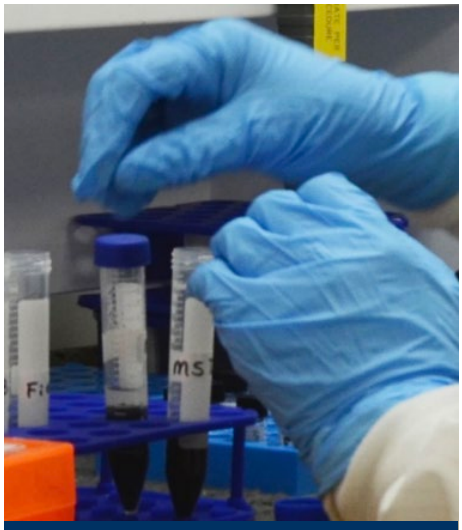
Hydrolysate Overview

The Pueblo Chemical Agent-Destruction Pilot Plant, known as PCAPP, is safely and efficiently destroying the chemical weapons stockpile at the U.S. Army Pueblo Chemical Depot. The stockpile consists of blister agent (HT and HD, also known as mustard) in projectiles.

The process being used to destroy the chemical weapons stockpile is neutralization followed by biotreatment. During the neutralization process, munitions are taken apart and the chemical agent is drained and separated from the energetics, explosives and propellants. The chemical agent is mixed vigorously with hot water and sodium hydroxide which destroys, or neutralizes, it.

The resulting product from neutralization of the chemical agent is a caustic wastewater known as hydrolysate, which requires further treatment and processing. It is expected that PCAPP will generate 8-10 million gallons of hydrolysate during destruction operations. The neutralization process will also produce a variety of other secondary wastes that will require additional treatment.



At the Pueblo Chemical Agent-Destruction Pilot Plant, mustard agent hydrolysate is analyzed to ensure it meets the required pH level.

Hydrolysate Defined

Hydrolysate is classified as hazardous waste under the Resource Conservation and Recovery Act. It is classified as such because the product of the destruction of a chemical warfare munition may contain heavy metals and have corrosive properties.

The corrosivity of hydrolysate can be compared to other chemicals using the pH scale, which is a method of measuring the acidity or alkalinity of water-soluble substances. Using this scale, 7 is considered neutral with 14 being very caustic, or corrosive. Mustard hydrolysate has a pH of approximately 10-12, making it comparable to commercial drain cleaner or liquid bleach. Like many household products, hydrolysate can be harmful if it comes into contact with the skin or eyes and may harm the respiratory or gastrointestinal tracts if inhaled or ingested.

Treatment and Destruction of Hydrolysate

Following the chemical agent neutralization process, hydrolysate is verified to ensure complete chemical agent destruction. Reaction products (thiodiglycol or TDG) are still of interest to treaty inspectors who want to ensure complete degradation of the agent chemical. The secondary treatment of PCAPP hydrolysate involves a process known as biotreatment.

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During the biotreatment process, chemical agent hydrolysate is fed into Immobilized Cell Bioreactors, or ICBs, to destroy the organic materials. In the ICBs, the hydrolysate is subjected to biological degradation. Water is recovered into the pilot plant and reused as part of the destruction process.

Some munitions will not be able to be easily processed through the main destruction plant. These problematic munitions include those that have leaked in the past and are overpacked, as well as "rejects" whose condition does not allow for automated processing. These munitions will be safely processed in PCAPP's Static Detonation Chambers.