

Detonating Chemical Weapons: Technology and Safety Paradox

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Summary

The US Army's decision to use controlled detonation through EDTs could complete the destruction task earlier than the current methods allow. EDTs are the appropriate supplements to current methods of neutralization followed by bio-treatment. US Army requires working in close cooperation with resident groups by effectively demonstrating them the technology that could address their concerns over environment and safety.

The United States has one of the largest stockpiles of chemical weapons some of which dates back as far as World War I. By end of January 2010, the US has destroyed 22,322 of the original 31500 tons of chemical stockpiles. It includes the deadliest nerve agents; Sarin, VX and the vesicant mustard stored at nine weapons depots. The weapons at the three sites have been eliminated through incineration or neutralization processes. The four sites are still running the active incinerators have completed the burning process. The remaining two storage sites; Blue Grass Army Depot (BGAD) in Kentucky and the Pueblo Chemical Depot (PCD); where the destruction work is yet to begin and there is a growing pressure to meet the 2012 deadline for completion of disposal. However, the US Army's Chemical Materials Agency (CMA) officials have claimed that the disposal work at BGAD will begin only by 2018 and will be over by 2021. In its bid to catch up with the 2012 deadline, the US Army's decision to explode some mustard munitions at both places², and possibly even some nerve agent in Kentucky, nevertheless has shocked the residents and environmentalists groups. The environmentalists are crying fowl over Army's decision since blowing up some of the weapons in a detonation chamber would be worse than burning them.

It is thus important to probe why US Army has decided to explode some munitions and what are the technologies and mechanisms its employs that does not jeopardise the safety of local residents and without causing any environmental disaster in its attempt to meet the deadlines. The US Army's decision is apparently guided by two primary concerns. First, the Assembled Chemical Weapons Alternatives (ACWA) - responsible for destruction at BGAD and PCD program - has decided to use an Explosive Destruction Technology (EDS) to accelerate the weapon disposal schedules at both installations and in turn to catch up to lawmakers' demand for full chemical disarmament by 2017. Second, an important concern behind this strategy is to augment the under construction facilities by providing an additional destruction capability

at both sites. However there have been serious misgivings about the way the select munitions were going to be blown up.

There are two major technology forms for destroying chemical weapons approved under the Chemical Weapon Convention: high temperature destruction technologies like incineration and low-temperature destruction technologies like hydrolysis followed by post-treatment of the generated reaction masses³. Besides that there are many alternative technologies developed today and the number is growing. In 2009, the US Army in collaboration with the National Research Council (NRC) tested four chemical weapons disposal technologies: three private-vendor systems and one Army-developed explosive destruction system (EDS). Tests were conducted at both; the BGAD in Kentucky and the PCD in Colorado. The Army and the NRC tested 3 private-vendor systems which were; the DAVINCH system developed by Japan's Kobe Steel and US-based Versar, the transportable detonation chamber T-60 model supplied by US-based CH2M Hill, and the static detonation chamber SDC2000 model from Sweden's Dynasafe. The report submitted by the National Research Council titles as 'Assessment of Explosive Destruction Technologies for Specific Munitions at the Blue Grass and Pueblo Chemical Agent Destruction Pilot Plants (2009)'; recommended that, for destruction of 155-mm mustard gas munitions at BGAD and PCD, the DAVINCH and SDC2000 were the most effective. And for destruction of M55 rocket motors, the report recommended the T-60 as most effective⁴.

However as per the recommendations the construction of these facilities would take some time. The Army's plan is to supplement these primary plans by carrying out the explosion inside an explosive containment vessel through controlled detonation. The ACWA is primarily considering the four EDT's for use in association to the full-scale treatment facility: Explosive Destruction System, Transportable Detonation Chamber, Static Detonation Chamber and a Vacuum-Integrated Chamber⁵. Each of these technologies has a large containment vessel designed to handle munitions. Certain mustard rounds which have been laying the depots for

years without any periodic refurbishing are primarily being considered for blowing up in EDT. It is virtually impossible to disassemble them as most of them have been leaking and corroded for years now. For bacterial neutralization they need to be manually disassembled. The disassembling can be done either through robots or by sending technicians with safety kits, masks and so on. It is not clear how much the robots can be effective in carrying out the dismantling. Hence the only other option is to send the experts with safety kits and devises to manually disassemble them which is fraught with manifold risks. Since CMA is not responsible to put those workers at that kind of risk, the EDT is being considered appropriate for the 'rogue mustard munitions'. However, no chemical weapons will be exploded outside of vessel containment. It is expected that explosive technology is being considered for 15,000 mustard- and nerve-agent filled projectiles in Kentucky and 125,000 mustard agent-filled munitions in Colorado. US Army has been using the mobile detonation facilities for quite a long time now. However, one cannot be sure how much the use of EDTs can expedite the process of munitions disposal. There are no international standards for using EDT's. During the President Bush's tenure the ACWA remained grossly under funded which have severely restrained the ACWA's ability to carry out the disposal in prescribed timelines. Thus the use of EDT is expected to complete the destruction task earlier than the current methods allow and also brings continuity in destruction operations without further time lag.

The sudden shift to EDTs to hasten the process of disposal has caused widespread despair among the local residents. There has been heavy opposition by the citizens' advisory commissions in both states regarding the use of the technology for large amount of munitions as Army has proposed. The citizens groups are increasingly demanding that the poisonous agents have to be neutralized by bacterial processing. The lack of information remains the major source of confusion as most of these technologies are untested and generating suspicions about the efficacy of any specific EDT system. The lack of information about the systems, their reliability and environment

friendliness within the larger scientific domain in US raised the apprehensions amongst the residents. According to Craig Williams, director of the Berea-based Chemical Weapons Working Group, “As far as the acceptability of an explosive detonation technology, we remain unconvinced that it will meet the environmental and health criteria required but the jury’s still out on that”⁶.

The Army being the authority to carry out the destruction of chemical weapons is responsible to ensure the abidance to the domestic as well as international obligations and environmental safety norms by expeditiously destroying all of the US-declared chemical weapons. The international verification mechanism, widespread media coverage, environmental and local groups all necessitates it to assuage the safety concerns while employing the appropriate technology or combination of technologies and simultaneously to respect its CWC deadlines. Thus given the widespread public sensitivities involved; in the larger public interest, Army requires working in close cooperation with various resident groups. The selection of appropriate technologies and its effective demonstration to the citizen groups through Army-Public partnership could help addressing many warranted as well as unwarranted concerns.

Endnotes:

1. Kris Osborn, “U.S. Gains Momentum Destroying Chemical Weapons Stockpiles”, URL: at http://www.usaasc.info/alt_online/article.cfm?iID=1003&aid=05
2. “US to Blow Up Some Chemical Stockpiles”, February 20, 2010 Associated Press URL: <http://www.military.com/news/article/us-to-blow-up-some-chemical-stockpiles.html>
3. Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (Chemical Weapons Convention) URL: <http://www.opcw.org/chemical-weapons-convention/>
4. Report by Committee to Review Assembled Chemical Weapons Alternatives Program Detonation Technologies, Board on Army Science

and Technology, Division on Engineering and Physical Sciences, and NATIONAL RESEARCH COUNCIL, “Assessment of Explosive Destruction Technologies for Specific Munitions at the Blue Grass and Pueblo Chemical Agent Destruction Pilot Plants” (2009), URL: http://www.nap.edu/openbook.php?record_id=12482&page=R1

5. Rachel Oswald, “Last Two U.S. Chemical Weapons Disposal Sites Funded at \$550M’, Tuesday, Jan. 26, 2010, Global Security Newswire, URL: http://www.globalsecuritynewswire.org/gsn/nw_20100126_6522.php
6. Ronica Shannon, “Idea to blow up weapons worries many”, Richmond Register, February 26, 2010, URL: <http://www.cwwg.org/rro2.26.10.html>