

What's he building in there?

In a letter dated 7 July 2014 Iraqi ambassador to the United Nations Mohamed Ali Alhakim notified UN secretary general Ban Ki-moon that 'armed terrorist groups' had entered the Muthanna complex on 11 June. The next morning a project manager observed the terrorists looting some equipment via the camera surveillance system before it was disabled. The document, as cited by Associated Press, explicitly referred to the capture of bunkers 13 and 41. Both these locations hold chemical weapons (CW) that were so severely damaged during the 1991 war to liberate Kuwait that it has not yet been possible to dispose of them safely.

Finding a way to destroy these weapons remains on the agenda of the Organisation for the Prohibition of Chemical Weapons' (OPCW), the international body implementing the Chemical Weapons

Convention (CWC). Iraq became a party to the CWC on 12 February 2009. However, the capture of the former CW production site by the Islamic State of Iraq and the Levant (ISIL, now rebranded as the Islamic State. Ed.) means that the Iraqi government is *de facto* no longer in control of the area. Alhakim consequently informed Ban that Iraq is unable to fulfil its CW destruction obligations and would resume those obligations as soon as the security situation has improved and control of the facility has been regained.

ISIL, as it then was, rose to global prominence in 2013 due to its role in the Syrian civil war. An uncompromising Sunni insurgency grouping, it grew out of the persistent political and economic discrimination against the Sunni majority in post-Saddam Iraq and in response to the US occupation of the country.

Initially it pledged affiliation to al Qaeda. However in 2013 al Qaeda leader Ayman al-Zawahiri ordered an end to the infighting among al Qaeda affiliates in Syria, which the current Islamic State leader, Abu Bakr al-Baghdadi, rejected. Seeing a challenge to its authority, the al Qaeda leadership publicly disavowed ISIL early in 2014. During the spring ISIL managed to gain control over large swaths of territory in both Syria and Iraq. On 29 June, the first night of Ramadan, al Baghdadi changed the name of the organisation, announced the reestablishment of the caliphate and pronounced himself caliph, thus demanding allegiance from all Muslims everywhere.

The Islamic State's capture of two CW storage bunkers at Muthanna raised fears of chemical warfare in Iraq as well as Syria.



The insurgent grouping's habitual resort to extreme violence, its strict upholding of sharia law and uncompromising attitude towards non-believers leaves many a commentator convinced that it will stop at nothing in pursuit of an Islamic state.

Analysis of documents relating to the dismantling of the Muthanna complex in the 1990s and subsequent monitoring of the site, however, demonstrates that it would be all but impossible for the insurgents to acquire and use Iraq's former CW, or for that matter, the toxic residues of warfare agents.

Dismantling Muthanna

The Muthanna complex, some 75km north-west of Baghdad, was Iraq's CW production site and principal storage area. Because of its remote desert location the United Nations Special Commission (UNSCOM) eventually decided to transfer all Iraq's toxic chemical materials to the site for destruction.

Starting in 1992, UNSCOM completed CW elimination operations early in 1994 and destroyed the infrastructure. One bunker in the huge complex was used to store destruction equipment remnants and contaminated soil. A second bunker containing unknown quantities of chemical munitions, agents and precursors had to be sealed, because the

damage it had sustained during the 1991 bombing campaign rendered entry by members of the UNSCOM Chemical Demolition Group extremely hazardous.

UN Security Council Resolution 687 (1991) laid down formal cease-fire conditions after Iraq's ejection from Kuwait. It also established UNSCOM to oversee the implementation of the non-nuclear disarmament dimension. UNSCOM's mandate included, among other things, 'to take possession for *destruction, rendering harmless or removal from the country* of all chemical and biological weapons, stocks of agents, [...] and all components and facilities associated with these [...] weapon systems' [emphasis added].

The phrasing differs considerably from the CWC, which defines CW destruction as a process by which chemicals are converted in an essentially irreversible way to a form unsuitable for production of chemical weapons, and which in an irreversible manner renders munitions and other devices unusable as such (Verification Annex, Part IVA, §12).

The fundamentally different statement of finality in the UNSCOM mandate explains why sealing the bunkers was an acceptable solution in 1994, and Iraq still faces a CW destruction challenge as a party to the CWC.

Bunker 13

The Iraqi military used bunker 13 (UNSCOM identification; named as bunker 2 in Iraqi documents) to store chemical munitions. It was damaged when a US bomb hit the roof on 8 February 1991. Table 1 summarises its contents.

According to the Iraqi declaration, the bunker housed some 2,500 122mm rockets filled with sarin at the time of the US attack. They were reported destroyed or damaged due to the bombing. Safety concerns prevented the UNSCOM Chemical Demolition Group from verifying the exact numbers or the condition of the bunker's contents. Besides the possibility of dangerous leaking toxic chemicals, UNSCOM also deemed the ageing explosive compounds to be potentially unstable. It is therefore not known if the rockets were fully assembled and fitted with their buster charges and fuses. UNSCOM was also unable to certify that no other munitions are inside bunker 13.

The highest estimate is that 15,000 litres of sarin were originally placed in the bunker. Iraq described the nerve agent as being of poor quality and unsuitable for long-term storage. Certain rockets hold polymer-based containers to counter degradation. Others were filled directly into the metal housing, in which case the sarin would have reacted with the metal

US Marines set fire to chemical barrels found during a search for an arms cache in Rawah, Iraq ©DoD

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| Muthanna complex: Bunker 13 | | | |
|---------------------------------|-------------|-----------------------------|---|
| Item | Number | Content | Status |
| 122mm rockets (different types) | 2,5000 | Sarin and sarin-type agents | Stored in wooden boxes, partially destroyed or damaged by US bombing. |
| Sodium cyanide | 180 tonnes | Tabun precursor | Cardboard boxes in poor condition, stored as loose salt |
| Potassium cyanide | 1.75 tonnes | Tabun precursor | Idem |
| Arsenic trichloride | 75 kg | Vesicant precursor | |
| 1-tonne containers | 170 | Empty, used to hold tabun | Contained crystallised salts as residue, filled with caustic soda for gradual decomposition |

| Muthanna complex: Bunker 41 | | | |
|-----------------------------|--------|---|--|
| Item | Number | Content | Status |
| 155mm artillery shell | ± 2000 | Empty, mustard agent contamination | Sealed inside bunker |
| 1-ton mustard containers | 605 | Residues of polymerised mustard agent | Filled with caustic soda and alcohol to allow degradation to continue |
| Incinerator equipment | | Pumps, pipes, valves, heat exchanger and tanks | Partly cleaned through burning; full decontamination impossible; stored in bunker. |
| 200-litre barrels | some | Empty, used to hold warfare agents and other toxic chemicals during destruction process | Storage |
| Construction material scrap | | Bricks, concrete slabs and soil from the incinerator and CW pits | Crushed, partially decontaminated through burning. Sealed in bunker. |

and degraded substantially. UNSCOM never recovered high-purity sarin in Iraq, and therefore concluded that the rocket contents would have degraded significantly after a few years, irrespective of whether the agent was held in internal containers or not. It produced the last estimated inventory early in 1994.

Arsenic-based chemicals (precursors to blistering agents) and their degradation

products pose a considerable persistent toxicological hazard. The Iraqis had transferred roughly 200 tonnes of cyanide salts (precursors to the nerve agent tabun) in cardboard boxes to Muthanna from another storage site. The 2007 Compendium prepared by the United Nations Monitoring, Verification and Inspection Commission (UNMOVIC) concluded that 'while these are not

chemical warfare agents *per se*, they are inherently blood toxins, and should be treated as hazardous materials'. Danger from these chemicals cannot be ruled out until the area is investigated through detailed sampling and analysis.¹ The empty tabun containers had been decontaminated before storage in bunker 13, but the residue would still have held hazardous cyanides.

Bunker 41

The second bunker at Muthanna, which UNSCOM identified as number 41 and the Iraqis knew as number six, contained empty mustard agent shells, parts from disassembled incinerator equipment, storage containers and other materials from the destruction sites that could not be thoroughly decontaminated. The emptied 155mm artillery rounds were filled with mixture of caustic soda and alcohol to destroy the polymerised mustard residue. Table 2 offers an overview of the bunker's contents and their status.²

Decontamination of the materials in bunker 41 was never completed and would not have satisfied today's health and environmental safety standards set by the CWC. In its final report, UNMOVIC assessed that the remnants of munitions and bulk containers with the residues of polymerised mustard left after the destruction operations may pose a threat to human health if handled improperly.

Lingering uncertainties

If any uncertainty about the contents of bunkers 13 and 41 exists today, this follows from UNSCOM's inability to verify the exact contents as declared by Iraq and certify the destruction of the 122mm rockets in 1994. The presence of possibly up to 50 tonnes of propellants for the rocket motors and an unknown quantity of buster charges posed a fundamental challenge to the physical exploration of bunker 13, and hence to the safe destruction of these CW under OPCW supervision. Any escape of the toxic chemicals spells major hazards both to humans and the environment.

Should the Islamic State fighters still find sarin, it is highly likely that it will have degraded below any useful degree of purity as another 20 years

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The US has done a lot of training of Iraqi hazmat technicians, but still not enough for them to deal with Al Muthanna ©DoD

have passed since the UNSCOM Chemical Demolition Group sealed the storage bunkers. However, as the UNMOVIC Compendium cautions, the degree of degradation cannot be determined without investigation and sampling the rocket contents.

Mustard agent is far more stable, but both UNSCOM and UNMOVIC reported significant degradation. (UNMOVIC conducted onsite inspections prior to the US-led invasion of Iraq in 2003 and found some mustard-filled artillery shells, which had been formally declared by Iraq, but somehow not destroyed under UNSCOM supervision.)

The 155mm artillery rounds contained hydrogen gas and other breakdown products which caused considerable internal pressure. Moreover, the thick-skinned shells proved particularly difficult to penetrate and drilling could have ignited the built-up gases. Before the UNSCOM Chemical Demolition Group came up with the idea of blowing the cones off the shells, they were wearing out a drill bit every three or four rounds and on average opened less than one a day.³

More importantly, however, none of the reports indicate the presence of mustard-filled munitions. The CW elimination teams drained the artillery shells and broke their buster tubes. Only some polymerised mustard agent residue remained in the barrels, which could still

pose a health risk if someone touched it.

UNSCOM selected bunkers 13 and 41 for their solidity and once destruction operations were completed both structures were sealed. Every entrance was blocked off with two brick walls with a 5cm layer of tar between them. A third brick wall was built one metre from the second walls and the space was filled with reinforced concrete, so the entrance seals are 1.5 metres thick overall. The hole in the top of bunker 13, containing the sarin rockets and precursor chemicals, was closed by filling the entire inner room with soil through that hole and then plugging it with reinforced concrete.⁴

Any penetration of the bunker by Islamic State fighters would require major demolition works and rubble removal, without knowing the exact positions of the toxic chemicals, propellants and explosives, and while facing the possibility of exposure to contaminated soil or air. Even the OPCW is still considering how it might proceed to determine the bunker's exact contents.

One can only speculate on the extent to which the US is continuously monitoring the Muthanna site today, by means of satellites or drones. But it is not hard to imagine that Islamic State attempts to extract items from bunkers 13 and 41 would be thwarted by means of air strikes or stand-off weapons. Fortunately, the desert location would

prevent any plume of toxic material from reaching population centres.

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¹ Compendium, Chapter 3, p. 316.

² Compendium, Chapter 3, p. 292.

³ Compendium, Chapter 3, p. 287.

⁴ Compendium, Chapter 3, p. 312.

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