



## U.S. ARMY CHEMICAL MATERIALS AGENCY

# Milestones in U.S. Chemical Weapons Storage and Destruction

With approximately 1,500 employees in addition to numerous support contractors, the U.S. Army Chemical Materials Agency (CMA) leads the world in chemical weapons destruction with a demonstrated history of safely storing, recovering, assessing and disposing of U.S. chemical weapons and related materials.

CMA manages all U.S. chemical materiel except for the disposal of two weapons stockpiles that fall under the Department of Defense's U.S. Army Element Assembled Chemical Weapons Alternatives pilot neutralization program. Through its Chemical Stockpile Emergency Preparedness Program, CMA works with local emergency preparedness and response agencies at weapons stockpile locations.

### 1960-1982

#### 1960s and before

The United States begins stockpiling and using chemical weapons against Germany in World War I, which lasts from 1914 to 1918. The weapons are securely stored at U.S. military installations at home and abroad.

The Edgewood Arsenal, Md., produces mustard and phosgene but the Arsenal is not large enough to store the agent and new installations are constructed in Huntsville, Ala., Denver, Colo., Pine Bluff, Ark., and Tooele, Utah.

After World War II ends in 1945, the United States produces nerve agents GB at Rocky Mountain Arsenal near Denver, and VX in Newport, Ind.

During the 1960s, the U.S. Army destroys chemical weapons using ocean dumping, open-pit burning and land burial. In 1969, the National Academy of Sciences recommends that ocean dumping be avoided.

In the late 1960s President Nixon halts the production of chemical weapons.



Stored chemical weapons

For more information, contact the CMA Public Affairs Office at (410) 436-3629 (800) 488-0648

#### 1971

The United States finishes transferring chemical munitions from Okinawa, Japan, to Johnston Island, located about 800 miles from Hawaii, in September of 1971.

#### 1972

The Army forms the U.S. Army Materiel Command's Program Manager for Demilitarization of Chemical Materiel, headquartered at Picatinny Arsenal, near Dover, NJ.

The Army develops environmentally sound chemical weapons disposal methods using incineration and chemical neutralization. Project Eagle incinerates six million pounds of mustard agent and neutralizes eight million pounds of nerve agent GB (sarin) at Rocky Mountain Arsenal, Colo., between 1972 and 1976.

#### 1973

The organization relocates to the Edgewood Arsenal, now known as, Edgewood Area of Aberdeen Proving Ground (APG), Md.

#### 1975

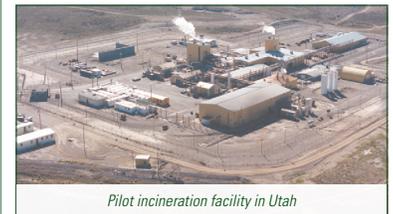
Organizational name is changed to Department of the Army Project Manager for Chemical Demilitarization and Installation Restoration.

#### 1978

Organizational name is changed to U.S. Army Toxic and Hazardous Materials Agency (USATHAMA).

#### 1979

The Army constructs and begins operating the Chemical Agent Munitions Disposal System (CAMDS), a pilot incineration facility located at what is now the Deseret Chemical Depot (DCD), Utah. The Army tests disposal equipment and processes at the plant. More than 91 tons of chemical agent are safely destroyed.



Pilot incineration facility in Utah

#### 1982

The United States starts construction of the Integrated Binary Production Facility at Pine Bluff Arsenal (PBA), Ark. Binary chemical weapons were designed to mix two non-lethal chemicals in flight to a target to form nerve agent. The binary weapons program leads to chemical weapons elimination talks between the United States and the Soviet Union later in the decade.



Pine Bluff Integrated Binary Production Facility



# Milestones in U.S. Chemical Weapons Storage and Destruction (continued)

## 1985-1992

### 1985

Construction on a demilitarization facility begins on Johnston Island in the Pacific Ocean. Construction is complete in 1987.

### 1986

Public Law 99-145 requires the safe destruction of the U.S. unitary chemical weapons stockpile. It also requires disposal facilities to be cleaned, dismantled and disposed of according to applicable laws and regulations. The stockpile is stored at eight military installations within the continental United States – APG, Md., PBA, Ark., DCD, Utah, Umatilla Chemical Depot (UMCD), Ore., Newport Chemical Depot (NECD), Ind., Anniston Army Depot (ANAD), Ala., Blue Grass Army Depot (BGAD), Ky., Pueblo Chemical Depot (PCD), Colo. – and on Johnston Island in the Pacific Ocean.

USATHAMA's chemical weapons management functions are split off to become the Program Manager for Chemical Munitions (Demilitarization and Binary). USATHAMA becomes the U.S. Army Environmental Center.

### 1988

The Army and the Federal Emergency Management Agency establish the Chemical Stockpile Emergency Preparedness Program (CSEPP) in response to Public Law 99-145 calling for added public protection. Although the new law reflects a greater awareness of the need to be prepared for a possible chemical accident, the Army's storage and maintenance of the stockpile has been and continues to be operated safely.



A CSEPP training exercise

### 1988 - 1990

The Army destroys BZ agent at PBA, Ark.



Pine Bluff Arsenal

### 1989

Organizational name is changed to Program Executive Officer-Program Manager for Chemical Demilitarization.

Construction begins on Tooele Chemical Agent Disposal Facility (TOCDF) at DCD, Utah.

U.S. Secretary of State James Baker and former Soviet Union Foreign Minister Eduard Shevardnadze sign a Memorandum of Understanding (MOU) on chemical weapons in Jackson Hole, Wyo. The MOU calls for cooperation and information exchange between the two countries concerning their chemical weapons capabilities. The two countries then sign an agreement to destroy much of their stockpiles. That agreement spurs international talks culminating in the international treaty known as the Chemical Weapons Convention (CWC).

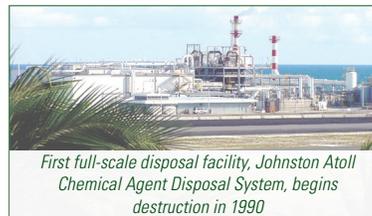


U.S. Secretary of State James Baker

Soviet Union Foreign Minister Eduard Shevardnadze

### 1990

The Army's prototype full-scale disposal facility, Johnston Atoll Chemical Agent Disposal System (JACADS), begins destruction of the stockpile on Johnston Island. The island's stockpile accounts for more than 6 percent of the Nation's original stockpile.



First full-scale disposal facility, Johnston Atoll Chemical Agent Disposal System, begins destruction in 1990

Chemical weapons from West Germany and a small number of recovered World War II-era chemical weapons from the Solomon Islands are shipped to Johnston Island.

Organizational name is changed to Program Manager for Chemical Demilitarization (PMCD). The United States halts all binary weapons programs in accordance with the American-Soviet MOU.

### 1991

Congress expands its chemical weapons destruction directive to include the disposal of non-stockpile materiel— items that are not part of the unitary chemical weapons stockpile.

### 1992

The U.S. Army Chemical Materiel Destruction Agency is established to consolidate responsibility for the destruction of chemical materials into one office.

Public Law 102-484 establishes Citizens' Advisory Commissions at each continental U.S. stockpile location. The state governor appoints seven members, with two more members from state government agencies responsible for chemical disposal program oversight.



Citizens' Advisory Commission

In compliance with Public Law 102-484, the Army creates the Non-Stockpile Chemical Materiel Project (NSCMP) to develop systems to safely assess, treat and destroy five categories of chemical warfare materiel not part of the declared stockpile: binary chemical warfare materiel, former chemical weapons production facilities, miscellaneous chemical warfare materiel, buried chemical warfare materiel and recovered chemical warfare materiel.



Recovered M139 bomblet



Recovered 4.2-inch mortar



# Milestones in U.S. Chemical Weapons Storage and Destruction (continued)

## 1994-2003

### 1994

The U.S. Army Chemical Materiel Destruction Agency is renamed to the U.S. Army Chemical Demilitarization and Remediation Activity (CDRA) and placed under the U.S. Army Chemical and Biological Defense Command (CBDCOM).

The Army establishes the Alternative Technologies and Approaches Project to investigate alternatives to incineration technology for the safe disposal of bulk chemical agent stockpiles at APG, Md. and NECD, Ind.

### 1995

CDRA is separated from CBDCOM and renamed PMCD.

CSEPP is restructured to streamline procedures and enhance operational responsiveness.

### 1996

TOCDF at DCD in Utah, with about 44 percent of the Nation's original stockpile of nerve and blister agents, begins destroying chemical weapons. Storage and maintenance of the entire U.S. stockpile continues to be carried out safely.

### 1997

The United States ratifies the CWC, agreeing to dispose of its unitary chemical weapons stockpile, binary chemical weapons, recovered chemical weapons and former chemical weapons production facilities.



Chemical Weapons Convention

Public Law 104-208 funds a new, separately managed pilot program to identify and demonstrate alternatives to incineration technology for the disposal of assembled chemical weapons. The law establishes the Program Manager Assembled Chemical Weapons Assessment.

The pilot program is intended to provide alternative disposal technology for the stockpiles at BGAD, Ky., and PCD, Colo.

Construction begins on the Anniston Chemical Agent Disposal Facility (ANCDF) at ANAD, Ala., and on the Umatilla Chemical Agent Disposal Facility (UMCDF) at UMCD, Ore.

### 1999

NSCMP Core Group forms to gain public input on the assessment and treatment of chemical warfare materiel.

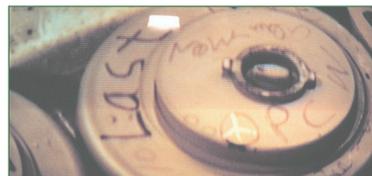
Construction begins at Aberdeen Chemical Agent Disposal Facility (ABCDF) at APG, Md.

NSCMP meets CWC requirement to destroy two categories of binary weapons components known as "excess other components" and "parity other components."

Construction begins at Pine Bluff Chemical Agent Disposal Facility (PBCDF) at PBA, Ark.

### 2000

JACADS completes destruction of its chemical weapons stockpile, making it the first stockpile facility to complete its mission. JACADS workers destroyed more than 412,000 chemical weapons.



Last mine destroyed at JACADS

Construction begins on the Newport Chemical Agent Disposal Facility (NECDF) at NECD, Ind.

### 2001

NSCMP's Rapid Response System (RRS) treats more than 700 Chemical Agent Identification Set (CAIS) items stored at DCD, Utah. CAIS consist of glass vials, bottles and ampoules containing small amounts of chemical agent or industrial chemicals that were once used for training purposes.

The Army begins studies to accelerate disposal operations in response to the terrorist attacks of Sept. 11, 2001.

The United States meets the CWC treaty requirement to destroy 20 percent of the U.S. chemical weapons stockpile.

NSCMP treats 10 sarin-filled bomblets recovered at Rocky Mountain Arsenal, Colo., using the Explosive Destruction System (EDS) for the first time. The EDS is a transportable system designed to provide safe and environmentally secure on-site treatment of chemical warfare materiel.



EDS treating round

### 2002

TOCDF completes destruction of all nerve agent GB (sarin) stored at DCD, Utah.

ANCDF completes disposal facility testing.

The Army announces plans to accelerate destruction of the chemical agent stockpiles at APG, Md., and NECD, Ind. Redesign and construction of facilities to allow for accelerated disposal begins in Maryland and Indiana.

Public Law 107-248 directs management of chemical demilitarization activities in Colorado and Kentucky to the Program Manager Assembled Chemical Weapons Alternatives.

### 2003

PMCD merges with the stockpile storage mission within the Army Soldier and Biological Chemical Command to form the Chemical Materials Agency (CMA.) CMA is created to store, assess and dispose of chemical materials. The agency is also tasked to work with state and local emergency response agencies for emergency preparedness activities in communities near stockpile sites.

ANCDF begins disposing of chemical weapons stored at ANAD, which held 7 percent of the original U.S. chemical weapons stockpile.

ABCDF begins disposing of mustard agent stored in large steel bulk containers at APG, Md. The APG mustard stockpile accounted for 5 percent of the original U.S. chemical weapons stockpile.



# Milestones in U.S. Chemical Weapons Storage and Destruction (continued)

## 2003-2007

NSCMP begins cleaning obsolete large steel bulk containers at the Pine Bluff Ton Container Decontamination Facility at PBA, Ark.

The United States meets the CWC treaty requirement to destroy 80 percent of its former chemical weapons production facilities.

### 2004

UMCDF begins disposing of chemical weapons stored at UMCD, which held 12 percent of the original U.S. chemical weapons stockpile.

TOCDF and ABCDF reach 50 percent destruction milestones for munitions and bulk agent, respectively.

The Single CAIS Access and Neutralization System (SCANS) performs its first treatment of a CAIS item at Fort McClellan, Ala. SCANS is a mobile, single-use device for accessing and treating individual CAIS items.



Single CAIS Access and Neutralization System (SCANS)

NSCMP begins testing its Munitions Assessment and Processing System at APG, Md. The facility will treat chemical and acidic smoke munitions recovered in Maryland.

### 2005

ABCDF destroys all drained mustard agent from the APG stockpile.



Last ton container at ABCDF

TOCDF destroys its millionth chemical agent munition at DCD, Utah. No other U.S. site will accomplish this as only DCD had more than a million munitions in its stockpile.

NECDF begins disposal operations of nerve agent VX stored in large steel bulk containers. NECD held 4 percent of the original U.S. chemical weapons stockpile.

PBCDF begins disposal operations. PBA stored 12 percent of the original U.S. chemical stockpile.



Positioning a weapons transport container at PBCDF

NSCMP opens the Binary Destruction Facility at PBA, Ark., to destroy the Nation's remaining inventory of binary precursor chemicals DF and QL.

### 2006

Treaty inspectors with the Organisation for the Prohibition of Chemical Weapons verify the complete destruction of ABCDF's hydrolysate at DuPont, marking the official 100 percent destruction of the APG stockpile. Demolition of all ABCDF buildings not held for other uses is completed.

Treaty inspectors verify that the former chemical warfare production facility at NECD has been destroyed.



Building 143 at NECD, the site of the final step in the VX production process, was demolished in March 2006

The Army destroys 50 percent—more than 1.7 million—of the munitions in the original U.S. chemical weapons stockpile.

NSCMP finishes chemically neutralizing the entire U.S. supply of precursor chemical agents DF and QL.

The United States meets the CWC treaty requirement to destroy 100 percent of its former chemical weapons production facilities, eliminating its chemical weapons production capacity.

TOCDF begins destroying mustard agent—the last remaining agent stockpiled at DCD. All nerve agent weapons have been safely and completely destroyed.

The NSCMP Pine Bluff Explosive Destruction System (PBEDS) begins operations to treat more than 1,200 munitions at PBA, Ark.

### 2007

NECD begins safe shipment of NECDF caustic wastewater to Veolia Environmental Services in Port Arthur, Texas, for final treatment and disposal.

The Army meets the CWC milestone of destroying 45 percent of the U.S. chemical agent stockpile.

ABCDF completes Resource Conservation and Recovery Act closure, becoming the first U.S. chemical demilitarization site to achieve permitted closure.

CMA officials, Veolia Environmental Services' work force and Tri-State Motor Transit drivers celebrate a half million miles safely driven—achieved transporting wastewater from the NECDF in Newport, Ind., to Veolia's Port Arthur, Texas, waste treatment plant.

Last VX nerve agent-filled spray tank in the U.S. chemical weapons stockpile destroyed.



VX Spray tank being unloaded from its shipping container at UMCDF.

Safe destruction of 50 percent of U.S. chemical agent stockpile achieved.

NSCMP meets CWC 100 percent destruction deadline of all binary chemical warfare materiel.



# Milestones in U.S. Chemical Weapons Storage and Destruction (continued)

## 2008-2011

### 2008

Last M55 rocket in CMA disposal mission destroyed, reducing cumulative storage risk to public by 94 percent.

PBCDF destroys the final VX-filled M23 landmine—the last nerve agent-filled munition in the PBA stockpile.



The last ton container of the Newport Chemical Depot stockpile is ready for delivery to the Newport Chemical Agent Disposal Facility.

NECDF completes its bulk nerve agent VX disposal mission, and shipment of the resulting caustic wastewater for final treatment and disposal.

UMCDF destroys the final VX-filled M23 landmine — the last nerve agent-filled munitions in the UMCD stockpile.



A munitions handler guides the last M 23 VX land mine in the Anniston Army Depot stockpile as it heads down the conveyor.

CMA destroys all of the VX in its disposal mission inventory when ANCDF destroys its final VX-filled land mine.

### 2009

Veolia Environmental Services in Port Arthur, Texas, celebrates destruction of more than one million gallons of caustic wastewater, commonly referred to as hydrolysate, from the NECD in Indiana.

The Army reaches 60 percent destruction—more than 1.9 million—of the munitions in the original U.S. chemical weapons stockpile.

The CAMDS at DCD, Utah, celebrates 30 years as the primary research, test and development facility for the U.S. chemical weapons disposal program.

In October 2009, CMA celebrates the safe destruction of its two millionth munition since Entry-Into-Force of the CWC.



(from left to right) NECD Commander Lt. Col. William D. Hibner, Sergeant Major Ricardo Soto-Acevedo and CMA Director Conrad Whyne are shown casing the colors at the Newport Deactivation ceremony.

### 2010

NECD receives a letter from the Indiana Department of Environmental Management (IDEM) stating that total closure as required by the Resource Conservation and Recovery Act (RCRA) had been completed. IDEM's approval of NECD's closure certification reports for hazardous waste storage areas used in support of the neutralization of the VX nerve agent stockpile closes the active portion of the RCRA permit that has been in place since December 1999.

NSCMP completes its mission at the PBEDS site, destroying more than 1,200 munitions cached at PBA, Ark.—marking the destruction of all recovered non-stockpile materiel declared prior to the United States Entry-Into-Force of the CWC. These munitions included 4.2-inch mortars and German Traktor rockets. PBEDS began operations in June 2006.

Workers safely destroy the last explosively-configured mustard-agent filled munition at the TOCDF located at DCD, Utah.



A ceremony was held June 15 at Pine Bluff Arsenal (PBA), Ark., to celebrate the completion of the Pine Bluff Explosive Destruction System (PBEDS) mission.

CMA reaches 75 percent destruction of the munitions in the U.S. chemical weapons stockpile since Entry-Into-Force of the CWC.

CMA achieves the destruction of 80 percent of the U.S. chemical agent stockpile since Entry-Into-Force.

NSCMP uses its Portable Isotopic Neutron Spectroscopy System and the Digital Radiography and Computed Tomography System to complete an assessment mission in Columboola, Australia—assessing 144 munitions recovered there.

PBCDF safely completes disposal of the last mustard agent-filled ton container, marking the successful completion of chemical weapons disposal operations at PBA.

NSCMP completes three successful assessment and destruction missions at Redstone Arsenal, Ala., Camp Sibert, Ala., and Spring Valley, Washington, D.C., using the transportable EDS.

### 2011

TOCDF reaches a significant milestone—11,111,111 consecutive man hours without a lost workday injury; significantly, this milestone occurred on Jan. 11, 2011 or 1/11/11. The milestone also marks more than five years without a lost workday due to an injury on the job.

ANCDF is inducted into the State of Alabama Engineering Hall of Fame.

CAMDS operators perform the final Demilitarization Protective Ensemble (DPE) entry.

CMA commemorates the end of operations at the PBCDF with a ceremony featuring recognition from CMA, depot and Army Material Command officials.

CMA achieves destruction of 85 percent of the U.S. chemical agent stockpile since Entry-Into-Force.

DCD makes the last of more than 20,000 safe on-site container deliveries to the TOCDF. Five days later, the TOCDF destroys the last of 6,399 mustard agent-filled bulk ton containers originally stored at DCD.

Disposal operations for the 108 bulk containers filled with mustard agent conclude at the ANCDF. The disposal campaign lasted 63 days.



## Milestones in U.S. Chemical Weapons Storage and Destruction (continued)

### 2011-2012



*Ton containers await decontamination at the U.S. Army Chemical Materials Agency's Pine Bluff Ton Container Decontamination Facility at Pine Bluff Arsenal, Ark. There, operators used magnetic induction heating to decontaminate 4,307 TCs, making them suitable for recycling.*

Pine Bluff Ton Container Decontamination Facility, operated by NSCMP, completes decontaminating 4,307 ton containers, resulting in 6.5 million pounds of steel recycled.

National Safety Council awards TOCDF the 2011 Industry Leader Award, recognizing outstanding safety performance. Recipients of this award are selected based on North American Industry Classification Code, lowest total incidence rate and employee work hours.

ANCDF completes disposal of the chemical weapons stockpile at ANAD, Ala. This completion marks destruction of 7 percent of the original U.S. stockpile of chemical munitions and containers.

UMCDF completes disposal of the chemical weapons stockpile at UMCD, Ore. This completion marks destruction of 12 percent of the original U.S. stockpile of chemical munitions and containers.

#### 2012

TOCDF completes disposal of the chemical weapons stockpile at DCD, Utah. This completion marks destruction of 44 percent of the original U.S. stockpile of chemical munitions and containers.

CMA completes Chemical Stockpile Elimination mission destroying 89.75 percent (27,000 U.S. tons) of the Nation's chemical weapons stockpile stored at seven sites.