

Disarming Iraq: What Did the UN Missions Accomplish?¹

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Surveying the work of the UN Special Commission (UNSCOM, 1991-1999), which set the stage for the recent efforts of the UN Monitoring, Verification, and Inspections Commission (UNMOVIC, 1999-present), three things are clear:

- First, a large amount of weapons, weapon materials, and weapon production equipment had been destroyed under UNSCOM supervision or were verified by UNSCOM as having been destroyed by Iraq or in the Gulf War. In addition, a very substantial weapon production infrastructure was destroyed or converted (and placed under monitoring).
- Second, UNSCOM was able to give some, but not complete, reassurances about the disposition of a larger number of weapons that Iraq claimed were consumed in war, destroyed unilaterally, or wasted.
- Finally, there was a large amount of weapons and weapon material whose disposition UNSCOM felt uncertain about because documentary evidence was incomplete or lacking, or because material evidence was lacking or not subject to quantification, or because there were inconsistencies in Iraqi records and accounts. (These the commission reported as “unaccounted for” weapons.)

Thus, while the UN disarmament missions contributed substantially to disarming Iraq and increasing confidence, they also left substantial residual uncertainties. The highest degree of confidence attaches to the disposition of those items and facilities that UNSCOM and the IAEA themselves destroyed, removed, or rendered harmless. Together UNSCOM and the IAEA:

- Destroyed or oversaw the destruction of 57 prohibited missiles, 50 missile warheads (including 30 for chemical warfare), 69 stationary and mobile missile launchers, and all components of the Iraqi large-caliber, long-range “super-guns”;
- Sealed the Abu Skhair uranium mine, destroyed 16 buildings related to nuclear weapons activity, 11 buildings related to missile production, and the entire Al-Hakam biological weapons production facility;

¹ This summary is based principally on the material presented in the final or most complete reports of the two UN inspection missions to Iraq: Richard Butler, *Report: Disarmament* (New York: UNSCOM, 25 January 1999); and, Hans Blix, *Unresolved Disarmament Issues: Iraq's Proscribed Weapons Programmes* (New York: UNMOVIC, 6 March 2003). Also essential to this summary was Glen Rangwala, *Claims and evaluations of Iraq's proscribed weapons* (Cambridge UK, 18 March 2003); available at: <http://middleeastreference.org.uk/iraqweaponsc.html>

- Destroyed more than 38,500 filled and empty chemical munitions, as well as:
 - 760 ton of chemical warfare agents, more than 3,300 tons of chemical warfare precursor chemicals, 17,750 kg of biological weapon growth medium, 600 tons of alloys essential to the production of nuclear weapons, and
 - Thousands of pieces of equipment and components essential to the production of nuclear, chemical, and biological weapons.

Most of this work was accomplished by 1996. Additionally, the successor to UNSCOM, UNMOVIC, oversaw the destruction of about 65 al-Samoud missiles and had taken possession of a small quantity of newly discovered (but empty) chemical weapon projectiles when its mission was cut short by war in 2003.

The most serious outstanding issues at the end of UNSCOM's tenure and during the work of UNMOVIC were the disposition of:

- 19-21 missiles of various sorts whose claimed destruction had not been adequately verified in the assessment of UNMOVIC;
- about 50 missile warheads (including as many as two for chemical or biological warfare) whose claimed destruction had not been adequately verified;
- 17,900 unfilled and about 650 filled special munitions whose claimed status as destroyed or converted had not been adequately verified;
- about 1.6 tons of the chemical agent VX and about 55 tons of a precursor for the production of VX whose destruction had not been verified; and
- about 2160 kg of various biological pathogen growth media whose consumption, destruction, or loss was not verified.

Two other outstanding issues of concern to UNSCOM and UNMOVIC were:

1. The possibility that 6,526 fewer aerial munitions had been consumed in the Iran-Iraq war than were claimed by Iraq. This concern was based on a discrepancy between two Iraqi accounts. And,
2. The possibility that Iraq had produced 7,000 more liters of anthrax than it had claimed, using it to fill munitions that were available at the time of the Gulf War.

Some of the residual uncertainties of the UNSCOM/UNMOVIC process may not have been resolvable by the methods adopted by the missions. This pointed to the need for supplementary confidence and security building measures. The UNSCOM, UNMOVIC, and IAEA method was to:

1. build a coherent, comprehensive account of Iraq's special weapon and missile programs covering two decades -- based on documentary evidence, interviews, defector reports, and other sources of information;
2. verify this picture (especially with regard to the disposition of weapons) as much as possible through inspections and the examination of material evidence; and
3. oversee the destruction, removal, or "rendering harmless" of any existing proscribed weapons and their means of production.

What the missions *did not* set out to do was "start from scratch" and scour every nook and cranny of Iraq themselves with the aim of verifying that nothing was hidden anywhere.

A key assumption of the method was that Iraq could, if it wanted to, provide a highly-detailed, fully-consistent, and well-documented account of all its program activities -- one that would also fully accord with information from outside sources. This is a fragile assumption. We need only consider the massive financial and material accounting problems that chronically beset the Pentagon *in peacetime* to find reasons to doubt that a less developed, less open country would emerge from a decade of war with its books in such good order.²

Consensual arms reduction negotiations also typically face problems of data accounting, but these can often be bridged by a degree of trust, a shared desire to build confidence, and a sense that progress in the negotiations will yield mutual benefits. None of these attributes attach to the post-Gulf War disarmament effort in Iraq, which essentially was a coercive exercise. Neither the character of the Hussein regime nor its behavior in the inspection process -- always truculent, usually evasive, frequently duplicitous -- gave reason for trust. Trust was lacking on the Iraqi side as well. They saw the target of the sanctions to be the Hussein regime, not just its disarmament -- an

² The Pentagon's untraceable bookkeeping entries totaled about \$1 *trillion* at the end of 2002 -- a significant reduction from previous years when untraceable entries exceeded \$3 *trillion*. It should be noted, however, that the occurrence of "untraceable entries" does not necessarily imply that most of these goods or funds have been actually stolen or lost -- and few critics assume that this is the case. Instead, the phrase refers to shortfalls in accounting practices. However, problems of inventory control are also epidemic. For instance, the General Accounting Office reported in 2002 that DoD had lost track of 1.2 million chemical-biological protective suits and that the Navy in 2001 had written off \$3 billion worth of goods as lost in transit.

Sources: General Accounting Office, *DoD Management: Examples of Inefficient And Ineffective Business Processes*, Statement of Gregory Kutz before the Subcommittee on National Security, Veterans Affairs, and International Relations, US House Committee on Government Reform, 25 June 2002 (Washington DC: GAO, June 2002); GAO, *DoD Financial Management Important Steps Underway But Reform Will Require a Long-term Commitment*, statement of Gregory Kutz before the Subcommittee on National Security, Veterans Affairs, and International Relations, US House Committee on Government Reform, 4 June 2002 (GAO, June 2002); Philip Dine, "Pentagon Is Struggling to Reform its Finances; Chief Financial Officer Says it Could Take 7 Years to Fix Military Accounting," *St. Louis Post-Dispatch*, 25 March 2002; GAO, *DoD Financial Management: Integrated Approach, Accountability, Transparency, and Incentives Are Keys to Effective Reform*, statement of Gregory Kutz before the Subcommittee on Government Efficiency, Financial Management, and Intergovernmental Relations, US House Committee on Government Reform, 20 March 2002 (GAO, March 2002); and, Jack Shanahan and Franklin C. Spinney, "Tighten Pentagon's Purse Strings Until It Passes an Audit," *Los Angeles Times*, 29 December 2000.

impression too often affirmed by high ranking US government officials.³ Also undermining Iraqi trust were reputable reports that information from the inspections were being passed along to foreign intelligence agencies.⁴ These issues subtracted from any positive inducement for Iraqi cooperation.

In the end, neither UNSCOM nor UNMOVIC (up to the point of its termination) were able to confidently assert that all the proscribed weapons and weapon material that Iraq might reasonably have produced or procured had been certifiably consumed, lost, or destroyed -- as the regime claimed. However, there were some factors formally outside the method of the inspections that helped narrow the "uncertainty gap" or reduce its significance:

- First, the fact that more than 2,000 inspections had occurred since 1991 without turning-up large hidden stores of weapons should have increased confidence that significant amounts had not been secreted away. Also contributing to confidence should have been the fact that persistent surveillance by the United States did not lead to the discovery of hidden weapon stores.
- Second, an ancillary effect of the inspections (together with outside surveillance activities) was that they served to impede any efforts to reconstitute a substantial weapon program and they precluded Iraq's testing or training with such weapons. At a modest cost, these efforts might have been continued indefinitely.
- Third, in some cases, the effectiveness of chemical and biological weapon agents and their precursors degrade over time -- especially if they are of a more primitive type or are stored improperly. If the Iraqis retained a store of proscribed

³ Both the elder President Bush and his Secretary of State, James Baker, stated that they did not foresee lifting sanctions while Saddam Hussein was in power. (Lawrence M. O'Rourke, "Bush Holds to Sanctions Against Iraq," *St Louis Post-Dispatch*, 21 May 1991, p. 1; and, "The President's News Conference With Chancellor Helmut Kohl of Germany," *White House Press Release*, 20 May 1991.) The Clinton and George W. Bush administrations have held a similar, but more nuanced view, asserting that the lifting of sanctions depended on more than compliance around arms. By contrast, UN Security Council Resolution 687, while mentioning other issues, is careful to explicitly link sanctions only to arms compliance. Resolution 688 demands that Iraq end human rights abuses, but does not link this to sanctions. Usually, statements by US officials that link sanctions more broadly also convey the impression that Hussein will never comply. Along these lines, the 1997 statement by former Secretary of State Madeleine Albright is the most famous. Regarding sanctions she said, "Our view, which is unshakable, is that Iraq must prove its peaceful intentions. It can only do that by complying with all of the Security Council resolutions to which it is subjected." She implies further that it is hard to conceive of a government headed by Hussein ever complying. ("Preserving Principle and Safeguarding Stability: United States Policy Toward Iraq", Secretary of State Madeleine K. remarks at Georgetown University, Washington, DC, 26 March 1997, Office of the Spokesman, US Department of State.) Bill Richardson, President Clinton's ambassador to the United Nations made similar remarks later that year as did President Clinton -- linking sanctions broadly to an array of complaints against Hussein. ("National Press Club Luncheon with US Ambassador to the United Nations Bill Richardson," *Federal News Service*, 9 December 1997; and, "Excerpts of President Clinton's News Conference," *Washington Post*, 17 December 1997.) Likewise, George W. Bush spokesman Scott McClellan linked sanctions broadly to issues other than arms in a September 2002 statement. (Betsy Pisik, "Iraq to readmit U.N. arms inspectors," *Washington Times*, 17 September 2002.)

⁴ Barton Gellman, "US Spied On Iraqi Military Via U.N.; Arms Control Team Had No Knowledge Of Eavesdropping," *Washington Post*, 2 March 1999; Tim Weiner, "US Spied on Iraq under UN Cover, Officials Now Say," *New York Times*, 7 January 1999, p. 1.

weapons, then compelling them to keep it under wraps was one way of chipping at its effectiveness.

Taken together these three factors should have added confidence that, if Iraq retained a hidden capability, it was not especially large, ready, or reliable.

- Fourth: As long as an inspection or monitoring team was kept in place, supplemented by air and space surveillance, the United States and others would have had early warning of any attempt by Iraq to break out of the confines of the disarmament regime.
- Fifth and finally: With the disarmament missions and their ancillary effects acting, at minimum, to tightly constrain Iraq's WMD capability and undercut its effectiveness, standard military deterrence would have acted to keep this residual threat in check. In addition, selective counter-proliferation strikes might have been conducted, if needed, to clip any attempt by Iraq to "break out" of the arms control regime.

Subsequent sections of this report review the results of the UNSCOM, UNMOVIC, and IAEA inspections in key areas: Iraq's nuclear program, missile programs, special munitions, chemical weapon agents, chemical weapon precursors, biological agents, and biological agent growth medium.

Note: weight quantities in previous sections were presented in "short tons" in accord with American usage. In the sections that follow, "metric tonnes" are used to facilitate checking against source documents. The conversion factors are: 1 metric tonne (1000 kg) = 2204.622 pounds, 1 long ton = 2240 pounds, 1 short ton = 2000 pounds.

Iraq's Nuclear Program

In the course of more than 200 inspections at 150 Iraqi locations during 2002 and 2003, the International Atomic Energy Agency, which was responsible for investigating Iraq's nuclear capabilities, "found no substantiated evidence of the revival in Iraq of a nuclear weapons programme," according to Mohamed ElBaradei, the IAEA's director-general.⁵

During the initial round of inspection in 1990s the IAEA found that, although Iraq had not yet been successful in developing nuclear weapons, it was "near success in some areas, notably uranium enrichment."⁶ Nonetheless, in the course of 500 inspections, the IAEA found nothing to indicate that Iraq had produced more than a few grams of weapons-grade nuclear material or that it had acquired it from other sources. Subsequently, the IAEA removed this material from Iraq along with 208 spent nuclear

⁵ Mohamed ElBaradei, "Mission Possible: Nuclear Weapons Inspections in Iraq," *Wall Street Journal*, 7 March 2003.

⁶ "The Iraqi Nuclear File: Where did things stand in December 1998, and what's been done since then?" (Vienna: IAEA); available at: <http://www.iaea.org/worldatom/Press/Focus/IaeaIraq/timeline.shtml>

fuel assemblies (which could be used in producing weapon-grade material). In addition, Iraq's Abu Skhair uranium mine was filled and sealed.

The campaign then proceeded to destroy more than 3,000 pieces of nuclear-related equipment and components and 600 tons of sensitive alloys, essential to the development of nuclear weapons. Sixteen buildings at five sites related to nuclear weapon production were also destroyed. (Sixty-six related buildings at six sites had been destroyed during the Gulf War). At the conclusion of the disarmament phase of its efforts, the IAEA initiated an ongoing monitoring effort comprising 1,000 follow-on inspections before the mission was terminated in late 1997.⁷

The IAEA's method was to use inspections, interviews, documentary evidence, and defector reports to build a consistent, comprehensive picture of Iraq's nuclear program. It then proceeded to identify and dismantle the program's individual components. UNSCOM and UNMOVIC have used essentially the same methodology in dealing with Iraq's chemical, biological, and missile weapon systems. But, as ElBaradei cautions, this approach has limitations and, for the sake of confidence, may require supplementary measures:

No verification programme can provide absolute guarantees that every facility or piece of equipment has been seen; there is always some degree of risk - and for that reason we need to continue to maintain a monitoring and verification presence in Iraq well into the future.⁸

Missile Programs

UNSCOM accounted for 817 of 819 missiles imported by Iraq (directly observing the destruction of 48 of these). The remaining two were declared by Iraq to have been unilaterally destroyed, but UNSCOM could not verify their disposition. Partially contravening its predecessor, UNMOVIC considered the claimed use in tests of 14 of the SCUD missiles to lack sufficient verification. Iraq also declared the destruction of 7 indigenously produced SCUD-type missiles and 80 combustion chamber/nozzles for such missiles, which UNSCOM could not verify -- although Iraq presented ingots which it said were the remnants of the destroyed combustion chambers. Finally, UNSCOM supervised the destruction of 9 "Fahad" missiles, which were SA-2 surface-to-air missiles that had been modified for a surface-to-surface role.

Launch sites and launchers: UNSCOM accounted for the destruction of 100 mobile missile launchers and stationary sites -- 69 of these under its own supervision and 31 destroyed by Iraq unilaterally, with remnants seen by inspectors.

⁷ *Fourth consolidated report of the Director General of the International Atomic Energy Agency under paragraph 16 of Security Council resolution 1051* (Vienna: IAEA, October 1997), "Attachment 3: Destruction, Removal, and Rendering Harmless"; available at: http://www.iaea.org/worldatom/Programmes/ActionTeam/reports/s_1997_779.pdf

⁸ ElBaradei, "Mission Possible".

Missile warheads: Iraq declared that it had imported 819 combat warheads for proscribed missiles of the SCUD/Al Hussein class and that 121 combat warheads of the same type had been produced indigenously -- thus, constituting a total of 940. Of these:

- 587 were reported by Iraq to have been expended in development, testing, training, or during the Iran-Iraq war;
- 93 were reported used during the Gulf war;
- 50 were destroyed by UNSCOM; and,
- 210 were claimed to have been destroyed unilaterally by Iraq.

In UNSCOM's assessment, excavation of the 210 warheads claimed to have been destroyed unilaterally left uncertain the disposition of 50 warheads.

Among the total warheads imported or manufactured by Iraq were some "special warheads" -- that is, chemical or biological warheads, filled or unfilled. Iraq claimed to have produced 75 special warheads for use in combat. Another 8 were declared built and used for training and testing purposes. UNSCOM destroyed 30 of the 75 combat warheads. Iraq declared that it had unilaterally destroyed 45 warheads and UNSCOM excavation allowed for the verification of 43-45 warheads.

Special Munitions

Iraq declared that, during the entire history of its chemical and biological program, it had produced about 200,000 "special munitions" -- bombs, shells, and warheads to carry chemical and biological agents. Of these, 100,000 filled munitions were claimed consumed or destroyed during the period 1982-1988. However, UNSCOM found that these numbers "could not be verified fully due to the absence of sufficient evidence of the procurement, indigenous production, the filling with CW agents, and the consumption of special munitions prior to 1988."⁹

Iraq declared that 127,941 filled and unfilled special munitions existed as of January 1991. The disposition of these falls into three categories: munitions destroyed during the Gulf War, munitions unilaterally destroyed soon after by Iraq, and munitions that existed after 1991.

Destroyed during Gulf War: Of the 127,491 munitions that Iraq said existed in January 1991, 41,998 munitions (5,498 filled and 36,500 unfilled) were claimed to have been destroyed during the Gulf War -- about one-third of the total stockpile. UNSCOM concluded that there was good evidence for the destruction of all but 2,000 of the unfilled munitions and 550 of the filled ones (artillery shells loaded with mustard agent that Iraq has declared "lost"). Thus, in UNSCOM view, the deposition of these 2550

⁹ Butler, "Appendix II: Status of the Verification of Iraq's Chemical Weapons Programme," *Report*, paragraph 9.

munitions remained uncertain. However, UNSCOM noted that it was not possible to achieve a precise numerical count “due to heavy bomb damage of the CW storage facilities, where these munitions had been stored during the Gulf war.”¹⁰

Claimed destroyed by Iraq after Gulf War: Iraq further declared that, after the Gulf War, it unilaterally destroyed 29,666 munitions -- about 23 percent of the total. UNSCOM concluded that there was good evidence for the destruction of about 13,660 of these munitions, although a precise numerical accounting was not possible based on remnants. Accounting for another 15,900 unfilled munitions was not possible: Iraq claimed to have melted them down and could produce no more than the resulting ingots as evidence. Finally, the commission concluded that the claimed destruction of about 100 munitions filled with BW agents could not be verified.

Existing after 1991: UNSCOM was able to account partially for the remaining 44 percent of Iraq’s stockpile, which amounted to 56,281 munitions (22,263 filled munitions and 34,018 unfilled munitions). Of these:

- Iraq destroyed 40,048 munitions under UNSCOM supervision (21,825 filled; 18,223 unfilled);
- Iraq presented documentation of the conversion to conventional munitions of another 15,616 unfilled artillery shells -- although UNSCOM directly accounted for only 1,779 of these;
- Iraq declared that 438 filled munitions were destroyed in a fire accident in 1988; UNSCOM saw remnants of several hundred of these; and
- About 600 unfilled bombs declared by Iraq were not found; Iraq claims these were defective when delivered from the manufacturer and subsequently discarded.

The numerical discrepancy of several hundred munitions in the overall accounting was attributed to minor deviations in the physical counting of large piles of weapons.

An additional concern about the disposition of Iraqi munitions is an Iraqi air force document that indicates that 6,526 fewer chemical weapon aerial bombs were used in the Iraq-Iran war than other Iraqi documents state. If so, these unused weapons would not have subtracted from Iraq’s total production runs and they might still be available. Iraq explained that the air force document was incomplete. According to Iraq, it did not include records from three airbases that were occupied in 1991. Those records had been destroyed. UNMOVIC was investigating this issue when its mission was terminated due to the war.¹¹

¹⁰ Butler, “Appendix II: Status of the Verification of Iraq’s Chemical Weapons Programme,” *Report*, paragraph 10-b.

¹¹ See the section on the air force document in Dr. Glen Rangwala, *Claims and evaluations of Iraq’s proscribed*

Bulk chemical weapon agents

Iraq declared an overall production quantity of 3,859 tonnes of CW agents of which 3,315 tonnes were weaponized. According to Iraq, 80 percent of the weaponized agents were consumed during 1982-1988. (The disposition of the remaining weaponized agents was covered in the munitions count, above.) As for the non-weaponized agents: Iraq reported that it had disposed of 130 tonnes during the 1980s, leaving 412.5 tonnes available in Iraq as of January 1991 (just prior to the onset of the Gulf War). Of this amount, UNSCOM destroyed 411 tonnes and Iraq claimed to have destroyed 1.5 tonnes.

CW precursors

Iraq declared to UNSCOM that:

- It had produced or procured some 20,150 tonnes of key precursor chemicals. UNSCOM was unable to fully verify this due to the “absence of sufficient evidence provided by Iraq and its foreign suppliers for Iraq's procurement and the consumption of key precursors in the production of CW agents prior to 1988.”¹²
- Of the 20,150 tonnes of declared precursor chemicals, Iraq claimed that 14,500 tonnes had been in the production of CW agents (which were discussed in the previous section.) The rest -- 5,650 tonnes -- had not been used to produce CW agents.
- Of the 5,650 tonnes of precursors not used in agent production, Iraq declared that only 3,915 tonnes of key precursors remained in Iraq as of January 1991. Much of the rest, they said, had been lost to spillage, leakage, and improper storage. Also, Iraq claimed that part of the discrepancy between the two declarations -- that is, between total chemicals produced or procured and the amount inventoried in 1991 -- was due to flawed record keeping on deliveries during the 1980s.
- Of the 3,915 tonnes of precursors that Iraq had declared available in January 1991, 2,850 tonnes were accounted for by UNSCOM and 2,610 tonnes were destroyed under UNSCOM supervision.
- Another 823 tonnes were declared by Iraq as having been destroyed during the Gulf war. UNSCOM was able to verify this qualitatively, but not quantitatively -- that is: it was able to verify the destruction of chemical stores, but not the exact

weapons (Cambridge UK, 18 March 2003): “Stockpile, A. Existing chemical weapons, (i) general”; available at: <http://middleeastreference.org.uk/iraqweaponsc.html#cstock>

¹² Butler, “Appendix II: Status of the Verification of Iraq's Chemical Weapons Programme,” *Report*, paragraph 14.

quantity destroyed.

- Iraq claimed to have unilaterally destroyed the final 242 tonnes immediately after the Gulf War. Here, again, some qualitative verification was possible, but not full quantitative verification.

Summarizing its finding on munitions, chemical agents, and chemical weapon precursors, UNSCOM declared that:

- The Commission has a high degree of confidence in its accounting for proscribed items which were physically presented by Iraq for verification and disposal. This includes the accounting for: 56,000 special munitions, 411 tonnes of bulk agents, 2,810 tonnes of key precursor, and 553 pieces of production equipment.
- The Commission has a certain degree of confidence in the accounting for proscribed items declared by Iraq as having been destroyed during the 1991 Gulf war. The Commission has accepted through its verification the destruction of 34,000 special munitions and 823 tonnes of key precursors. Outstanding issues remain. These include the accounting for 2,000 unfilled and 550 filled special munitions.
- The Commission has a lesser degree of confidence in accounting for proscribed items declared by Iraq as having been destroyed unilaterally. These include 15,900 unfilled and 100 filled special munitions, the CW agent VX, and 50 tonnes of a precursor for the production of VX. Nevertheless, the Commission has accepted through its verification the destruction of 13,660 special munitions and about 200 tonnes of key precursors.¹³

Biological weapons and growth media

Efforts to piece together an account of Iraq's biological warfare program, materially account for all its components, and solidly verify its disposition leave room for considerable uncertainty.

With regard to biological warfare agents, Iraq claims to have produced:

- 19,180 liters of concentrated Botulinum toxin,
- 8,445 liters of concentrated Bacillus Anthracis spores,
- 2,200 liters of Aflatoxin,
- 340 liters of concentrated Clostridium Perfringens spores,
- 10 liters of Ricin, and
- some small amount of Wheat Cover Smut.

¹³ Butler, "Appendix II: Status of the Verification of Iraq's Chemical Weapons Programme," *Report*, paragraphs 48, 49, 50.

This is a sufficient quantity of agents to equip more than 300 weapons. However, Iraq further claimed to have consumed or destroyed this entire stock before 1992 -- much of it during the summer of 1991 in order to conceal the existence of the program. There are several reasons for uncertainty regarding Iraq's claims:

- First, Iraqi documentation of the program is generally poor;
- Second, Iraq had equipment that, if used to its full theoretical capacity, could have produced much more than the claimed amounts of Botulinum, Bacillus Anthracis, and Clostridium -- indeed, three times as many anthrax spores, 16 times as much Clostridium perfringens, and six percent more botulinum. Indeed, both UNSCOM and UNMOVIC found some evidence that more anthrax was produced than claimed -- perhaps as much as 7,000 liters more; and,
- Third, while UNSCOM was able to verify qualitatively that some of the pathogens had been destroyed as claimed, it could not ascertain the amounts destroyed.

These reasons for doubt are not proof positive that Iraq produced more or destroyed less than it claimed. Indeed, Iraq did submit documentation that its fermentation units operated well below capacity and we know that some significant quantity of pathogen was destroyed as claimed -- but not the exact amount. Thus, an "uncertainty gap" existed -- and, by 1997, Iraq may not have been able to meet the inspectors' standards for closure.

Perhaps the most serious outstanding issue with regard to biological toxins concerned indications that Iraq may have produced more Anthrax than claimed (8,445 liters). One source claimed that Iraq had filled more munitions with Anthrax than it had declared -- a sufficient number to require another 7,000 liters of the pathogen. If so, these munitions may or may not have been destroyed.

There also is uncertainty regarding the amount and disposition of the pathogen growth medium that Iraq procured, although less uncertainty than in the case of the pathogens themselves. Iraq claimed to have:

- Acquired 32,160 kg of growth medium,
- Used 13,213 kg for the production of pathogens (which is addressed above),
- Lost or wasted 923 kg,
- Had 18,003 kg remaining in 1991,
- Unilaterally destroyed 520 kg of yeast extract, and
- Destroyed under UNSCOM supervision 17,750 kg.

According to UNSCOM, the Iraqi declaration did not include several, smaller but significant shipments of medium, which amount to at least 600 kg of medium. Iraq claimed that these orders must have been for the Forensic Laboratory which was not part of the bio-weapon program.

Regarding Iraqi claims that it had destroyed 520 kg of medium, UNSCOM could confirm that some destruction had occurred at the declared site, but it could not verify the quantity and, thus, did not consider this 520 kg of medium accounted for. With regard to Iraqi claims about the amount of medium consumed in productions of pathogens and the amount lost, wasted, or stolen, UNSCOM noted that there was no solid or unambiguous documentation -- and it specifically doubted claims about stolen medium. Finally, with regard to the medium destroyed under UNSCOM auspices, there was some significant disagreement between Iraq and the commission about the quantity of yeast extract and peptone. In light of these issues, UNSCOM estimated that a total of 2160 kg of various media was "unaccounted for." This does not mean that this amount necessarily exists; instead, it means that UNSCOM considered the Iraqi claims made about the disposition of this amount to be insufficiently supported by documentation or material evidence.

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