtel is performing a series of "trade studies" to examine design alternatives that could reduce project costs. Using the existing plant design as a starting point, a team of engineers and scientists will examine a series of potential changes to equipment and operations that could reduce capital cost, operating cost, or both.

The studies are scheduled for completion in April 2005, and the results will be incorporated into a revised concept for the plant that Bechtel will submit to the government for review. This revised concept will be one factor considered by the Department of Defense in making decisions about the schedule and funding for PCAPP.

PCAPP will employ a process called "neutralization followed by biotreatment." The process uses hot water to neutralize the mustard agent. The resulting liquid, called "hydrolysate," is mostly water and thiodiglycol, a common industrial chemical that is readily biodegradable. Ordinary sewage treatment bacteria, or microbes, consume the organics in the hydrolysate. Metal parts that contained mustard are heated to 1,000 degrees Fahrenheit for 15 minutes to ensure that they are decontaminated.

The trade studies will look at several major systems and pieces of equipment involved in this process to determine if they can be modified to reduce costs, without compromising safety and environmental protection. Areas to be studied include:

### **Off-site Shipment of Uncontaminated Secondary Wastes**

–The chemical weapons at Pueblo primarily consist of projectiles that look like big bullets. A variety of packing materials and containers are used to store the projectiles. While some of these materials may be contaminated with mustard agent, most will be uncontaminated. The current design calls for treating all these materials at the PCAPP facility. This study will evaluate the cost and schedule impacts of shipping the uncontaminated dunnage (including pallets, strapping, containers, packaging waste, etc.) off-site rather than processing at PCAPP.

### **Off-site Shipment of Uncontaminated Propellant, Fuses, Cartridges, etc.**

–The stockpile also includes "propellants," the explosive charges used to fire the projectiles. These propellants are not an integral part of the projectiles. This study will evaluate the cost and schedule impacts of shipping uncontaminated and stable propellant-related items off-site rather than the current plan of neutralizing them at PCAPP.

### **Reduce Energetics Neutralization Reactor to Two Holding Tanks**

–The existing design includes four "Energetics Neutralization Reactors," large metal tanks in which the hydrolysate from neutralizing the explosive materials will be treated. Two holding tanks and a 30-day storage tank are also used. This study will re-examine the total number of tanks required to hydrolyze the energetics, sample and then transfer the energetics hydrolysate to the bioreactor system.

#### **FOR MORE INFORMATION CONTACT:**

Pueblo Chemical  
Stockpile  
Outreach Office  
104 West B Street  
Pueblo, CO 81003  
Telephone:  
(719) 546-0400

U.S. Army  
Pueblo Chemical Depot  
Public Affairs Office  
Telephone:  
(719) 549-4135

Web site:  
[www.pmacwa.army.mil](http://www.pmacwa.army.mil)

**Optimize Agent Neutralization Reactors and Tankage**—The current design includes four sets of “Agent Neutralization Reactors.” These are large metal tanks in which the mustard agent is mixed with water to be neutralized. The study will examine using two larger agent neutralization reactors instead of the four.

**Optimize Space in Munitions Wash Station Areas**—Mustard agent will be removed from the projectiles in a “Munitions Wash Station,” which uses robotic equipment to wash out the projectiles with high-pressure water. This study will examine various ways to position equipment that could reduce the size of the wash station facilities.

**Eliminate Hydrolysate Cooling System**—The current design includes heat exchangers to cool the mustard agent hydrolysate before it goes from the Agent Processing Building to the biotreatment area. This study will evaluate whether cooling is needed.

**Eliminate Forklift Operations**—In the current design, munitions are transported by an automatic guided vehicle (AGV) into a monitoring station, and forklifts then move them to the Agent Processing Building. This study will examine eliminating the forklift operations and using AGVs all the way.

**Replace Induction Heating with Resistance Heating for the Continuous Steam Treater and Metal Parts Treater Systems**—The current design calls for using “induction heating” to heat metal parts. Induction heating creates an electromagnetic field around a piece of metal, causing it to heat up quickly. Resistance heating passes electricity through a metal coil, causing it to heat up, but not as fast as induction heating. This study will examine whether the rapid heating capability of induction heating is necessary, and whether substituting resistance heating would reduce costs.

**Cascading Off-Gas Treatment System (OTS) Condensates**—In the current design, condensate from the Continuous Steam Treater and the Metal Parts Treater is held in storage tanks to be sampled for the presence of mustard agent before the gases can be released from engineering controls. This study will evaluate alternate ways to configure the off-gas treatment system and to treat the condensate.