

INCINERATION

The Army chose incineration as the main destruction technology in 1988. First used at Johnston Atoll, incineration is now used at Anniston and Tooele. Incineration is also the technology planned for use at Umatilla and Pine Bluff.

Some opposition to incineration among citizens in some of the localities where storage sites were located led Congress to mandate Army research into possible alternative technologies other than incineration. As a result, neutralization has been adopted at sites where bulk agent is stored. However, the Army has repeatedly determined that incineration is the most effective available option for destroying chemical agent already weaponized in munitions.

THE CHEMICAL AGENT INCINERATION PROCESS

- Chemical Weapons are removed from igloos – steel-reinforced cement structures – and transported to disposal plants in sealed, fire- and impact-resistant containers.
- Before opening the containers at the disposal facility, workers check for leaking munitions. Employees then load the weapons onto conveyors, which carry the weapons through the disposal process.
- Workers then oversee the disposal process from an enclosed control room using robotics, video monitoring equipment, and computers.
- Automatic, robotic equipment drains the chemical agent from the weapons and dismantles the weapons in explosive-proof rooms.
- Once dismantled and drained, the different weapon parts travel to various furnaces in the plant, each designed for a specific purpose.
 - The liquid incinerator destroys the chemical agent.
 - The deactivation furnace destroys explosive material.
 - The metal parts furnace heats casings and other heavy metal parts to destroy any remaining agent contamination.
- During the entire process, all gaseous effluents go through an advanced filtration system and levels are monitored for safety.

NEUTRALIZATION

Chemical neutralization is the only alternative technology employed in the Chemical Demilitarization Program. Used at both Aberdeen and Newport, chemical neutralization is efficient at destroying chemical agents stored in bulk containers.

Neutralization employs different chemicals depending on the agent to be destroyed. By contrast, incineration constantly uses the same process for all agents. Currently, the ACWA plans to use neutralization at Blue Grass and Pueblo.

THE CHEMICAL AGENT NEUTRALIZATION PROCESS

- Ton containers are transported to the neutralization facility.
- Using protective equipment, workers open plugs in the containers and drain the liquid agent (sulfur mustard or VX).
- The steel containers are put aside for later destruction.
- Neutralization begins, which varies depending on the agent.
 - VX Agent Neutralization:
 - VX is added to a large mixing tank that contains hot lye.
 - These react and create a liquid effluent called hydrolysate.
 - The hydrolysate is tested to confirm no agent remains.
 - Sulfur Mustard Neutralization:
 - Sulfur mustard is added to a tank with hot water.
 - This mixture creates a liquid effluent called hydrolysate.
 - The hydrolysate is tested to confirm no agent remains.
- The hydrolysate is then transported off-site to a commercial treatment and disposal facility, where the chemical byproducts are made safe using biological degradation.**
- The empty steel containers are then cut into small pieces. Agent residue is removed with hot, high-pressure water. The pieces are then tested to ensure that no agent remains, and shipped to an Army steel recycling location.

**Transport of the hydrolysate is regulated by the Resource Conservation and Recovery Act [Hazardous Waste Rules]. Though hazardous, hydrolysate is actually less hazardous than many commercial chemicals transported by road.