



Characteristics of Nerve Agents

The Program Executive Office, Assembled Chemical Weapons Alternatives, known as PEO ACWA, is responsible for the safe and environmentally compliant destruction of the remaining U.S. chemical weapons stockpile stored at the [U.S. Army Pueblo Chemical Depot](#) in Colorado and the [Blue Grass Army Depot](#) in Kentucky. The safe, secure storage of the stockpiles in the U.S. Army inventory is the responsibility of the [U.S. Army Chemical Materials Activity \(CMA\)](#).

The ACWA program is responsible for destroying two types of nerve agent-filled weapons in the original Kentucky stockpile. The agents are known by the military designations VX and GB. The original stockpile in Kentucky comprised 523 U.S. tons of nerve and mustard agents in rockets and projectiles, with approximately 432 tons of that quantity consisting of nerve agents VX and GB, each in rockets and projectiles.

Currently, the program is operating state-of-the-art pilot plants that are safely and efficiently destroying these stockpiles. Operations are on target for completion by the Chemical Weapons Convention treaty commitment of Sept. 30, 2023. U.S. Public Law mandates stockpile destruction by Dec. 31, 2023.

What are nerve agents?

Nerve agents are members of the organophosphate family.

Nerve agent VX, a clear, odorless and tasteless liquid, has an appearance similar to motor oil. VX can become an aerosol, or very small droplets, through explosion or a vapor through ignition. It is heavier than water and evaporates 2,000 times more slowly.

Highly toxic in its liquid, aerosol and vapor forms, VX is most hazardous when absorbed through the skin. As a vapor or aerosol, it can be inhaled and absorbed through the lungs or through the digestive system if consumed.

Nerve agent GB, also known as sarin, is one of the most toxic members of the organophosphate family. Under normal conditions, it is a clear to straw-colored liquid and has approximately the same density and evaporation rate as water.

GB presents the greatest hazard when released in vapor form. Such vapors can be released only by evaporation of the liquid or vaporization into the air.

Have nerve agents previously been destroyed in the U.S.?

As a signatory to the [Chemical Weapons Convention](#), the U.S. successfully completed the destruction of nearly 90% of its original chemical weapons stockpile in January 2012, via CMA. The remaining U.S. chemical weapons stockpile near Richmond, Kentucky and in Pueblo, Colorado, represent the 10% for which PEO ACWA is responsible.





Nerve agent VX in bulk containers was previously destroyed at Newport, Indiana. In addition, chemical weapons containing both nerve agents GB and VX have been previously destroyed at Anniston, Alabama; Pine Bluff, Arkansas; Umatilla, Oregon; Tooele, Utah; and Johnston Atoll, a group of islands about 800 miles southwest of Hawaii.

Are nerve agents harmful?

Nerve agents were designed to injure and kill by binding to cholinesterase, an enzyme of the human body that is essential for functioning of the nervous system. They also produce a range of neurological disorders followed by paralysis and cardiovascular or respiratory failure. Nerve agents inhibit the action of the enzyme, preventing messages from the brain from reaching the nerve endings. As a result, hyperactivity occurs in the organs stimulated by these nerves. Nerve agents can affect both the respiratory muscles and the respiratory center of the nervous system. The combination of these two effects cause death by respiratory failure.

What are the signs of exposure?

In the unlikely event of an accident or incident involving nerve agents VX or GB, avoiding agent vapor is the primary goal. Low-dose symptoms may include increased saliva production, runny nose, deterioration of short-range vision and hallucinations. Higher-dose symptoms may include difficulty breathing, vomiting, sweating and convulsions. The severity of exposure depends on how much nerve agent is in the vapor and the length of time of exposure. Anyone with symptoms of nerve agent exposure should call for medical help immediately and follow instructions.