

Projectile Processing



State of Oregon
Department of
Environmental
Quality

Office of the Director
Chemical
Demilitarization
Program

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Background

In February 1997, the Environmental Quality Commission, the DEQ's governing body, issued environmental permits to the U.S. Army to build and operate the Umatilla Chemical Agent Disposal Facility (UMCDF) to destroy the chemical weapons stockpile stored at the Umatilla Chemical Depot (UMCD) near Hermiston, Oregon.

The Umatilla Chemical Depot stores nerve agents and blister (called "mustard") agents in liquid form. All of the chemical warfare agents are highly toxic. Nerve agents are contained in munitions, such as rockets, projectiles, land mines, and in large containers, such as spray tanks, bombs, and "ton containers." Blister agent is stored in ton containers.

How much agent is in a projectile?

The UMCD stores almost 80,000 155-mm projectiles and about 18,000 of the 8-inch projectiles, containing VX and GB nerve agents. The 155-mm projectile contains six pounds of chemical agent, and the 8-inch projectile contains 14.5 pounds.

How are projectiles stored?

All projectiles are stored on wood pallets in earth-covered concrete buildings called "igloos" or bunkers. Each pallet holds a total of eight 155-mm projectiles or six 8-inch projectiles. The pallets are stored stacked on top of each other.

Are there guidelines for munitions transportation?

Yes. The UMCD has strict guidelines that must be followed prior to and during transportation of all munitions. The guidelines were established to prevent transportation accidents and to ensure that if an incident does occur, chemical agent will not travel beyond the UMCD boundaries. The UMCDF Permit requires that weather conditions be evaluated daily prior to any loading or transporting of munitions. Under certain weather conditions, such as icy roads or dense fog, transportation of munitions are not allowed. The DEQ also requires that a Transportation Contingency Plan be in place prior to the movement of any munition, and that all munitions (except for spray tanks) be transported from the igloos to UMCDF inside an "Enhanced On-Site Container" (EONC).

What is an EONC?

An EONC is a cylindrical transport container about 12 feet long by 8 feet high that is specifically designed to withstand impacts, fire, crushing, and leaks. There are a maximum number of munitions or containers that may be loaded into an EONC. The load varies for each type of munition. The EONC has a hydraulically sealed door with a locking ring mechanism. After the EONC is loaded the door is closed and the seal is checked for tightness before it is moved by truck to the UMCDF.

How are projectiles transported to UMCDF?

Before going into the storage igloos the workers sample the air inside of the igloos to make sure there are no vapor leaks. If the sample shows it is safe to enter the building, the workers open the door. A forklift is then used to carefully pick up the pallets individually and transfer the munitions to the EONC. An EONC can hold nine pallets of 155-mm projectiles or six pallets of 8-inch projectiles. Once the EONC is loaded, the door is closed and sealed. The EONC is transported by truck to the Container Handling Building (CHB) where UMCDF personnel take custody of the munitions.

Because the loading and transportation of the munitions from the igloos may be prohibited under certain conditions, the CHB is permitted to store up to 48 EONCs at a time. This provides enough storage capacity to continue agent processing when additional munitions cannot be moved into the building.

What happens to the EONCs once inside the CHB?

The EONCs are unloaded from the truck with an overhead crane and placed on a conveyor for transfer to the unpack area (via an elevator to the second floor). There are two elevators between the unloading area and the unpack area, one for full EONCs going up and one for empty containers coming down. The lifts are sealed to make sure air from the Munitions Demilitarization Building (MDB) is contained within the filtered area of the MDB.

In the unpack area, the interior of the EONC is monitored for signs of chemical agent before the door is opened. If agent is detected, the EONC remains sealed and is sent back down the elevator and routed to the Toxic Maintenance Area for special handling. If no agent is detected, the EONC door is opened and the pallets are removed.

How is a projectile processed?

Each projectile is manually removed from the pallets and loaded base first onto the Projectile Feed Conveyor, from this point the process is remotely controlled. The conveyor moves the projectiles through an airlock into the Explosion Containment Vestibule and then into the Explosion Containment Room (ECR).

Once the projectile enters the ECR it is transferred to the Projectile/Mortar Disassembly (PMD) Machine for “reverse assembly.” The PMD is a multi-station machine that removes the explosive components from each projectile prior to agent draining.

The PMD includes an indexing table that rotates the projectile to different stations. The first station of the PMD is called the “Load Station,” where the projectile is removed from the conveyor. The projectile is rotated to the second station, the “Nose Closure Removal Station,” where the lifting plug is removed and sent by conveyor to the Deactivation Furnace System (DFS).

The table is then rotated again, placing the projectile at the third station, called the “Miscellaneous Parts Removal Station.” This is where the fuze well cup or other explosive charges are removed from the projectile and sent by conveyor to the DFS.

The fourth station is the “Burster Removal Station,” where the last explosive component, the burster charge, is removed.

The burster is a tube packed with explosives contained in a “burster well” that extends the length of the projectile. The burster is pulled out of the projectile, cut into two pieces, and fed to the DFS through a feed chute. The projectile is then unloaded from the PMD at the fifth station, the “Unload Station,” and transferred from the ECR to the Munitions Processing Bay (MPB).

At the MPB the projectiles are transferred to the Multipurpose Demilitarization Machine (MDM). The MDM uses a two-step process to remove agent from the projectile. The first step removes the burster well from the projectile, and the second step inserts a drain tube to drain the chemical agent. The agent is measured to verify that the projectile has been drained, and then pumped to holding tanks where it is stored prior to treatment in the Liquid Incinerator (LIC).

After the agent is drained, the burster well is crimped to deform it before it is placed back in the projectile. Crimping the burster well prevents it from being reinserted completely, so that there is free air movement within the projectile. This prevents pressure build-up when the projectile is heated. After the burster well has been re-inserted a machine picks up the projectile and places it on a tray. When the tray is full it is transferred to the Metal Parts Furnace(MPF) for combustion of any residual agent.

Where to get more information

Contact Shelly Ingram at the DEQ office in Hermiston, 256 East Hurlburt (Suite 105) or call (541) 567-8297 ext. 25 (toll-free in Oregon 1-800-452-4011).

Alternative formats

Alternative formats of this document can be made available. Contact DEQ, Shelly Ingram at (541) 567-8297 ext. 25. People with hearing impairment may call DEQ's TTY at (503) 229-6993.

Related fact sheets available from DEQ:

- || Liquid Incinerator
- || Rocket Processing
- || Metal Parts Furnace
- || Deactivation Furnace System