

Annex B Al Muthanna Chemical Weapons Complex

Background: Evolution of Iraq's Chemical Weapons Development Facilities

Iraq's pursuit of chemical and biological warfare programs dates back to the early 1960s when members of the armed forces traveled overseas, including to the US and UK, in pursuit of CBW training. From this training, Iraq formed the Chemical Corps. With this foundation and a change in political power from the Ba'thist revolution in 1968, Iraq began a campaign of organized research and development into an infant CBW program.

- Junior Army officers were trained in United States and Russia in chemical warfare during the 1960s. The Iraqi army then formed the Chemical Corps.
- A division of opinion evolved in the chemical corps where the more Senior Officers desired only a defensive CW program while Junior Officers favored both an offensive and defensive program. This rift in leadership opinion continued into the 1970s.
- The Ba'thist revolution forged contacts among Junior Officers of the chemical corps and Senior Officers of the Army enabling Iraq to embark upon an offensive CBW program.

Iraq's first attempt to produce a chemical weapon was a series of failures and limited technological advances.

- During the early 1970s the Army developed the concept of "Scientific Centers for Excellence." The goal of the project was to develop a chemical weapon, however after four years of poorly organized research, the project failed to achieve the development of a chemical weapon.

The desire to undertake an offensive CW program continued, and a more organized approach to produce a chemical weapon began in 1974 under the

military leadership and Iraqi Intelligence Service (IIS) oversight. In 1975 the Al Hasan institute (the first laboratory devoted to the development of CBW) was formed. Its main laboratory was at Al Rashad in suburban Baghdad.

- The Al Hasan Institute was founded as the nucleus for chemical research dedicated to CW development.
- Al Hasan was funded by the government through the Ministry of Higher Education, not the military.
- The Al Hasan Institute was intimately supported by the IIS. The project was not just a Chemical Corps project.

Two key military personnel founded the Al Hasan Institute, the first laboratory devoted to the development of CBW.

- Ghassan Ibrahim, a captain in the chemical corps, formed the Al Hasan Institute.
- Faiz 'Abdallah Al Shahin, an Intelligence Officer, was Ghassan's assistant.

The institute established a mentorship and overseas training program to foster better-trained scientists and chemical corps officers.

- Some of the more prominent Iraq chemical weapons experts received their PhDs from the Chemical Warfare Academy in Moscow from 1973 to 1979.

—Dr. 'Imad Husayn 'Abdallah Al 'Ani (Research and Development)

—Dr. Salah-al-Din 'Abdallah (Weapons Design Expert and Toxicity Research)

—Dr. Hammad Shakir (Weapons Preparation Expert)

Iraq's second organized attempt at CBW production ended abruptly in a scandal and the Al Hasan Institute was abolished in 1978.

- The founder of the Al Hasan Institute and a number of staff were imprisoned for fraud and embezzlement.
- The program, though it made substantial advancements in CW research and development, never succeeded in CBW production. The program ultimately failed to meet expectations.

Project 1/75 evolved from the Al Hasan Institute and began to materialize after 1978. Project 1/75 eventually evolved into Iraq's third and most successful attempt in developing a viable and productive CBW program. Funding came from a different ministry, leadership was changed, and resources became more remotely located away from Baghdad.

- Project 1/75 was a remnant of the Al Hasan Institute and started as a small facility 40 km SW of Samarra', Iraq.
- The Ministry of Defense funded the project.
- Lt. Gen. Nizar 'Abd-al-Salam Al-Attir spearheaded what later became the largest campaign in the pursuit of chemical weapons in Iraq's history.

In 1980, after Saddam took power, Project 1/75 was greatly expanded. The project was renamed Project 922. With the Iran-Iraq war looming, Iraq made the CBW program a top priority.

- German firms were contracted to build equipment and facilities designed for the sole purpose of the safe, efficient, mass production of CBW agents.
- Iraq's elite scientists were recruited. Research groups were coalesced and moved into these facilities near Samarra'.

To maintain anonymity, Project 922 was known to the Iraqis as a pesticide production company. The State Establishment for Pesticide Production (SEPP) became the front company for Iraq's 100 square kilometer industrial facility dedicated to CBW production.

- ***Project 922 was referred to as the Samarra' Chemical Weapons Production and Storage Complex. The name was chosen because of its close proximity to Samarra', Iraq.***
- ***Project 922 was known to the Iraqi community as The State Establishment for Pesticide Production (SEPP).***

- Currently the complex is referred to as Al Muthanna Chemical Weapons Complex.

Within three years (1978-1981), Project 922 had gone from concept to production for first generation Iraqi chemical weapons (mustard agent). By 1984 Iraq started producing its first nerve agents, Tabun and Sarin. In 1986, a five-year plan was drawn up that ultimately led to BW production. By 1988 Iraq had produced VX. The program reached its zenith in the late 1980s during the Iran-Iraq war. Between 1981 and 1991, Iraq produced over 3,857 tons of CW agents.

- Initial research under an elite group of chemists focused on mustard, but rapidly progressed into Tabun and Sarin (G-Agents). Production efforts for mustard started at 10 tons of agent production in 1981 and increased roughly 80-100 tons per year until 1985 when the facility annually produced 350 tons. In 1987 Iraq produced almost 900 tons of mustard agents and in 1988 they produced close to 500 tons of agent.
- Iraq produced between 60-80 tons of Tabun annually between 1984 and 1986.
- Eventually they researched Cyclosarin and VX concurrently. In 1984 Iraq produced 5 tons of Sarin. Iraq constantly increased Sarin production efforts. In 1987 and 1988 Iraq produced 209 and 394 tons of Sarin, respectively.
- Cyclosarin was highly desirable to the Iraqis because of its low volatility and the commercial availability of its precursor compound cyclohexanol. These factors gave Cyclosarin several advantages; it was easier to work with in hotter environments, had enhanced efficacy and storage

life, and the precursor compound cyclohexanol was relatively cheap, commercially available, and difficult to control by sanctions.

- Iraq produced 2.5 tons of VX in 1988 before ending production due to the end of the Iran-Iraq War.
- Production for Sarin, VX, and Mustard resumed in 1990.

During the early years, Egyptian scientists provided consultation, technology, and oversight allowing rapid advances and technological leaps in weaponization. With the Iran-Iraq war well underway, Egypt assisted Iraq in CW production:

- In 1983, Egypt made modifications to the Grad 122 mm Multiple Launch Rocket System to enable warheads to store chemical agents.
- In 1984, Egypt exported Grad rockets with plastic inserts to hold chemical agent.
- In the mid 1980s, Iraq invited Egyptian chemical weapons experts to Iraq to assist in producing Sarin munitions.

Project 922 Becomes Al Muthanna after 1986

Project 922 underwent a name change in 1986 when the Al Muthanna State Establishment (MSE) oversaw operations and the facility became known as Al Muthanna (see Figure 1). The secrecy of the facility began to erode in the mid 1980s precipitating a venue change in Project 922's production and research.

- The BBC Panorama aired the documentary "Secrets of Samarra" on 27 October 1986. Security and secrecy were compromised for this clandestine CW program.
- The original Director General Lt Gen. Nizar was relieved by Fiaz 'Abdallah Al Shahin in 1987 (IIS agent and co-leader of the Al Hasan Institute).

- The Establishment was subordinate to the Ministry of Industrial Commission (MIC).

Research and production efforts underwent a strategic change in 1988, after the Iran-Iraq war ended, when a commercial product line was introduced. Despite the strategic production change, Iraq always maintained the philosophy that a CW program would persevere; in times of war facilities would be utilized for CW production and in times of peace facilities would be converted to commercial entities with the ability to quickly revert.

- Al Muthanna (previously Project 922) halted CW production focusing instead on R&D, purification and stability of CW agents during August 1988 to April 1990.
- The rationale for stopping the chemical weapons production was that the CW agents at Al Muthanna throughout the previous years were in the crude state, containing many impurities which affected the stability and consequently the storage ability of the agents.
- The need for CW agent drastically subsided and resources begin to stagnate from the reduced production requirement.
- Personnel and facilities were redirected to formulate and produce commercial products such as lice shampoo and petroleum jelly.
- Al Muthanna, however, maintained its ability to conduct a vibrant CW research, development and production program.

In order to ensure self-reliance, minimize dependence upon foreign resources, and conceal a CW program within a legitimate commercial entity, Director General Fa'iz in the mid-late 1980s began producing, purchasing, and utilizing off-site facilities. The facilities contained the next generation equipment and were research capable.

- Dependence upon foreign suppliers for precursors made the CW program vulnerable. Self-reliance for precursor production became a priority.

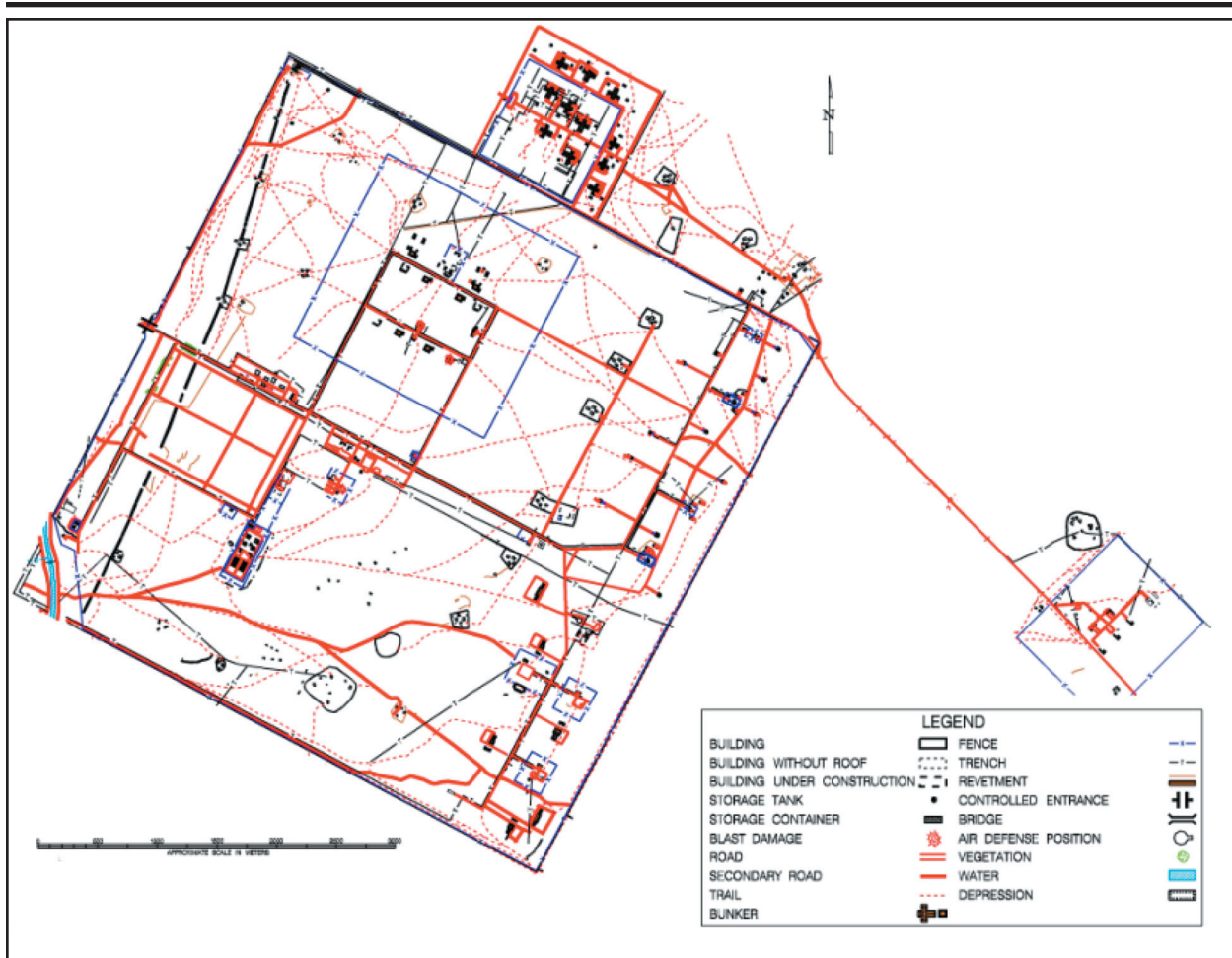


Figure 1. Al Muthanna Chemical Weapons Complex.

The BW program trailed the CW program, but gained momentum in 1985 by a compelling proposal submitted by Professor Nasser Al Hindawi. A microbiologist, Dr Rihab Rashid Taha, was recruited to lead the new BW program for Project 922. Research started at Al Muthanna but 1987 was transferred to Salman Pak.

- **The State Organization for Technical Industrialization recommended Dr Rihab Rashid Taha Al ‘Azzawi be recruited to pursue the establishment of BW program.**

- **In 1985 a laboratory was utilized at Al Muthanna and staffed with scientists to develop Bacillus anthracis, the causative agent of anthrax, and botulinum toxin.**
- **In May 1987 the BW program was transferred to Salman Pak. There was a leadership change at Al Muthanna and new management under General Shahin believed the BW work interfered with CW precipitating the location change.**
- **The BW program remained under Al Muthanna State Establishment control.**

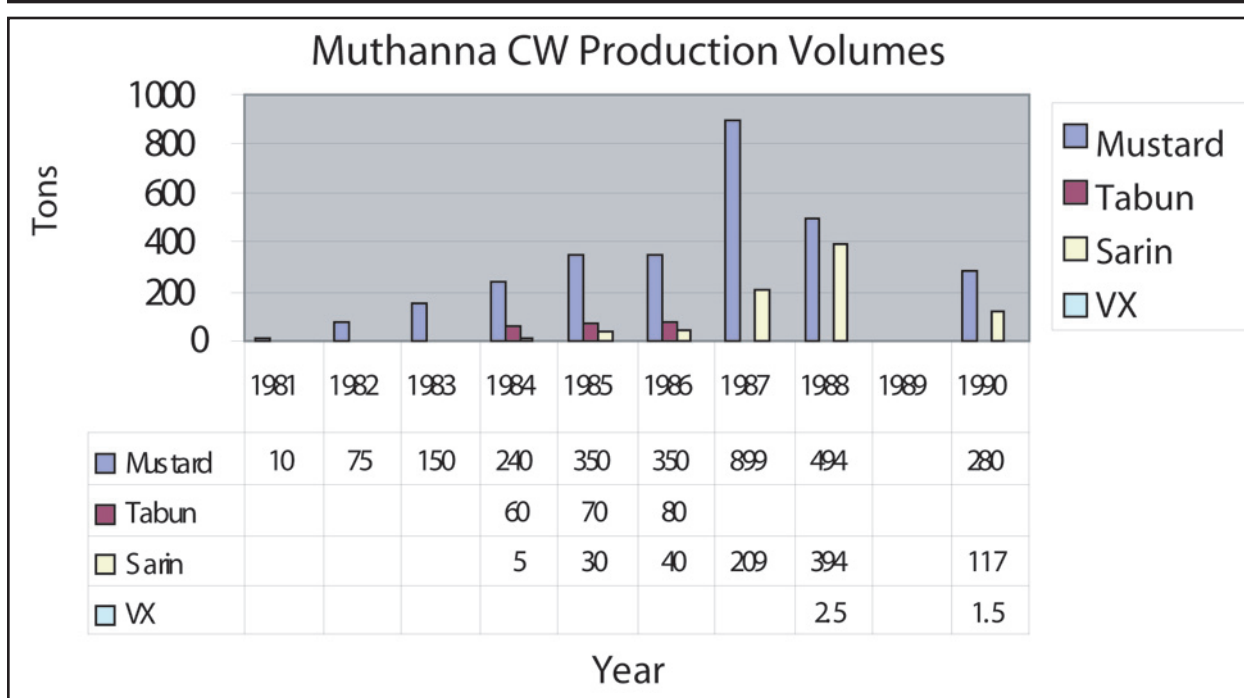


Table 1. Project 922, declared production volumes of CW agents.

- Certain CBW projects at Al Muthanna were compartmentalized and relocated to other locations. Al Muthanna began acquiring commercial chemical, biological and pharmaceutical facilities to conceal the CBW program within analogous commercial enterprises:
 - ‘Aqarqf Laboratory
 - Fallujah I, II, and III (also known as Habbaniyah III, II, and I) to coalition forces.
 - The Serum and Vaccine Institute (SVI) at Al ‘Amiriyah.
 - Samarra’ Drug Industries.

As early as April 1990, under fear of hostilities from Israel, resources at Al Muthanna were focused to operate at full CW production capacity. The Iraqi invasion of Kuwait in the same year precipitated an international reprisal. A US-led bombing campaign

quickly ensued and disabled Al Muthanna’s production ability. After the bombings, reestablishing late Iran-Iraq war production rates proved difficult and dangerous. Al Muthanna was not able to recreate Iran-Iraq war CBW inventories.

- In 1990 Al Muthanna produced 1/3 its maximum annual production volume for mustard, 1/3 its maximum annual production volume for Sarin and 2/3 its maximum annual production volume for VX. See Table 1 Project 922 Declared Production Volumes of CW Agents in this section for CW agent volumes.
- On 02 April 1990 Saddam announced that Iraq possessed binary agents similar to the US and former Soviet Union and threatened to use them on Israel if the Israelis attacked Iraq with nuclear weapons.

- Al Muthanna began preparation, in late April 1990, for filling Al Husayn warheads with Sarin and its mixtures and switched to producing the binary by August 1990.
- Production efforts intensified after August 1990.
- An order was issued by MIC in late 1990 to evacuate all Al Muthanna State Establishment documents. To implement this requirement, most of the documents were transferred to air-raid shelters within MSE.
- Al Muthanna essentially ceased production in December of 1990 and refocused resources on dispersing CW stockpiles and equipment for protection against the anticipated bombing campaigns, which started in January 1991.

Al Muthanna Chemical Weapons Production Facility Before and After Desert Storm

Al Muthanna's ability to produce chemical weapons ended with the Gulf war, and soon afterwards the UN resolution proscribed Iraq's ability to produce chemical weapons. The Fallujah satellite facilities (damaged during the Gulf war and not destroyed by UNSCOM), were repaired with the exception of Fallujah I which was not operational and operated as dual-use capable facilities. The majority of the Al Muthanna complex was bombed during Desert Storm, completely incapacitating Iraq's chemical weapon production capabilities, however, large stockpiles of chemical weapons and bulk agent survived.

Laboratories and production areas are shown below after the Gulf war bombing. Facilities boxed are annotated. The facilities not boxed in the enclosure are Iraqi decoys (see Figure 2).

After the bombing during Desert Storm, the roofs on the research facilities collapsed incapacitating research capabilities at Al Muthanna. The animal house was left.

During Desert Storm, the bomb assembly area was destroyed. The engineering support area and Chemical and Material Storage area experienced some collateral damage. Chemical and Material Storage Area where CW precursors were stored at the end of February 1991 were not bombed but experienced collateral damage as a result of the bombing.

The precursor and agent production area at Al Muthanna was not completely destroyed during Desert Storm. Portions of the mustard (blister agent) production and storage area survived. The VX and Tabun production (nerve agent) facilities were incapacitated. Decoy facilities that had been built on the complex remained intact (see Figure 3 for complete annotation).

The pilot plants survived much of the bombing during Desert Storm. Several structures remained intact, including the Inhalation Chamber, Quality Control Lab and two production areas. The Sarin production area was struck but not destroyed.

- Pilot Plants included three main production areas; Pilot Plant No.1 produced DMMP and D4, Pilot Plant No.2 produced DMMP and MPC, Pilot Plant No.3 produced DMMP, methyl phosphonyldifluoride (MPF) and Sarin.
- In the northeast portion of this area of the plant was a quality control laboratory. The laboratory was not struck during Desert Storm.
- Located in this section of the plant was an Inhalation Chamber. A guard post and barracks—both non-production related—were located at the northern section of this area. Neither facility were struck during Desert Storm (see Figure 4).
- The weapons assembly area where agent was loaded into munitions was located approximately 3 kilometers southeast of the overall facility. The remoteness of the location was chosen by the Iraqis to avoid unnecessary casualties in the event of a mishap during the uploading process.

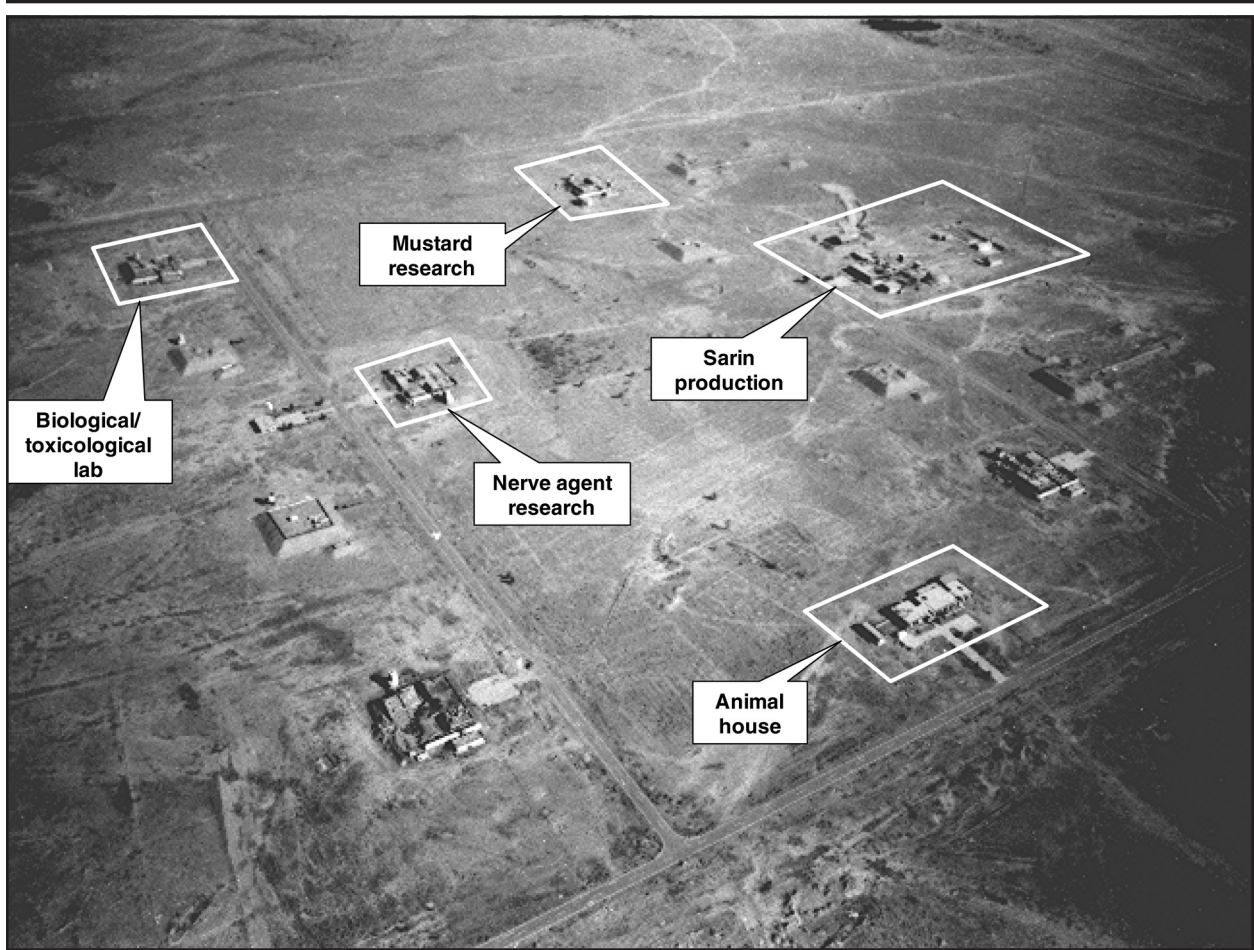


Figure 2. Al Muthanna R&D/Laboratory area after Desert Storm.

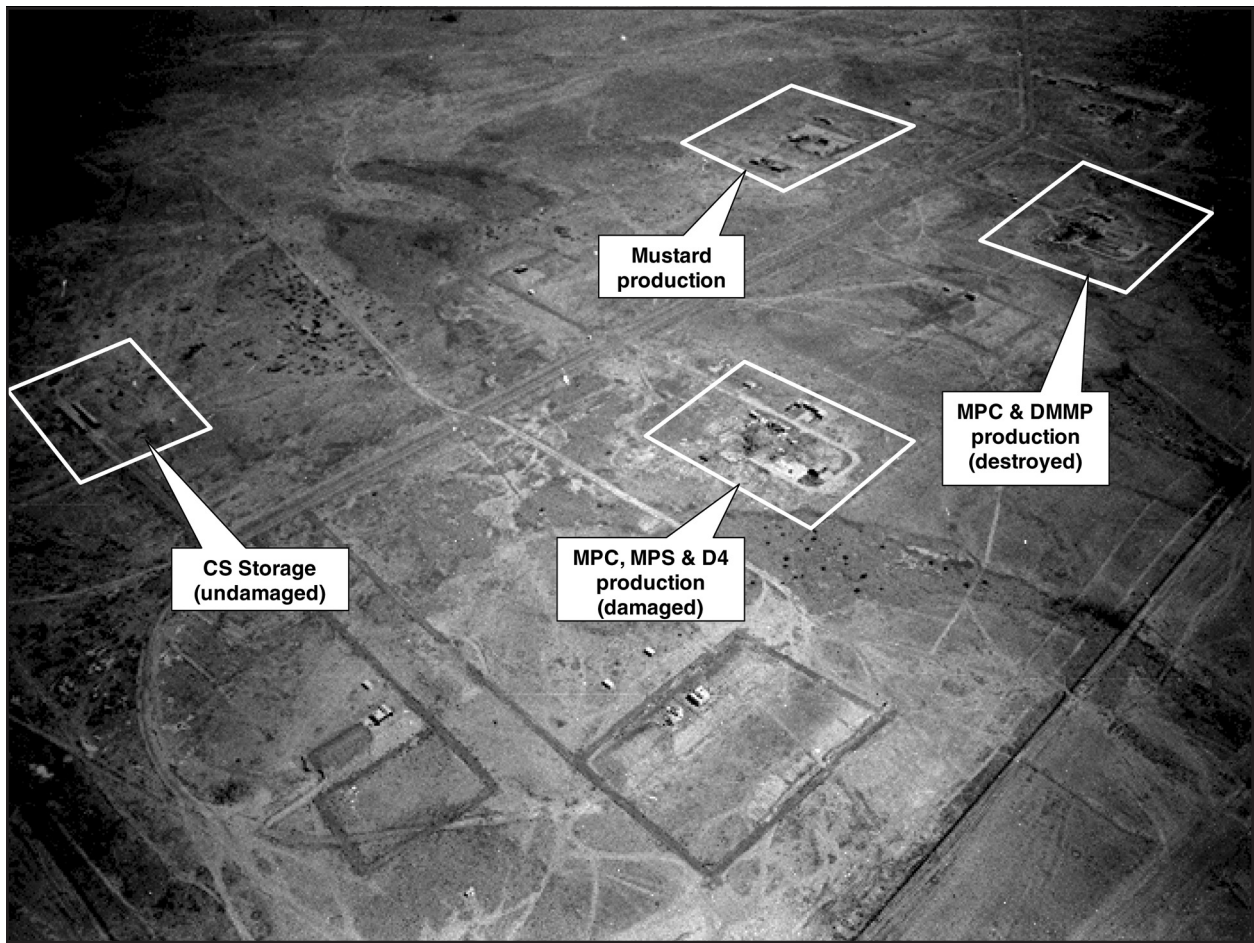


Figure 3. Al Muthanna precursor and agent production area after Desert Storm.

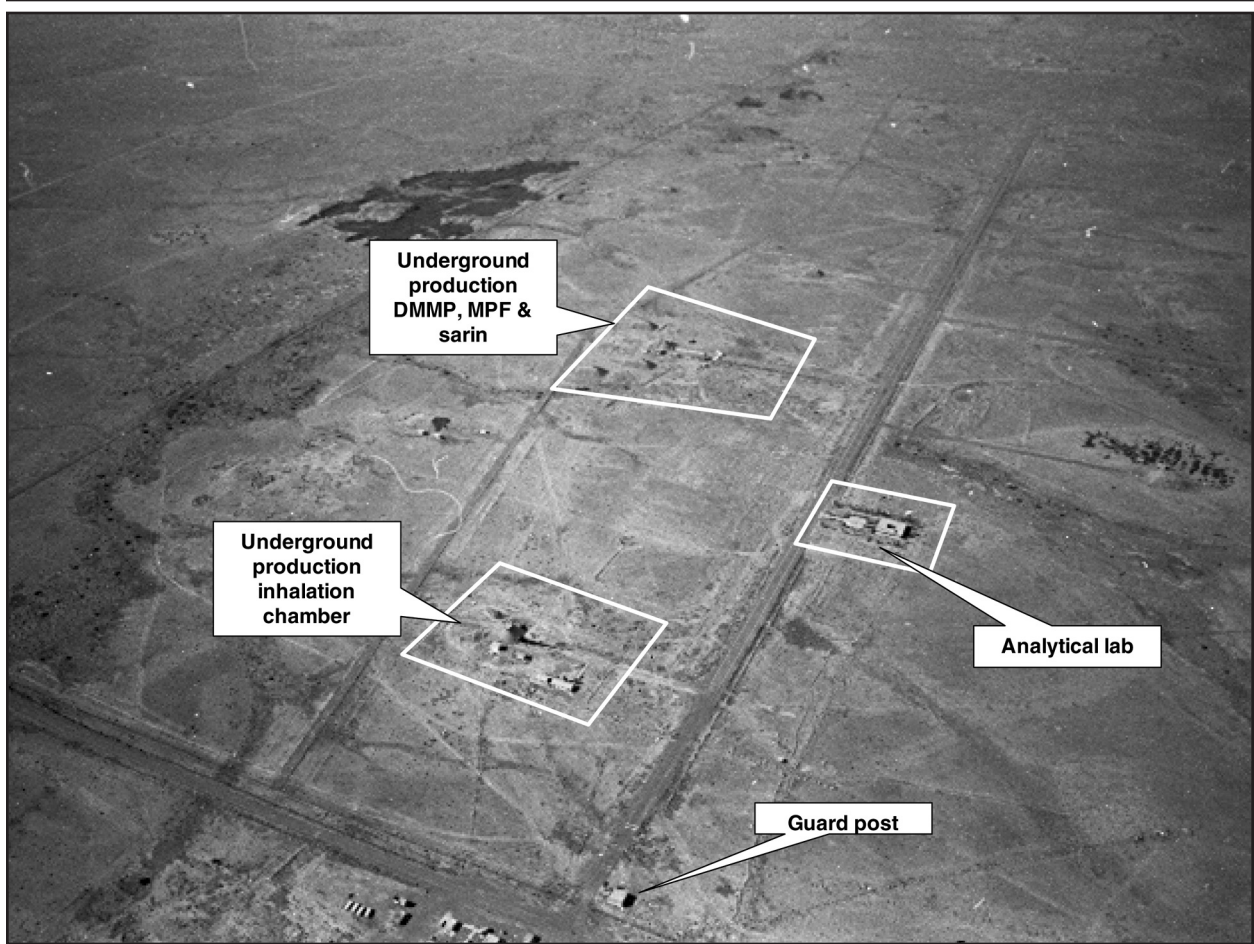


Figure 4. Al Muthanna pilot plants and storage area after Desert Storm.

- There is also a shampoo filling area located on the northeast section of this portion of the facility.

The Munitions Filling area suffered serious damage during Desert Storm. The entire operation was completely disabled except for two structures that were part of the Shampoo Filling Station at the northeast end of the complex.

Cruciform bunkers after Desert Storm are shown Figure 5. The overall facility contained more than 30 bunkers and hardened facilities. The CW bunker storage area consisted of eight large, earth-covered cruciform bunkers and six dummy cruciform bunkers. Gulf war bombing completely destroyed one bunker because of secondary explosion and severely damaged two others.

Al Muthanna State Establishment Post-Gulf War

From 1992 to 1994, UNSCOM's Chemical Destruction Group (CDG) oversaw destruction operations. A portion of the facility was transformed into a CW agent destruction facility. An incinerator was constructed in the summer of 1992 for the destruction of mustard agent at the munitions filling location. Chemical munitions stored throughout Iraq were to be gathered and destroyed at Al Muthanna. See Figure 6 for the location (note image was taken after incinerator was dismantled).

- Between 1992 and 1994 the facility was the primary collection and destruction site for all declared CW agents, precursor chemicals, and chemical production equipment.
- Between 1992 and 1994 and again in 1996, the CDG oversaw destruction of 30,000 pieces of ordnance, 480,000 liters of chemical agents, and more than 2 million liters of chemical precursors. Eventually, most of the facilities at the complex the Iraqi's destroyed and sold for scrap.
- Equipment that survived Desert Storm was tagged by UN or destroyed, but the UN was never able to verify that all equipment purchased for MSE was tagged or destroyed.

- Two Cruciform Bunkers were sealed containing munitions too dangerous for destruction.

- Bunkers, damaged by coalition bombing, collapsed, concealing unaccounted CW equipment and munitions in the debris. Over the next ten years some of the facilities were razed by the Iraqis. Precise accountability of equipment and munitions is unverifiable, because the National Monitoring Directorate and UNSCOM did not always oversee excavation.

After 1994, CW production related activities ceased at the Primary Al Muthanna site that once was Project 922 (Samarra' Chemical Weapons Production and Storage Complex). A small security detail remained. Two sealed cruciform bunkers containing the largest declared stockpile of chemical munitions, old bulk chemical agent, and hazardous material associated with the CW program remained. The surrounding area at the facility became a refuse area or junkyard for relics of Iraq's past CW weapons program.

- Two damaged cruciform bunkers were used to seal damaged chemical munitions, residual chemical agents, and hazardous material.
- The contents of the bunkers were declared to the UN but never fully. The munitions inside the bunkers were damaged from ODS bombings; fires, leaking munitions and physical damage to munitions made the environment inside the bunker extremely dangerous.
- The National Monitoring Directorate and a small security detail monitored the bunkers.

Between 1994 and OIF, Iraq requested UN approval to remove and relocate some of the equipment and facilities. Imagery analysis revealed in early 1997 that the Iraqis excavated many of the research and production buildings. Iraq had razed most of the Al Muthanna Complex by early 2000, leaving only the southern part of the former chemical and material storage area intact (see Figure 7).

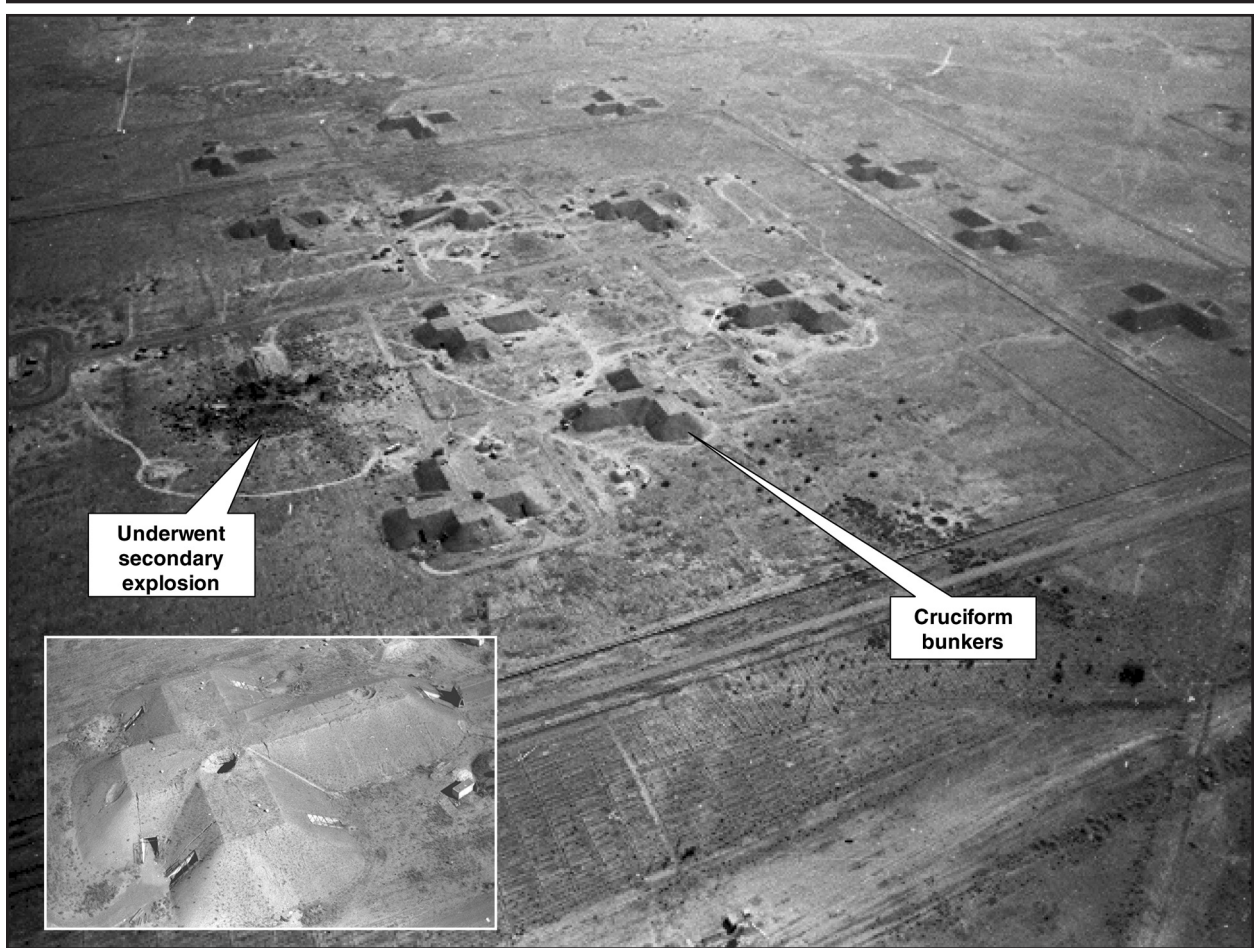


Figure 5. Munitions storage area.

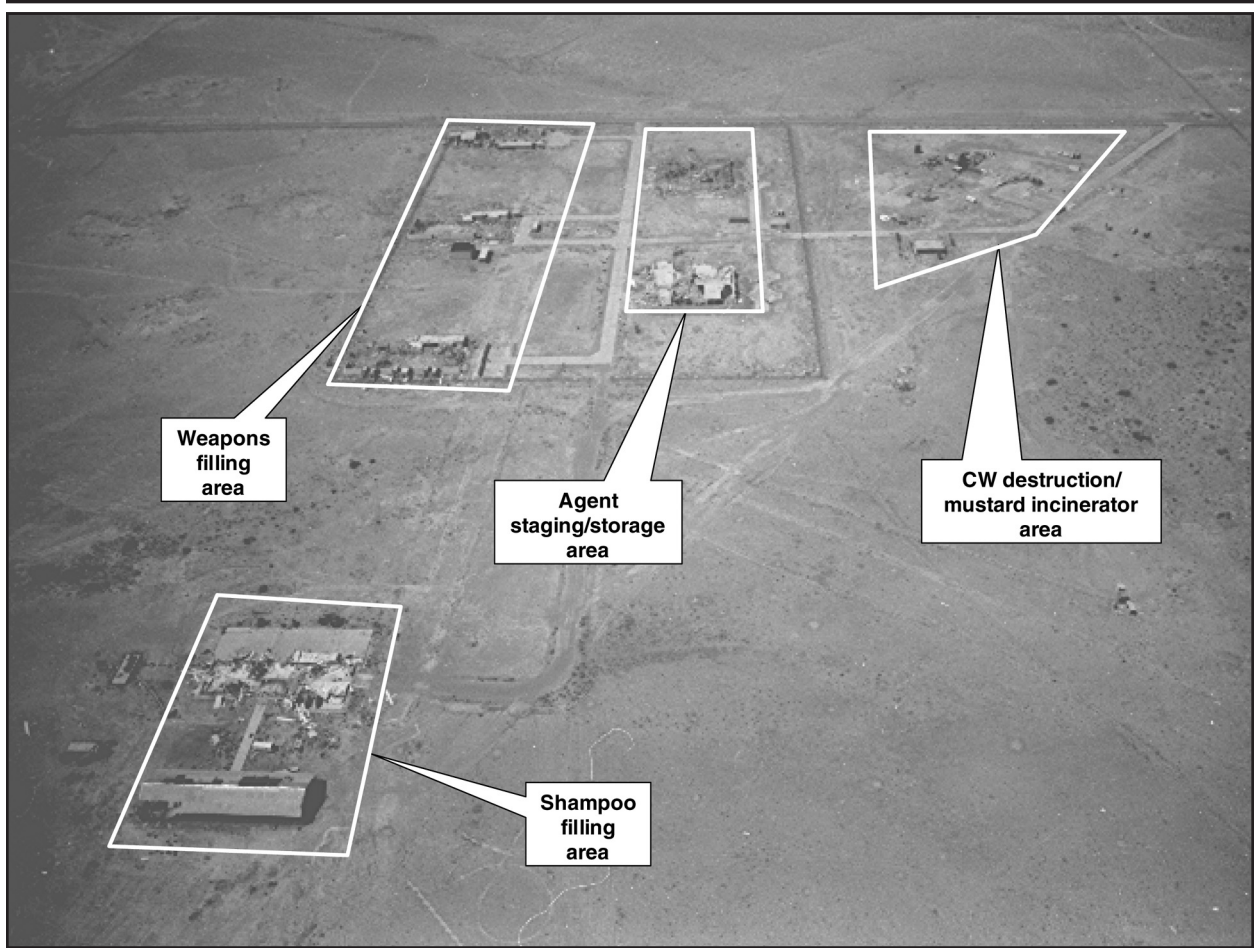


Figure 6. Destroyed CW agent filling area.

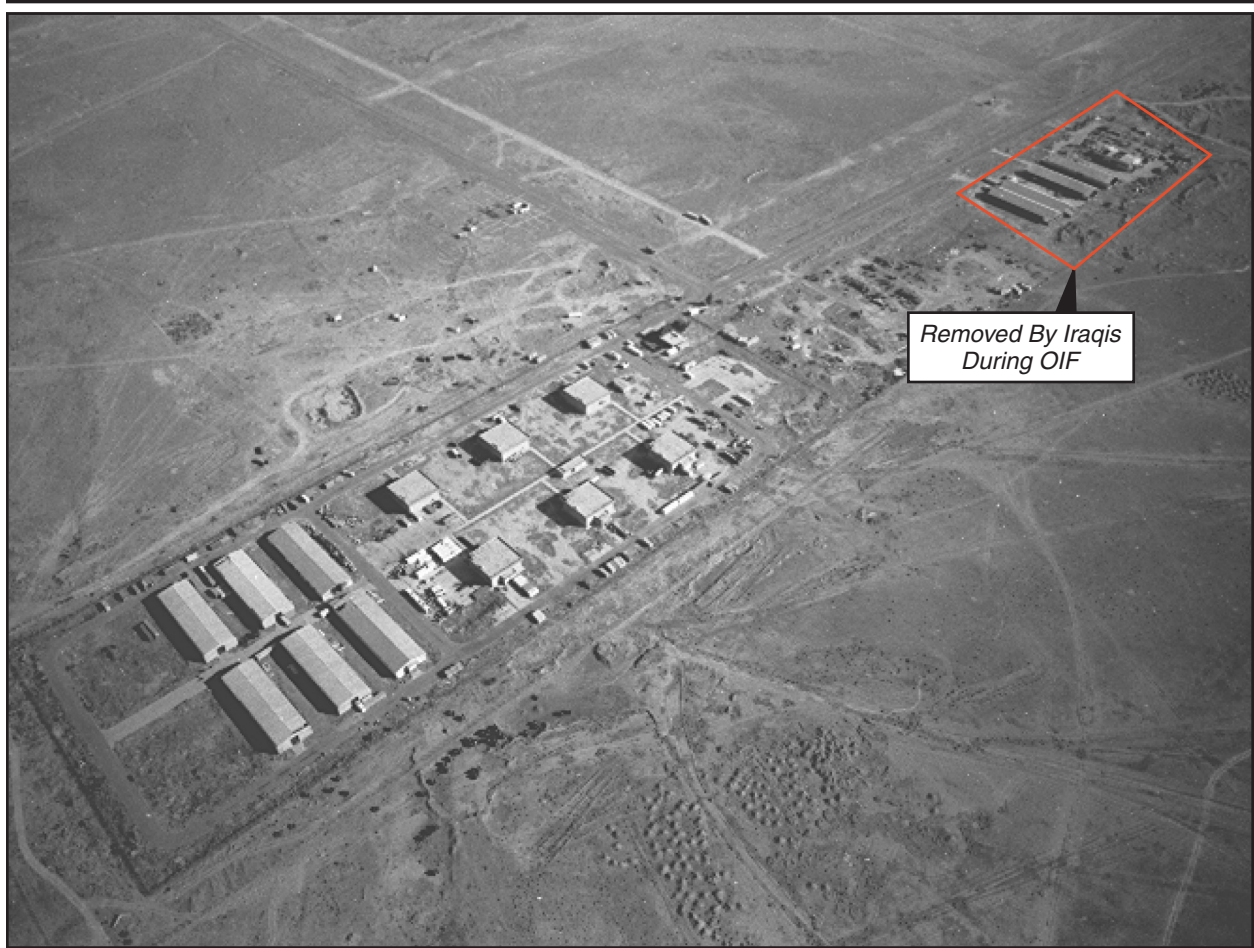


Figure 7. Al Muthanna chemical and material storage area after OIF.

UN Criteria for CW Destruction

During the UNSCOM-supervised destruction processes, a CW facility was technically considered destroyed under three different criteria:

- *Equipment was permanently disabled by the Iraqis, then examined and documented by UN.*
- *Equipment would be tagged, dismantled, and reused by the Iraqis for other legitimate commercial use while being documented and monitored by UN.*
- *Facilities destroyed from coalition strikes were deemed unusable for CW development.*

Note: UN did not verify reusability of some of the equipment concealed within rubble of destroyed facilities. The CW process that once occurred within a bombed facility was regarded as inoperable, but utility of equipment reusability sometimes remained unverifiable.

- Prior to OIF, Iraq removed buildings and their contents from the northern section of the Chemical Precursor storage area. The facilities at the southern section of the facility were removed by unknown entities between April and June of 2003.
- Between 2002 and OIF the Iraqis removed some of the facilities/warehouses (photo above). This activity was probably not WMD related.

The majority of the facilities—including the laboratory area, pilot plant, production area, bomb product, and engineering support weapons filling area—had been excavated prior to OIF.

Figure 8 shows the Administration Area razed before OIF. One structure remained intact after 1994; the remaining administration buildings were removed after 1994.

Figure 9 is the laboratory area. It had been excavated and razed by the Iraqis after 1990 and prior to OIF. The only facilities not razed by the Iraqis were the animal storage area (not bombed during ODS).

The Iraqis razed and removed all existing structures for the biological/toxicological lab, mustard research lab, and Sarin production facility. In addition to complete removal of the facilities, complete foundations were excavated and removed. These actions were undertaken after the National Monitoring Directorate was displaced in Iraq and completed without international scrutiny.

The Tabun Production Facility was razed in a similar fashion to the other nerve agent production facilities in that all remnants of the existing facility were removed to include foundations and surrounding top layers of soil. Portions of the VX Production Facility were filled with sand. The facility was not razed by the Iraqis, however all equipment were removed (see Figure 10).

Figure 11 shows the pilot plant area had been sealed after ODS. This was a hardened facility area, and the QC lab and Inhalation facility were still intact. The Sarin Production Facility that was bombed was excavated and the non-hardened facilities in the area were razed.

Al Muthanna undergoes a series of name changes and ultimately becomes the Al Tariq Company. After 1994 MSE (Samarra' Chemical Weapons Production and Storage Facility as well as its satellite facilities) underwent strategic changes in key researchers and production. Resources were spent trying to rebuild the satellite facilities; however, the site Al Muthanna (Samarra' Chemical Weapons Production and Storage Facility) remained essentially abandoned.

- Key leadership at the facility sought alternative employment.
- The bulk of the technicians and certain key scientists were employed within the Al Tariq State Establishment.
- Several key figures are employed by, or consultants to NMD.
- The Director General of Al Muthanna assumed a leadership position within Al Tariq.

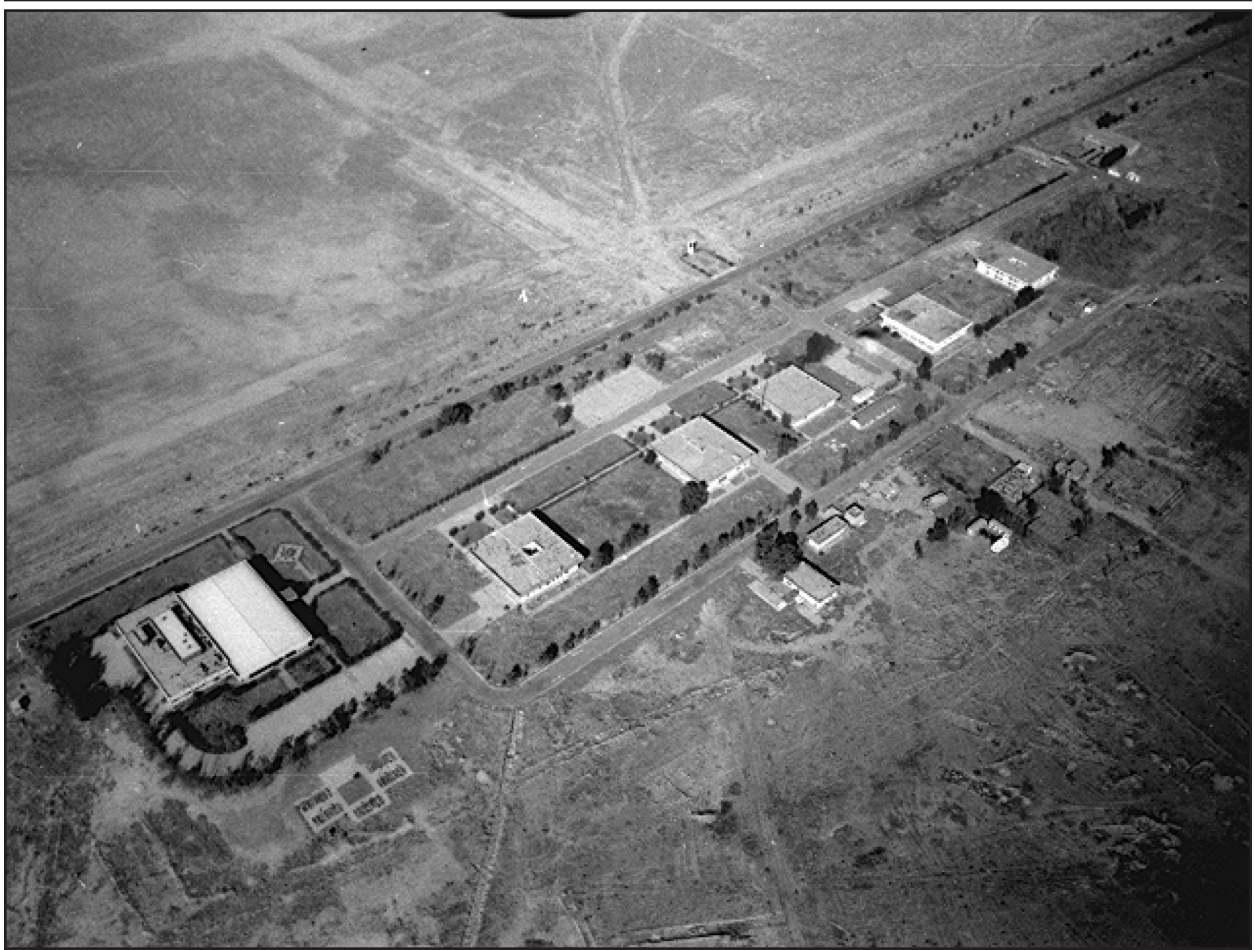


Figure 8. Al Muthanna administration support area razed after 1994.



Figure 9. Al Muthanna research laboratory area.



Figure 10. Complete excavation and removal of the Tabun production facility (left) and the sand-filled sarin production facility (right).



Figure 11. Al Muthanna nerve agent lab (left) and quality-control lab (right).

Exploitations of Al Muthanna

ISG conducted multiple exploitations of the Al Muthanna site to determine whether old chemical weapons, equipment, or toxic chemicals had been looted or tampered with since the last UN visit to the site. ISG is unable to unambiguously determine the complete fate of old munitions, materials, and chemicals produced and stored there. The matter is further complicated by the looting and razing done by the Iraqis.

An exploitation of the facility reconfirmed previous imagery analysis that the site remained inoperable from bombings and UNSCOM compliance, including destruction of equipment and resources, and no significant production capabilities existed. Facilities and bunkers revealed no evidence of production since UNSCOM departed.

- The teams found no new structures or any construction activities except for those declared by Iraq to UNSCOM. The facilities appeared to be abandoned prior to OIF.
- Several pieces of equipment that were once used for CW production were found bearing no UN tags, and the ISG was unable to assess whether the equipment had been reused since 1994 or intended for a future production processes and abandoned.
- The tag system used by the UN was known to not be robust, and given the absence of inspectors between 1998 and 2002, Iraq would have had little incentive to maintain the tags in good condition.
- The extent of the looting and unaccounted for excavations of bombed facilities makes it impossible to determine what, if any, equipment was removed after 1994, either for legitimate industrial use or a renovated CW production process.
- ISG exploitations indicate that the storage area still remains a threat despite testing. Chemical storage containers filled with unknown hazardous chemicals are showing signs of rusting-through and leaking.
- Key bunkers and facilities are currently scheduled to be sealed or resealed.

Stockpiles of chemical munitions are still stored there. The most dangerous ones have been declared to the UN and are sealed in bunkers. Although declared, the bunkers contents have yet to be confirmed. These areas of the compound pose a hazard to civilians and potential blackmarketers.

- Numerous bunkers, including eleven cruciform shaped bunkers were exploited. Some of the bunkers were empty. Some of the bunkers contained large quantities of unfilled chemical munitions, conventional munitions, one-ton shipping containers, old disabled production equipment (presumed disabled under UNSCOM supervision), and other hazardous industrial chemicals. The bunkers were dual-use in storing both conventional and chemical munitions. Figure 12 is a typical side-view of a cruciform shaped bunker.
- The contents of two of the cruciform bunkers bombed during Desert Storm showed severe damage. Due to the hazards associated with this location, the UN decided to seal the bunkers.
- UNSCOM viewed the contents of the two bunkers; however an accurate inventory was not possible due to the hazards associated with that environment.
- UNSCOM relied upon Iraqi accountability of the bunkers' contents and assessed the amount of munitions declared to be realistic.
- Military field testing equipment showed positive for possible CW agent in the cruciform bunkers that contained munitions and a storage bunker that contained bulk chemical storage containers. Note: this is not unusual given the munitions once stored there and the conditions in which they were stored post 1994.

An exploitation team observed the old UNSCOM CW destruction area that contained large (some in excess of 75 meter) sloping trenches once used in the CW destruction process. Damaged chemical storage drums were visible at the bottom of some of the trenches.

- Drums and debris were visually observed in two of the 12 burial trenches. The other 10 trenches appeared to be partially filled, no drums or debris was visually observed and they did not register positive for chemical agent. The two that contained exposed 55-gallon drums and various metal debris did not register positive from CW. These were remnants of the incinerating pits and should have been covered.
- Bunkers tested positive for chemical agents and confirmed observations (bunkers contained large quantities of unfilled chemical munitions, conventional munitions, one ton shipping containers, old disabled production equipment (presumed disabled under UNSCOM supervision), and other hazardous industrial chemicals). Also noted were hundreds of rusted bulk storage containers that once contained bulk mustard agent. Despite the presence of these chemical storage drums field testing concluded no CW agents were present.
- The hardened laboratories/pilot plant and animal compound were sealed prior to OIF and were breached, presumably by looters. Sampling of both areas showed no evidence or presence of chemical agents and the facilities were incapable of producing chemical munitions.

All the facilities (laboratories, pilot plant, bunkers, and animal storage area) inspected that were supposed to be sealed as a result of UN resolutions had been breached. Exploitation of these facilities revealed materials and equipment were removed, however the extent of looting makes it difficult to differentiate whether Iraqi government removed equipment after 1998 while still under UN sanction or if it was looted after OIF.

- Locks on metal doors were cut or concrete and bricks were breached producing apertures large enough for human entry.
- Figure 13 shows that bricked entryways were breached. The debris in the corridor in the photo to the right apparently is from removed material inside the bunker. ***Massive amounts of cylinders that once stored chemical agents, primarily bulk mustard agent, now are stacked in huge bunkers.***

This practice was consistent with Iraq's destruction program involving the removal and incineration of agent and equipment.

- Hundreds of bulk storage cylinders were preserved from the destruction processes that took place in the early 1990s. They once contained chemical agents that were supposed to be destroyed. The remaining cylinders contained residual material that was to be neutralized by adding caustic and water. Some residual or leaking caustic, now dried, is apparent from the white residue on the side of a cylinder in Figure 14 (residue not sampled). This is consistent with Iraq's destruction program involving the removal and incineration of agent and equipment.
- The team located a storage cylinder with the red and white plastic siphon (see Figure 14), and found it suspect. It was apparent that contents had been removed. Follow-on analysis of the drum revealed the drum was filled with petroleum products (presumably fuel oil). ISG assesses the fuel oil storage in the cylinders might be from residual oil once used in/for the mustard incinerator. Since the oil was associated with mustard destruction, it might have been regarded as hazardous material and thereby not discarded into the environment. Instead it was placed into the contaminated storage cylinders and stored in the bunker with the rest of the contaminated cylinders.

ISG also exploited the underground pilot plants, which also had been breached by looters, and found a reactor unit that was suspect.

- The reactor should have been destroyed as part of UNSCOM inspections. The plant infrastructure required to operate the reactor was missing rendering it inoperable.
- The reactor is made from a recycled two-ton bulk mustard storage cylinder, similar to the ones viewed in the storage bunker above (see Figure 15).

The team found the laboratory, production, and animal house area looted and inoperable. Again, equipment that should have been destroyed by the UN was found here.



Figure 12. Typical side view of a cruciform shaped bunker.



Figure 13. Bricked entryways that were breached.



Figure 14. Storage cylinder with the red and white plastic siphon.



Figure 15. Reactor made from recycled two-ton bulk mustard storage cylinder.

- Cages that once housed animals were strewn about the site. Some of the cages appear to have held dogs used to study the efficacy of CBW agent, and others were designed to hold primates based on the size and bar spacing on the cages despite intelligence that Iraq never conducted research on primates. Scratch marks also were on the wall apparently from animals, probably primates.
- An inhalation chamber was located at the site. Although it did not appear designed for humans, it was large enough to accommodate a human. Instead, the chamber apparently held cages which were inserted for animal experiments (see Figure 16). Note: there was no evidence recovered to indicate that humans were used in the experiments. This equipment should have been destroyed and verified by UNSCOM.

The team found multiple glass-lined reaction chambers, remnants from the former CBW programs, some which were UN-tagged and others which did not bear tags. Inconsistencies in the destruction methods among reactors might allow for cannibalization of parts to produce other reactors. The most interesting find is the reactor shown in Figure 17, which not only was devoid of a UN tag, but the glass-liner was still pristine with only minor chips.

- The reactor liner probably was chipped by looters when attempting to move the reactor without the proper equipment. More importantly, there is no indication of where the reactor originated and where it has been since the departure of the UN.

As a general note, there are a number of possible reasons for equipment bearing no UN tags:

- Equipment was destroyed in Desert Storm and therefore was not tagged;
- Equipment was destroyed by UNSCOM and was tagged, but the tag was removed;
- Equipment was tagged, and possibly moved to other facilities for use as a dual-use item;
- Equipment survived bombing during Desert Storm, but was buried by rubble and subsequently not

tagged or destroyed by UNSCOM. Over the years, it may have been excavated by the Iraqis after UNSCOM left, or by looters after OIF.

It was apparent that some of the reactors were delivered to the facility for destruction while others were indigenous to the facility and destroyed on site.

A refuse area was exploited containing hundreds of empty munitions intended for chemical or biological agent filling. Warheads and peripheral hardware for brass and recyclable metals are still being looted. Old hardware destroyed under the auspice of the UN agreement and thousands of pieces of chemical weapons hardware that did not meet quality controls lay waste in the refuse area (see Figure 18).

- Hundreds of mangled and rusted munition bodies and tail sections lay strewn about (see Figure 18, upper left photo).
- Chemical bombs destroyed probably early 1990s (see Figure 18, upper right).
- Chemical rounds (observed were defective warheads) empty of chemical agents (see Figure 18, lower left photo).
- Chemical rounds (without agent) after explosive agent had been removed by a scavenger in order to recover brass components (see Figure 18, lower right photo).

The ISG found hundreds of canisters—both polymer and metal foil inserts—for chemical agents used as insert for munitions lying on the ground.

Two pictures Figure 19 show the difference—on the left, the metal SAKR-30 canister, and the right, a polymeric canister that fits inside the SAKR-30 canister. There is no picture of the sister canister that connects to form the body of the warhead.

The team noted several sloping trenches near the site which we believe were once used in the destruction process of CW rockets. Note: some of the trenches appear to be arranged for a specific process while some contained brick structures within the



Figure 16. An inhalation chamber.



Figure 17. Glass-lined reactor.

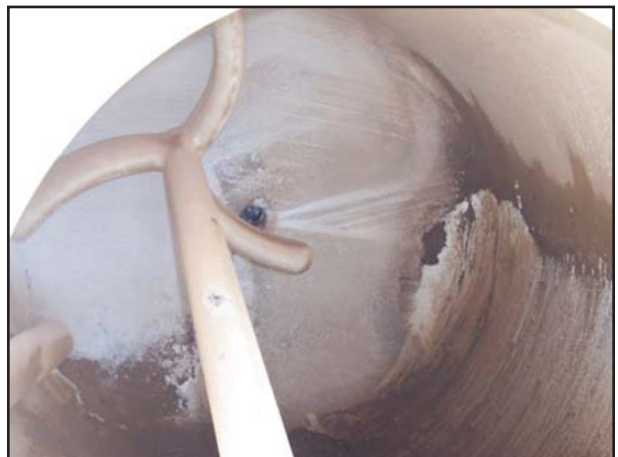




Figure 18. Mangled and rusted munition bodies and tail sections (top left), chemical bombs destroyed probably early 1990s (top right), chemical rounds empty of chemical agent (lower left), and chemical round (without agent) after explosive agent had been removed by a scavenger.



Figure 19. Metal (left) and polymeric (right) chemical agent canister inserts for SAKR-30 munitions.



Figure 20. Sloping trenches with exposed drums and debris.



base (see Figure 20). Upon completion of destruction, other trenches were covered. It is uncertain if portions of the trenches were unearthed by looters or were not originally filled.

- Two of the trenches contained some drums that were exposed and rusted. Sampling of the damaged drums and surrounding standing water showed no presence of CW agents.
- The picture above shows one of the deeper sloping trenches with exposed drums and debris. A multitude of bird droppings coated the area where birds had taken refuge in the sandy walls of the trenches.

The entire Al Muthanna mega-facility was the bastion of Iraqi's chemical weapons development program. During its peak in the late 1980s to early 1990s, it amassed mega-bunkers full of chemical munitions, and provided Iraq with a force multiplier

sufficient to counteract Iran's superior military numbers. Two wars, sanctions and UNSCOM oversight reduced Iraqi's premier production facility to a stockpile of old damaged and contaminated chemical munitions(sealed in bunkers), a wasteland full of destroyed chemical munitions, razed structures, and unusable war-ravaged facilities. In 1998 Al Tariq State Establishment took over all remaining remnants at Al Muthanna.