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# **Iraq's Weapons of Mass Destruction Programs**

**September 2002**

## Summary

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**Iraq—which has the expertise, facilities, and equipment to expand its WMD arsenal—is working to reconstitute prohibited WMD programs.**

- Since December 1998, Baghdad has refused to allow UN inspectors into Iraq as required by UN Security Council resolutions; in the absence of such inspections, Iraq's ability to work on prohibited programs without risk of discovery has increased.
- Iraq has stockpiles of CW and BW agents and munitions and is rebuilding its dual-use production facilities, giving Baghdad the capability of producing large quantities of agents quickly. Additionally, Iraq is aggressively pursuing delivery platforms—including UAVs—for chemical and biological agents.
- Iraq is developing a ballistic missile capability that exceeds the UN imposed 150-km range limitation and probably retains a small force of prohibited Scud-variant missiles and launchers and is developing two short-range ballistic missile systems that could violate UN-imposed range restrictions. Currently, all of these Iraqi weapons could have warheads that deliver chemical or biological agents. Iraq admitted filling some of its Scud warheads with either chemical or biological agents in 1991.
- Iraq still has much of the infrastructure needed to pursue its goal of building a nuclear weapon, although it is unlikely to produce indigenously enough weapons-grade material for a deliverable nuclear weapon until the last half this decade. Baghdad could shorten the acquisition timeline significantly if it were able to procure fissile material abroad. Baghdad could have procured nuclear weapons related materials and equipment without detection.
- Iraq has been able to import dual-use, WMD-related equipment and material through procurements both within and outside the UN sanctions regime. Baghdad diverts some of the \$10 billion worth of goods now entering Iraq every year for humanitarian needs to support the military and WMD programs.

# **Iraq's Weapons of Mass Destruction Programs**

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In April 1991, the UN Security Council enacted Resolution 687 requiring Iraq to declare, destroy, or render harmless its weapons of mass destruction (WMD) arsenal and production infrastructure under UN or International Atomic Energy Agency (IAEA) supervision. UN Security Council Resolution (UNSCR) 687 also demanded that Iraq forgo the future development or acquisition of WMD.

Baghdad's determination to hold onto a sizeable remnant of its arsenal, agents, equipment, and expertise has led to years of dissembling and obstruction of UN inspections. Elite Iraqi security services orchestrated an extensive concealment and deception campaign to hide incriminating documents and material that precluded resolution of key issues in each WMD category: Iraq's missile, chemical warfare (CW), biological warfare (BW), and nuclear programs.

- Iraqi obstructions prompted the Security Council to pass several subsequent resolutions demanding that Baghdad comply with its obligations to cooperate with the inspection process and to provide United Nations Special Commission (UNSCOM) and IAEA officials immediate and unrestricted access to any site they wished to inspect.
- While outwardly maintaining the facade of cooperation, Iraqi officials frequently denied or substantially delayed access to facilities, personnel, and documents in an effort to conceal critical information about their WMD programs.

Successive Iraqi declarations on Baghdad's pre-Gulf war WMD programs gradually became more accurate between 1991 and 1998 but only because of sustained pressure from UN sanctions, coalition military force, and vigorous and robust inspections facilitated by information from cooperative countries. Nevertheless, **Iraq never has fully accounted for major gaps and inconsistencies in its declarations and has provided no credible proof that it has completely destroyed its weapons stockpiles and production infrastructure.**

- Despite the destruction of most of its prohibited ballistic missiles and some Gulf war-era chemical and biological munitions, Iraq probably still has a small force of Scud-variant missiles, chemical precursors, biological seed stock, and thousands of munitions suitable for chemical and biological agents.
- Iraq has managed to preserve and in some cases even enhance the infrastructure and expertise necessary for WMD production and has used that capability to maintain a stockpile and possibly to increase its size and sophistication.

Since December 1998, Baghdad has refused to allow United Nations inspectors into Iraq as required by the Security Council resolutions. Technical monitoring systems installed

**UN Security Council Resolutions and Provisions for Inspections and Monitoring: Theory and Practice**

Resolution Requirement	Reality
<p>Res. 687 (9 April 1991) Requires Iraq to declare, destroy, remove or render harmless under UN or IAEA supervision and not to use, develop, construct or acquire all chemical and biological weapons, all ballistic missiles with ranges greater than 150 km and all nuclear weapons, usable material, including related material, equipment and facilities. The resolution also formed the Special Commission and authorized the IAEA to carry out immediate on-site inspections of WMD-related facilities based on Iraq's declarations and UNSCOM's designation of any additional locations.</p>	<p>Baghdad refused to declare all parts of each WMD program, submitted several declarations as part of its aggressive efforts to deny and deceive inspectors, and ensured that certain elements of the program would remain concealed. The prohibition against developing delivery platforms with ranges greater than 150 km allowed Baghdad to research and develop shorter range systems with applications for longer range systems and did not affect Iraq's efforts to convert full size aircraft into unmanned aerial vehicles as potential WMD delivery systems with ranges far beyond 150 km.</p>
<p>Res. 707 (15 August 1991) Requires Iraq to allow UN and IAEA inspectors immediate and unrestricted access to any site they wish to inspect. Demands Iraq provide full, final and complete disclosure of all aspects of its WMD programs, cease immediately any attempt to conceal, move, or destroy WMD-related material or equipment, allow UNSCOM and IAEA teams to use fixed-wing and helicopter flights throughout Iraq, and respond fully, completely, and promptly to any Special Commission questions or requests.</p>	<p>Baghdad in 1996 negotiated with UNSCOM Executive Chairman Ekouss modalities that it used to delay inspectors, to restrict to four the number of inspectors allowed into any site. Baghdad declared as "sensitive" and to prohibit them altogether from sites regarded as sovereign. These modalities gave Iraq leverage over individual inspections. Iraq eventually allowed larger numbers of inspectors into such sites but only after lengthy negotiations at each site.</p>
<p>Res. 715 (11 October 1991) Requires Iraq to submit to UNSCOM and IAEA long-term monitoring of Iraqi WMD programs, and approved detailed plans called for in UNSCRs 687 and 707 for long-term monitoring.</p>	<p>Iraq generally accommodated UN monitors at declared sites but occasionally obstructed access and manipulated monitoring cameras. UNSCOM and IAEA monitoring of Iraq's WMD programs does not have a specified end date under current UN resolutions.</p>
<p>Res. 1051 (27 March 1996) Established the Iraq export/import monitoring system, requiring UN members to provide IAEA and UNSCOM with information on materials exported to Iraq that may be applicable to WMD production and requiring Iraq to report imports of all dual-use items.</p>	<p>Iraq is negotiating contracts for procuring—outside of UN controls—dual-use items with WMD applications. The UN lacks the staff needed to conduct thorough inspections of goods at Iraq's borders and to monitor imports inside Iraq.</p>
<p>Res. 1060 (12 June 1996) and Resolutions 1115, 1134, 1137, 1154, 1194, and 1205 Demand Iraq cooperate with UNSCOM and allow inspection teams immediate, unconditional and unrestricted access to facilities for inspection and access to Iraq officials for interviews. UNSCR 1137 condemns Baghdad's refusal to allow entry to Iraq to UNSCOM officials on the grounds of their nationality and its threats to the safety of UN reconnaissance aircraft.</p>	<p>Baghdad consistently sought to impede and limit UNSCOM's mission in Iraq by blocking access to numerous facilities throughout the inspection process, often sanitizing sites before the arrival of inspectors and routinely attempting to deny inspectors access to requested sites and individuals. At times, Baghdad would promise compliance to avoid consequences, only to renege later.</p>
<p>Res. 1154 (2 March 1998) Demands Iraq comply with UNSCOM and IAEA inspections and endorses the Secretary General's memorandum of understanding with Iraq, providing for "severe consequences" if Iraq fails to comply. Res. 1194 (9 September 1998) Condemns Iraq's decision to suspend cooperation with UNSCOM and the IAEA. Res. 1205 (6 November 1998) Condemns Iraq's decision to cease cooperation with UNSCOM.</p>	<p>UNSCOM could not exercise its mandate without Iraq compliance. Baghdad refused to work with UNSCOM and instead negotiated with the Secretary General, whom it believed would be more sympathetic to Iraq's needs.</p>
<p>Res. 1284 (17 December 1999) Established the United Nations Monitoring, Verification and Inspection Commission (UNMOVIC) replacing UNSCOM, and decides Iraq shall allow UNMOVIC teams immediate, unconditional and unrestricted access to any and all aspects of Iraq's WMD program.</p>	<p>Iraq repeatedly has rejected the return of UN arms inspectors and claims that it has satisfied all UN resolutions relevant to disarmament. Compared with UNSCOM, Iraq gives the UNMOVIC chairman less authority, gives the Security Council a less formal role in defining key disarmament tasks, and requires that inspectors be full-time UN employees.</p>

by the UN at known and suspected WMD and missile facilities in Iraq no longer operate. Baghdad prohibits Security Council-mandated monitoring overflights of Iraqi facilities by United Nations aircraft and helicopters. Similarly, Iraq curtailed most IAEA inspections since 1998, allowing the IAEA to visit annually only a very small number of sites to safeguard Iraq's stockpile of uranium oxide.

**In the absence of inspectors, Baghdad's ability to work on prohibited programs without risk of discovery has increased, and there is substantial evidence that Iraq is reconstituting prohibited programs.**

- Activities since 1998 clearly show that Baghdad has used the absence of UN inspectors to repair and expand dual-use and dedicated missile development facilities and to increase its ability to produce WMD.

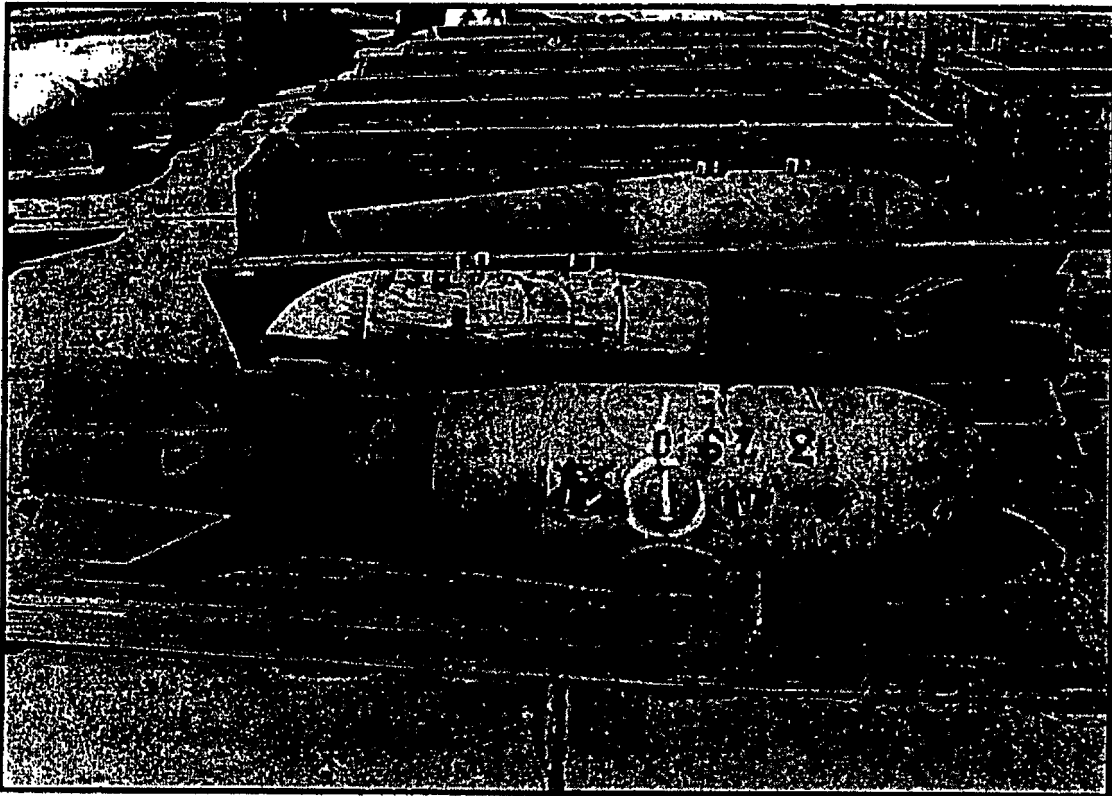
Iraqi Acknowledged Open-Air Testing of Biological Weapons		
Location-Date	Agent	Munition
Al Muhammadiyat - Mar 1988	<i>Bacillus subtilis</i> <sup>1</sup>	250-gauge bomb (cap. 65 liters)
Al Muhammadiyat - Mar 1988	<i>Botulinum toxin</i>	250-gauge bomb (cap. 65 liters)
Al Muhammadiyat - Nov 1989	<i>Bacillus subtilis</i>	122mm rocket (cap. 8 liters)
Al Muhammadiyat - Nov 1989	<i>Botulinum toxin</i>	122mm rocket (cap. 8 liters)
Al Muhammadiyat - Nov 1989	Aflatoxin	122mm rocket (cap. 8 liters)
Khan Bani Saad - Aug 1988	<i>Bacillus subtilis</i>	aerosol generator - Mi-2 helicopter with modified agricultural spray equipment
Al Muhammadiyat - Dec 1989	<i>Bacillus subtilis</i>	R-400 bomb (cap. 85 liters)
Al Muhammadiyat - Nov 1989	<i>Botulinum toxin</i>	R-400 bomb (cap. 85 liters)
Al Muhammadiyat - Nov 1989	Aflatoxin	R-400 bomb (cap. 85 liters)
Jurf al-Sakr Firing Range - Sep 1989	Ricin	155mm artillery shell (cap. 3 liters)
Abu Obeydi Airfield - Dec 1990	Water	Modified Mirage F1 drop-tank (cap. 2,200 liters)
Abu Obeydi Airfield - Dec 1990	Water/potassium permanganate	Modified Mirage F1 drop-tank (cap. 2,200 liters)
Abu Obeydi Airfield - Jan 1991	Water/glycerine	Modified Mirage F1 drop-tank (cap. 2,200 liters)
Abu Obeydi Airfield - Jan 1991	<i>Bacillus subtilis</i> /Glycerine	Modified Mirage F1 drop-tank (cap. 2,200 liters)

<sup>1</sup> *Bacillus subtilis* is commonly used as a simulant for *B. anthracis*.

- Iraq has expanded trade with the outside world and has gained steadily growing access to specialized and dual-use technology and materials that could be diverted to prohibited programs, as well as access to foreign expertise in WMD delivery systems.
- In recent years, Baghdad has diverted goods contracted under the Oil-for-Food program for military purposes and has increased solicitations and dual-use procurements—outside the Oil-for-Food process—that almost certainly are going to prohibited WMD and other weapons programs.

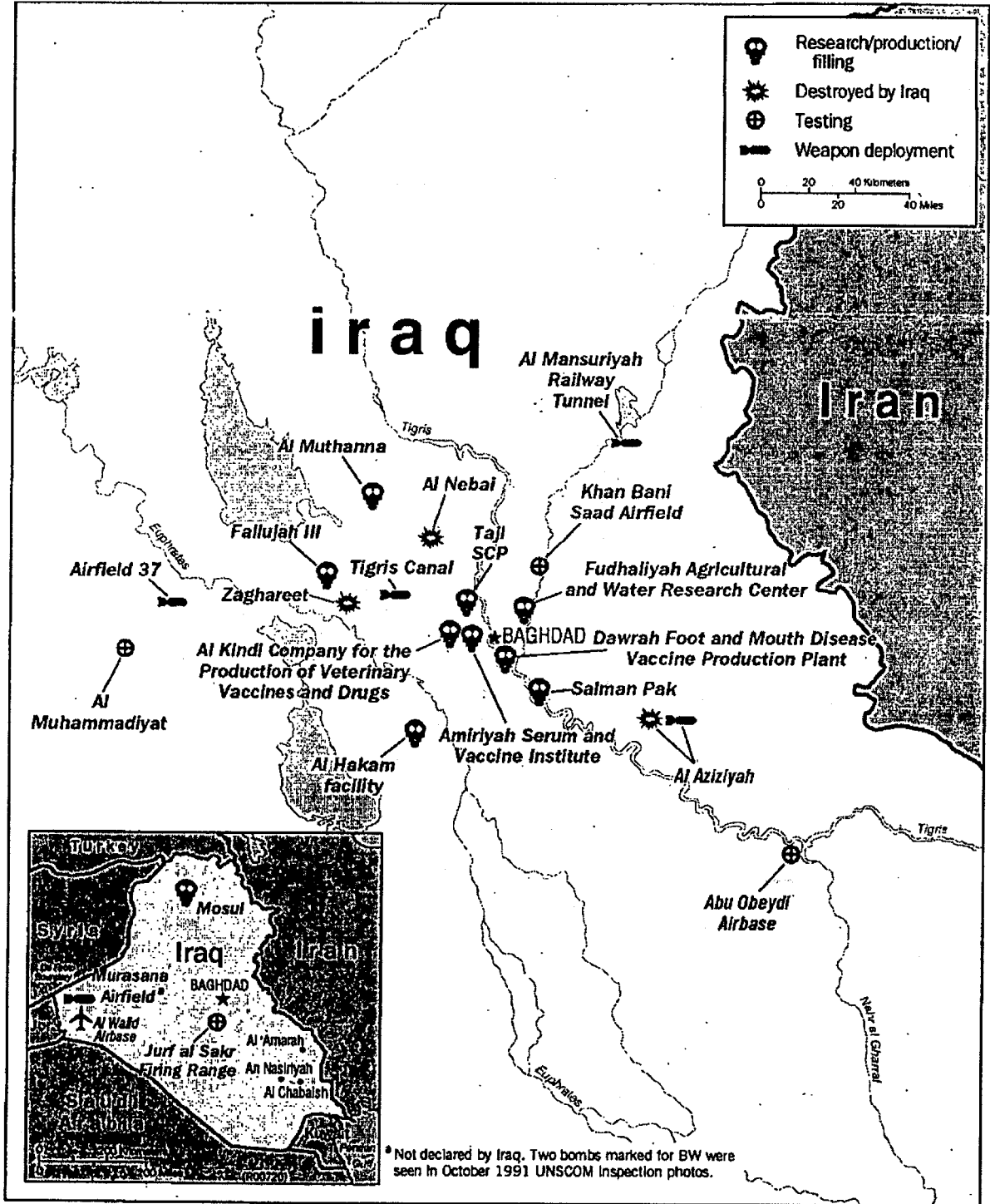
## **Biological Weapons Program**

**Iraq has the capability to convert quickly legitimate vaccine and biopesticide plants to BW production and already may have done so. This capability is particularly troublesome because Iraq has a record of concealing its BW activities and lying about the existence of its offensive BW program.**



*Two R-400A bombs in foreground photographed by UNSCOM inspectors at Mursana Airfield near the Al Waid Airbase in late 1991 bear markings indicating they were to be filled with botulinum toxin. Other bombs appear to have markings consistent with binary chemical agent fill. This evidence contradicted Iraq's declarations that it did not deploy BW munitions to operational airbases and that it destroyed all BW bombs in July 1991—declarations that were subsequently retracted in the face of overwhelming evidence to the contrary.*

**Iraq: Declared BW-Related Sites**



**After four years of claiming that they had conducted only “small-scale, defensive” research, Iraqi officials finally admitted in 1995 to production and weaponization of biological agents.** The Iraqis admitted this only after being faced with evidence of their procurement of a large volume of growth media and the defection of Husayn Kamil, former director of Iraq’s military industries.

- Iraq admitted producing thousands of liters of the BW agents anthrax,<sup>2</sup> botulinum toxin, (which paralyzes respiratory muscles and can be fatal within 24 to 36 hours) and aflatoxin, (a potent carcinogen that can attack the liver, killing years after ingestion) and preparing BW-filled Scud-variant missile warheads, aerial bombs, and aircraft spray tanks before the Gulf war.

Baghdad did not provide persuasive evidence to support its claims that it unilaterally destroyed its BW agents and munitions. **Experts from UNSCOM assessed that Baghdad’s declarations vastly understated the production of biological agents and estimated that Iraq actually produced two-to-four times the amount of agent that it acknowledged producing, including *Bacillus anthracis*—the causative agent of anthrax—and botulinum toxin.**

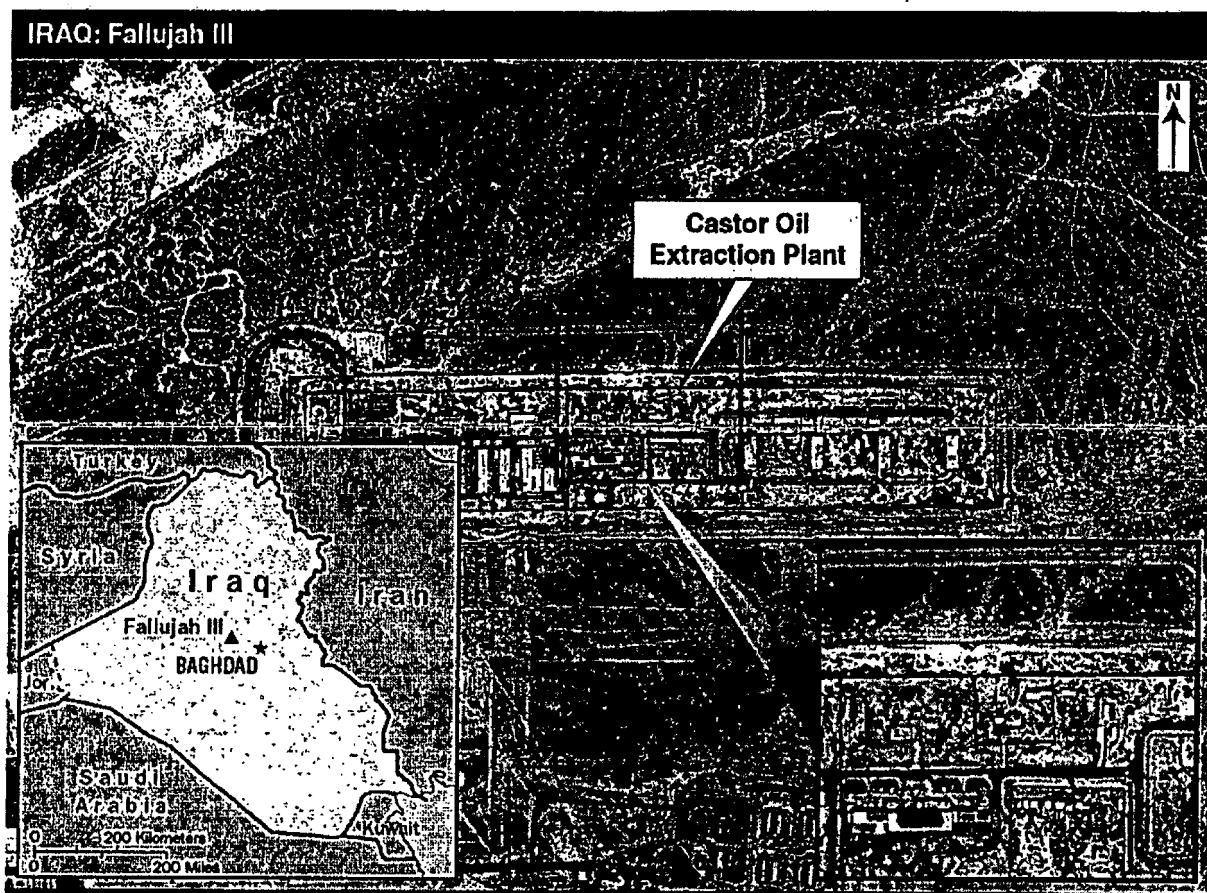
Current concerns about the BW program are amplified by the improvement or expansion of a number of nominally “civilian” facilities that were directly associated with biological weapons.

- The al-Dawrah Foot and Mouth Disease Vaccine Facility is one of two known Biocontainment Level-3 facilities in Iraq with an extensive air handling and filtering system. Iraq admitted that before the Gulf war that Al-Dawrah was a BW agent production facility. UNSCOM attempted to render it useless for BW agent production in 1996 but left some production equipment in place because UNSCOM could not prove it was connected to previous BW work. In 2001, Iraq announced it would begin renovating the plant without UN approval, ostensibly to produce a vaccine to combat a foot-and-mouth disease outbreak. In fact, Iraq easily can import all the foot and mouth vaccine it needs through the UN.
- The Amiriyah Serum and Vaccine Institute is an ideal cover location for BW research, testing, production, and storage. UN inspectors discovered documents related to BW research at this facility, some showing that BW cultures, agents, and equipment were stored there during the Gulf war. Of particular concern is the plant’s new storage capacity, which greatly exceeds Iraq’s needs for legitimate medical storage.
- The Fallujah III Castor Oil Production Plant is situated on a large complex with an historical connection to Iraq’s CW program. Of immediate BW concern is the

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<sup>2</sup> An infectious dose of anthrax is about 8,000 spores or less than one-millionth of a gram in a non-immunocompromised person. Inhalation anthrax historically has been 100 percent fatal within five to seven days, although in recent cases aggressive medical treatment has reduced the fatality rate.





potential production of ricin toxin.<sup>3</sup> Castor bean pulp, left over from castor oil production, can be used to extract ricin toxin. Iraq admitted to UNSCOM that it manufactured ricin and field-tested it in artillery shells before the Gulf war. Iraq operated this plant for legitimate purposes under UNSCOM scrutiny before 1998 when UN inspectors left the country. Since 1999, Iraq has rebuilt major structures destroyed during Operation Desert Fox. Iraqi officials claim they are making castor oil for brake fluid, but the verification of such claims without UN inspections is impossible.

In addition to questions about activity at known facilities, **there are compelling reasons to be concerned about BW activity at other sites and in mobile production units and laboratories.** Baghdad has pursued a mobile BW research and production capability to better conceal its program.

- UNSCOM uncovered a document on Iraqi Military Industrial Commission letterhead indicating that Iraq was interested in developing mobile fermentation units, and an Iraqi scientist admitted to UN inspectors that Iraq was trying to move in the direction of mobile BW production.

<sup>3</sup> Ricin can cause multiple organ failure within one or two days after inhalation.

- Various press reports have cited evidence of ongoing Iraqi efforts to procure mobile BW laboratories that could be used for research and development.

## Chemical Weapons Programs

Iraq has the ability to produce chemical warfare agents within its chemical industry and now is expanding its infrastructure, under cover of civilian industries, that it could use to advance its CW production capability. During the 1980s Saddam had a formidable CW capability that he used against Iranians and against Iraq's Kurdish population. Iraqi forces killed or injured more than 20,000 people in multiple attacks, delivering chemical agents (including mustard agent<sup>4</sup> and the nerve agents sarin and tabun<sup>5</sup>) in aerial bombs, 122mm rockets, and artillery shells against both tactical military targets and restive segments of Iraq's Kurdish population. Before the 1991 Gulf war, Baghdad had a large stockpile of chemical munitions and a robust indigenous production capacity.

Although precise information is lacking, human rights organizations have received plausible accounts from Kurdish villagers of even more Iraqi chemical attacks against civilians in the 1987 to 1988 time frame—with some attacks as late as October 1988—in areas close to the Iranian and Turkish borders.

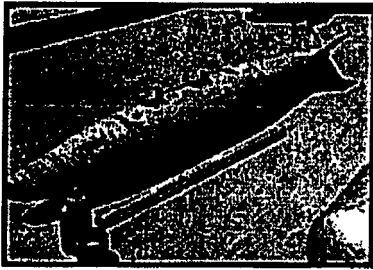
Date	Area Used	Type	Approximate Casualties	Target Population
Aug 1983	Haji Umran	Mustard	fewer than 100	Iranians/Kurds
Oct-Nov 1983	Panjwin	Mustard	3,000	Iranian/Kurds
Feb-Mar 1984	Majnoon Island	Mustard	2,500	Iranians
Mar 1984	al-Basrah	Tabun	50 to 100	Iranians
Mar 1985	Hawizah Marsh	Mustard/Tabun	3,000	Iranians
Feb 1986	al-Faw	Mustard/Tabun	8,000 to 10,000	Iranians
Dec 1986	Umm al-Rasas	Mustard	thousands	Iranians
Apr 1987	al-Basrah	Mustard/Tabun	5,000	Iranians
Oct 1987	Sumar/Mehran	Mustard/nerve agents	3,000	Iranians
Mar 1988	Halabjah	Mustard/nerve agents	hundreds	Iranians/Kurds

<sup>4</sup> Mustard is a blister agent that causes medical casualties by blistering or burning exposed skin, eyes, lungs, and mucous membranes within hours of exposure. It is a persistent agent that can remain a hazard for days.

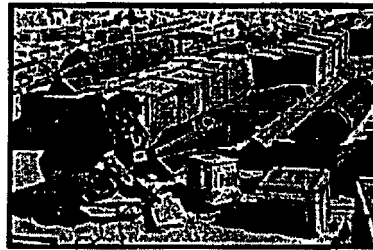
<sup>5</sup> Sarin, cyclosarin, and tabun are G-series nerve agents that can act within seconds of absorption through the skin or inhalation. These agents overstimulate muscles or glands with messages transmitted from nerves, causing convulsions and loss of consciousness. Tabun is persistent and can remain a hazard for days. Sarin and cyclosarin are not persistent and pose more of an inhalation hazard than a skin hazard.

## Chemical-Filled Munitions Declared by Iraq

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*Iraqi 250-gauge  
chemical bomb.*



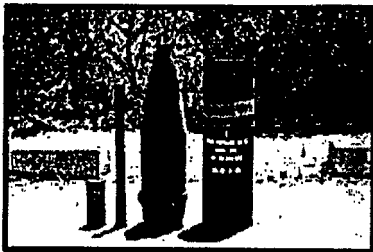
*Iraqi 500-gauge  
chemical bombs.*



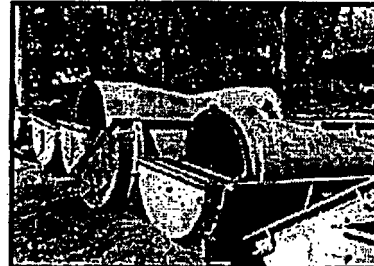
*Iraqi DB-2  
chemical bomb.*



*Iraqi R-400  
chemical bombs.*



*Iraqi 155-mm  
chemical shell.*

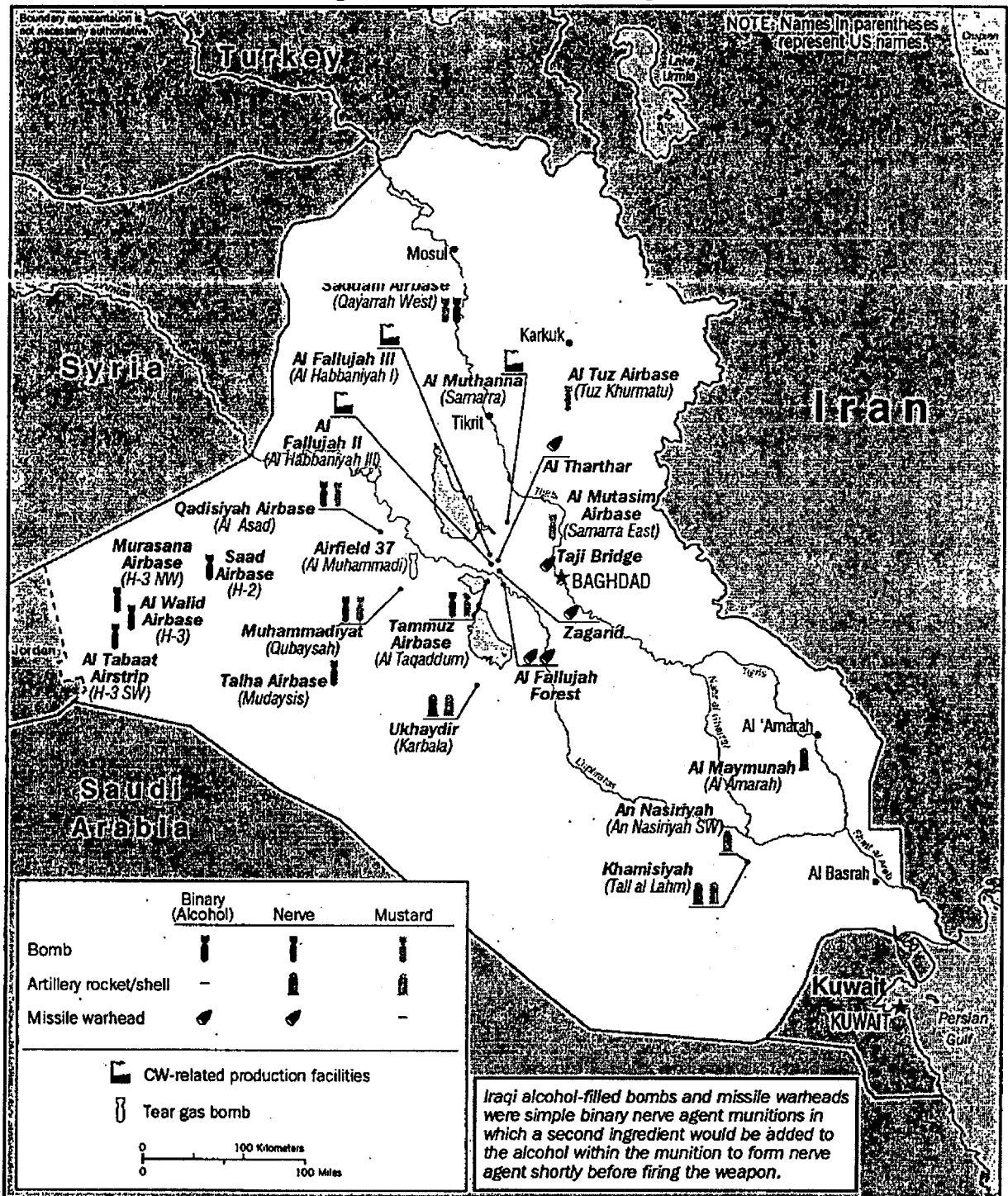


*Iraqi Al Husayn  
chemical  
warheads.*

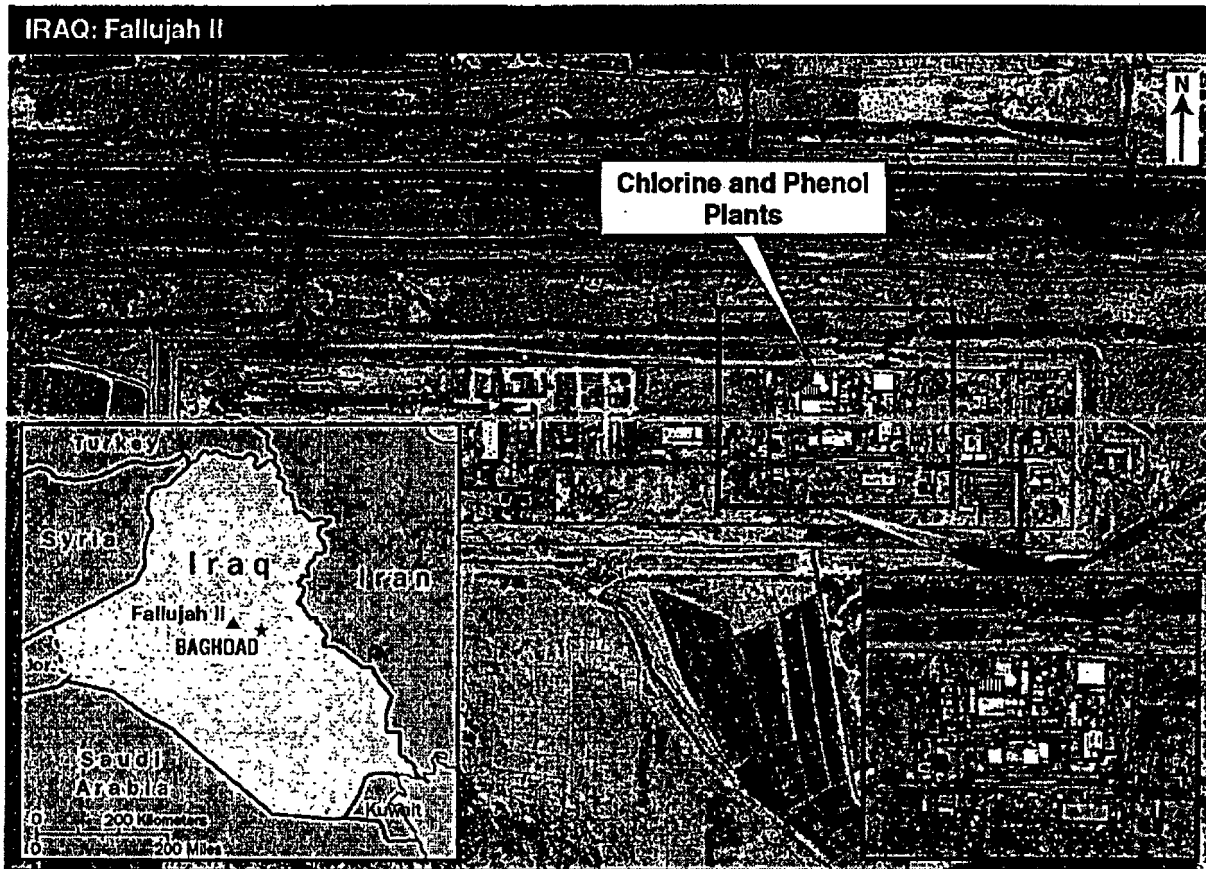


*122-mm rockets  
filled with the  
chemical nerve  
agent sarin prior  
to destruction.*

**Iraq: CW-Related Production Facilities and Declared Sites of Deployed Alcohol-Filled or Chemical Agent-Filled Munitions During Desert Storm**



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- UNSCOM supervised the destruction of more than 40,000 chemical munitions, nearly 500,000 liters of chemical agents, 1,800,000 liters of chemical precursors, and seven different types of delivery systems including ballistic missile warheads.

More than 10 years after the Gulf war, gaps in Iraqi accounting and current production capabilities strongly suggest that Iraq maintains a stockpile of chemical agents, probably VX<sup>6</sup>, sarin, cyclosarin<sup>7</sup>, and mustard.

- **Iraq probably has concealed precursors, production equipment, documentation, and other items necessary for continuing its CW effort.** Baghdad never supplied adequate evidence to support its claims that it destroyed all of its CW agents and munitions. Thousands of tons of chemical precursors and tens of thousands of unfilled munitions, including Scud-variant missile warheads, remain unaccounted for.
- UNSCOM discovered a document at Iraqi Air Forces headquarters in July 1998 showing that Iraq overstated by at least 6,000 the number of chemical bombs it told the UN it had used during the Iran-Iraq war—bombs that still are unaccounted for.

<sup>6</sup> VX is a V-series nerve agent that is similar to but more advanced than G-series nerve agents in that it causes the same medical effects but is more toxic and much more persistent. Thus, it poses a far greater skin hazard than G-series agents. VX could be used for long-term contamination of territory.

<sup>7</sup> See footnote 5.

- Iraq has not accounted for 26,500 artillery rockets that in the past were its preferred means for delivering nerve agents, nor has it accounted for about 550 artillery shells filled with mustard agent.

**Baghdad continues to rebuild and expand dual-use infrastructure that it could divert quickly to CW production.** The best examples are the chlorine and phenol plants at the Fallujah II facility. Both chemicals have legitimate civilian uses but also are raw materials for the synthesis of precursor chemicals used to produce blister and nerve agents. Iraq has three other chlorine plants that have much higher capacity for civilian production; these plants and Iraqi imports are more than sufficient to meet Iraq's civilian needs for water treatment. Of the 15 million kg of chlorine imported under the UN Oil-for-Food program since 1997, Baghdad used only 10 million kg and has 5 million kg in stock, suggesting that some domestically produced chlorine has been diverted to such proscribed activities as CW agent production.

- Fallujah II was one of Iraq's principal CW precursor production facilities before the Gulf war. In the last two years the Iraqis have upgraded the facility and brought in new chemical reactor vessels and shipping containers with a large amount of production equipment. They have expanded chlorine output far beyond pre-Gulf war production levels—capabilities that they could divert quickly to CW production. Iraq is seeking to purchase CW agent precursors and applicable production equipment and is trying to hide the activities of the Fallujah plant.

## **Nuclear Weapons Program**

More than ten years of sanctions and the loss of much of Iraq's physical nuclear infrastructure under IAEA oversight have not diminished Saddam's interest in acquiring or developing nuclear weapons. Iraq had an advanced nuclear weapons development program before the Gulf war that focused on building an implosion-type weapon using highly enriched uranium. Baghdad was attempting a variety of uranium enrichment techniques, the most successful of which were the electromagnetic isotope separation (EMIS) and gas centrifuge programs. After its invasion of Kuwait, Iraq initiated a crash program to divert IAEA-safeguarded, highly enriched uranium from its Soviet and French-supplied reactors, but the onset of hostilities ended this effort. Iraqi declarations and the UNSCOM/IAEA inspection process revealed much of Iraq's nuclear weapons efforts, but Baghdad still has not provided complete information on all aspects of its nuclear weapons program.

- Iraq has withheld important details relevant to its nuclear program, including procurement logs, technical documents, experimental data, accounting of materials, and foreign assistance.
- Baghdad also continues to withhold other data about enrichment techniques, foreign procurement, weapons design, and the role of Iraqi security services in concealing its nuclear facilities and activities.

Before its departure from Iraq, the IAEA made significant strides toward dismantling Iraq's nuclear-weapons program and unearthing the nature and scope of Iraq's past nuclear activities. In the absence of inspections, however, Iraq easily could have begun to reconstitute its nuclear program and to unravel the IAEA's hard-earned accomplishments.

Iraq retains its cadre of nuclear scientists and technicians, its program documentation, and sufficient dual-use manufacturing capabilities to support a reconstituted nuclear weapons program. Iraqi media have reported numerous meetings between Saddam and nuclear scientists over the past two years, signaling his continued interest in reviving a nuclear program.

Iraq's expanding international trade provides growing access to nuclear-related technology and materials and potential access to foreign nuclear expertise. An increase in dual-use procurement activity in recent years is likely to be supporting a reconstituted nuclear-weapons program.

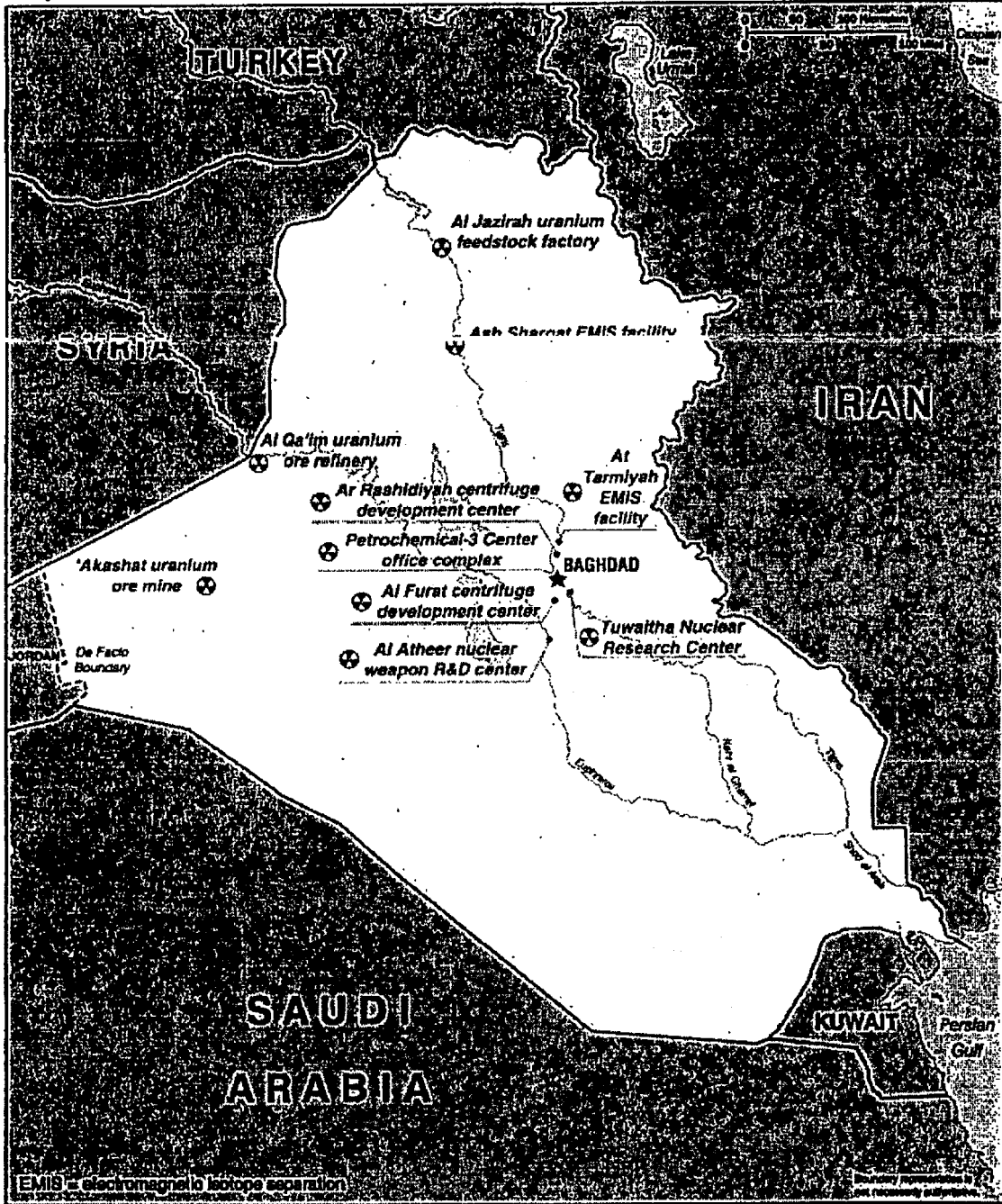
- The acquisition of sufficient fissile material is Iraq's principal hurdle in developing a nuclear weapon.
- **Iraq is unlikely to produce indigenously enough weapons-grade material for a deliverable nuclear weapon until the last half of this decade. Baghdad could shorten the acquisition timeline significantly if it were able to procure fissile material abroad.**
- **We cannot rule out that Baghdad has procured uranium enrichment capabilities that could substantially shorten the amount of time necessary to make a nuclear weapon.**

### **Ballistic Missile Program**

**Compelling information reveals that Iraq is developing a ballistic missile capability that exceeds the 150-km range limitation established under UNSCR 687. During the 1980s, Iraq purchased 819 Scud B missiles from the USSR. Hundreds of these 300-km-range missiles were used to attack Iranian cities during the Iran-Iraq War. Beginning in 1987, Iraq converted many of these Soviet Scuds into extended-range variants, some of which were fired at Tehran, some launched during the Gulf war, and others remaining in Iraq's inventory at war's end. Iraq admitted filling at least 75 of its Scud warheads with chemical or biological agents and deployed these weapons for use against coalition forces and regional opponents including Israel in 1991.**

Most of the approximately 90 Scud-type missiles Saddam fired at Israel, Saudi Arabia, and Bahrain during the Gulf war were al-Husayn variants that the Iraqis modified by lengthening the airframe and increasing fuel capacity, extending the range to 650 km.

**Iraq: Nuclear-Related Facilities**

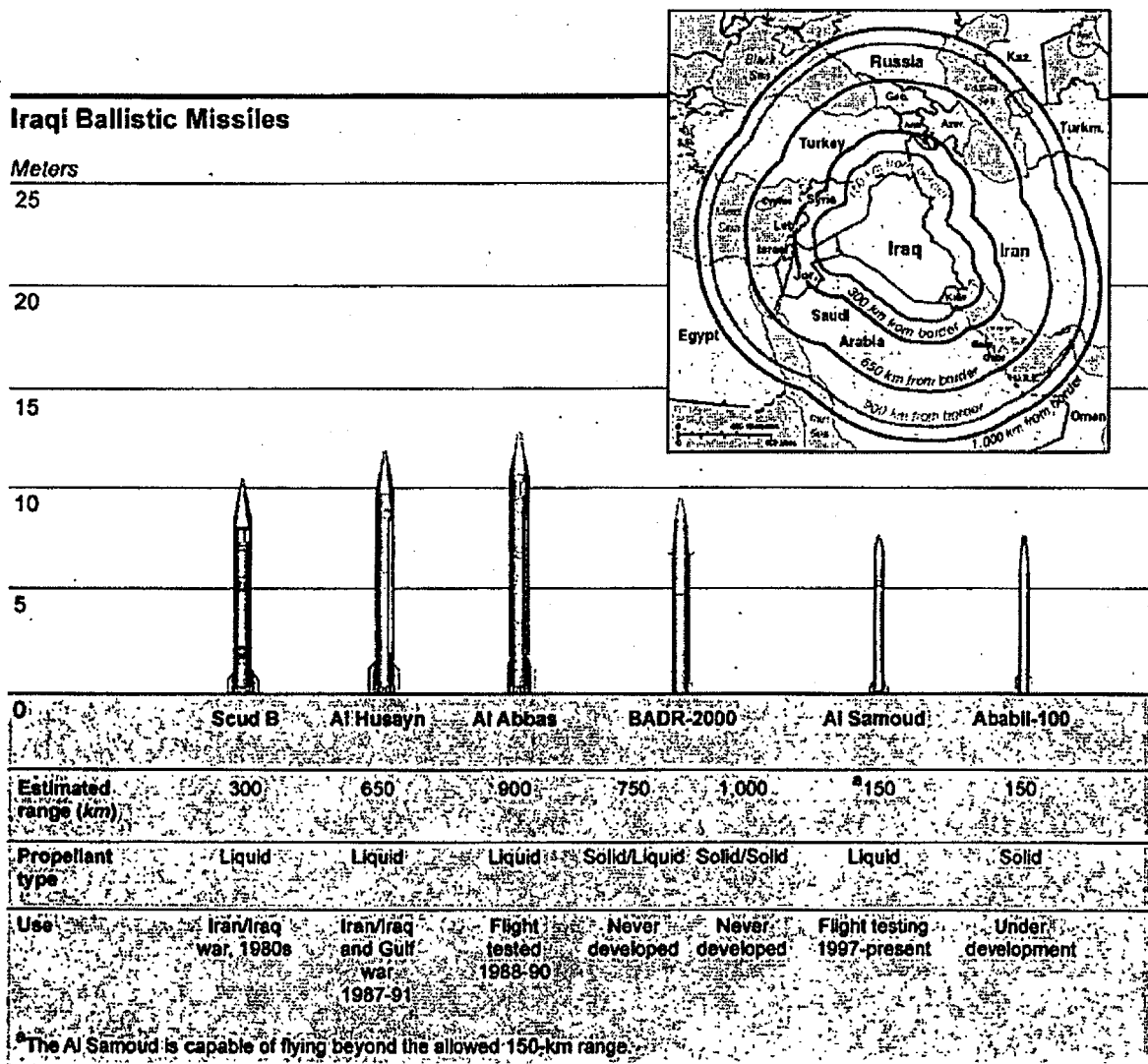


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Baghdad was developing other longer-range missiles based on Scud technology, including the 900-km al-Abbas. Iraq was designing follow-on multi-stage and clustered medium-range ballistic missile (MRBM) concepts with intended ranges up to 3,000 km. Iraq also had a program to develop a two-stage missile called the Badr-2000 using solid-propellants with an estimated range of 750 to 1,000 km.

- Iraq never fully accounted for its existing missile programs. Discrepancies in Baghdad's declarations suggest that Iraq retains a small force of Scud-type missiles and an undetermined number of launchers and warheads. Further, Iraq never explained the disposition of advanced missile components, such as guidance and control systems, that it could not produce on its own and that would be critical to developmental programs.

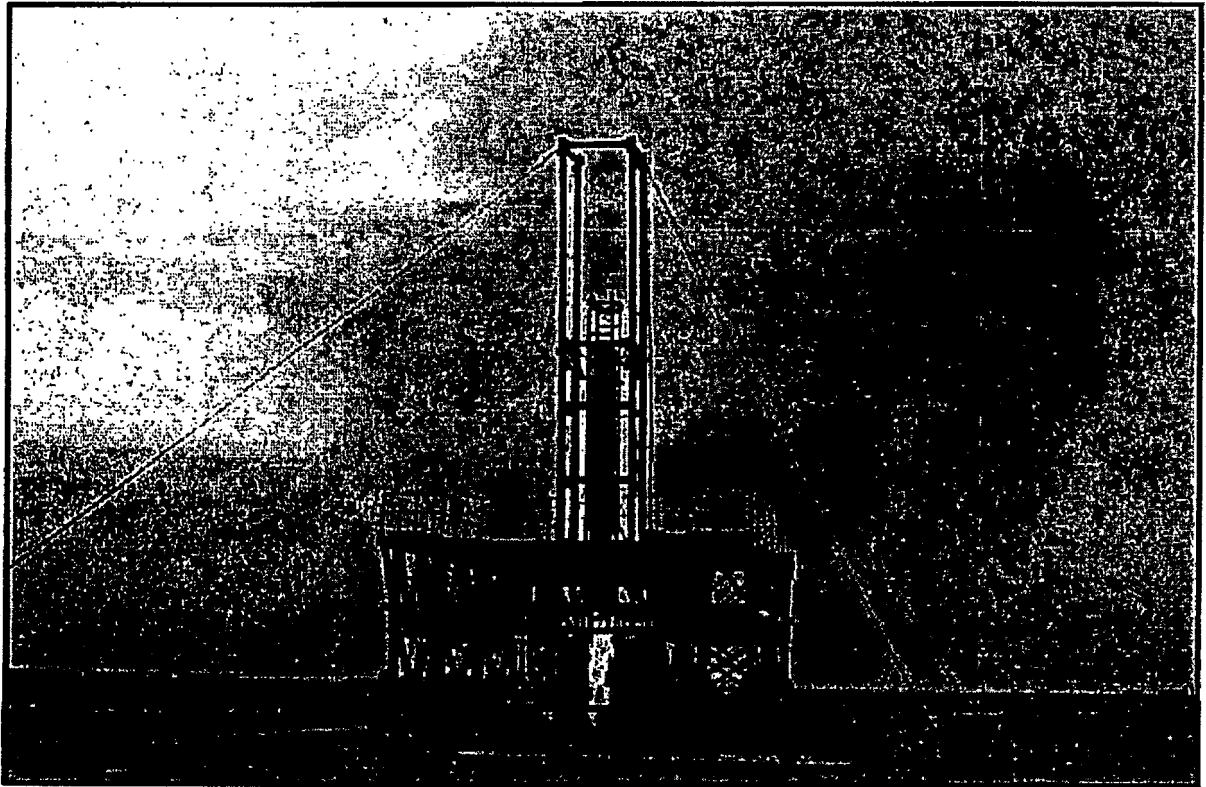


Iraq continues to work on UN-authorized short-range ballistic missiles (SRBMs)—those with a range no greater than 150 km—that help develop the expertise and infrastructure needed to produce longer-range missile systems. The al-Samoud liquid propellant SRBM and the Ababil-100 solid propellant SRBM are, however, capable of flying beyond the allowed 150 km range. Both missiles are being tested aggressively. Both may be nearing operational deployment and appeared on launchers in a military parade on 31 December 2000 in Baghdad. Other evidence strongly suggests Iraq is modifying missile testing and production facilities to produce even longer-range missiles:

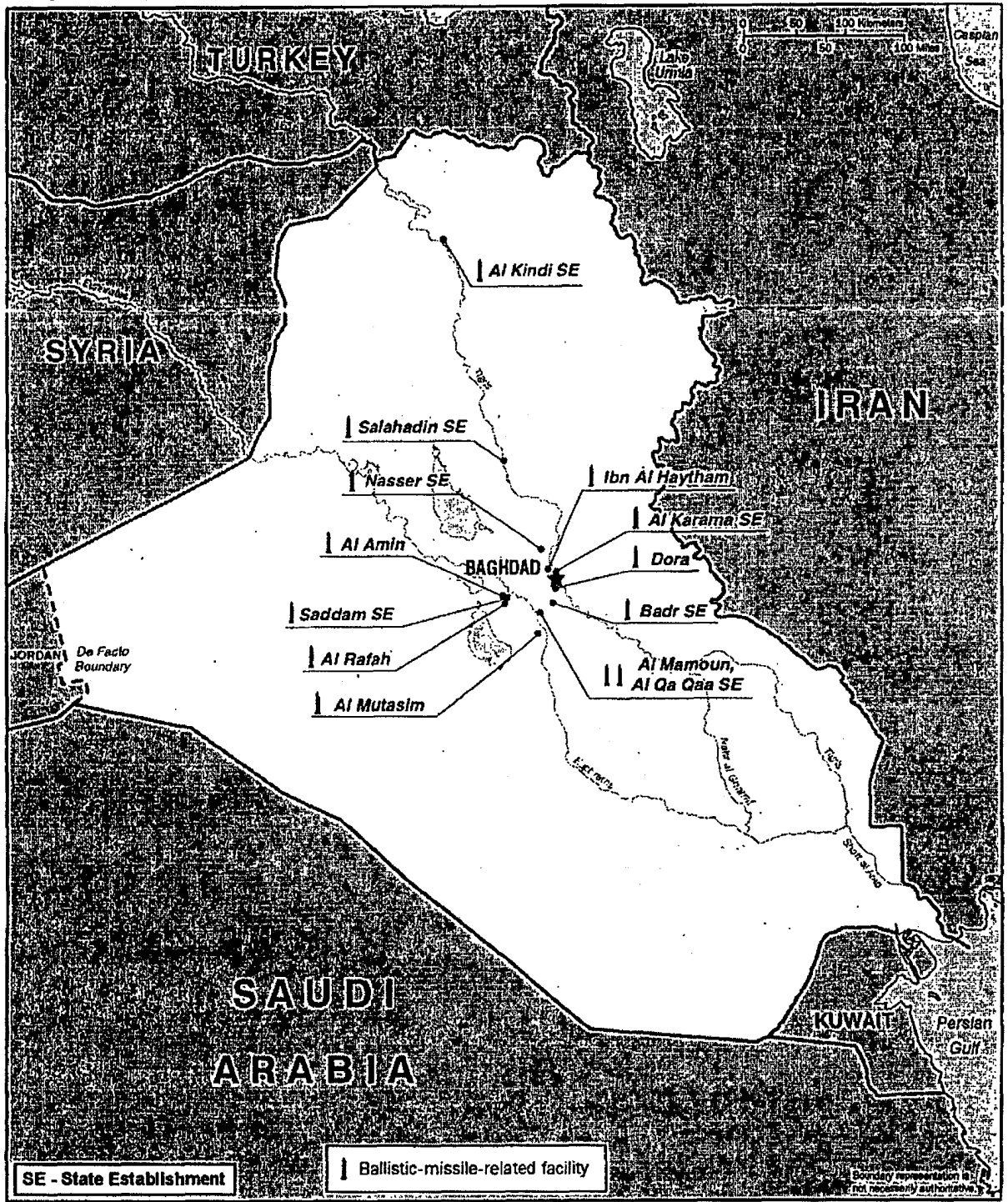
- The Al-Rafah-North Liquid Propellant Engine RDT&E Facility is Iraq's principal site for the static testing of liquid propellant missile engines. Baghdad has been building a new test stand there that is larger than the test stand associated with al Samoud engine testing and the defunct Scud engine test stand. The only plausible explanation for this test facility is that Iraq intends to test engines for longer-range missiles prohibited under UNSCR 687.

#### SA-2 (Al Samoud) Engine Test

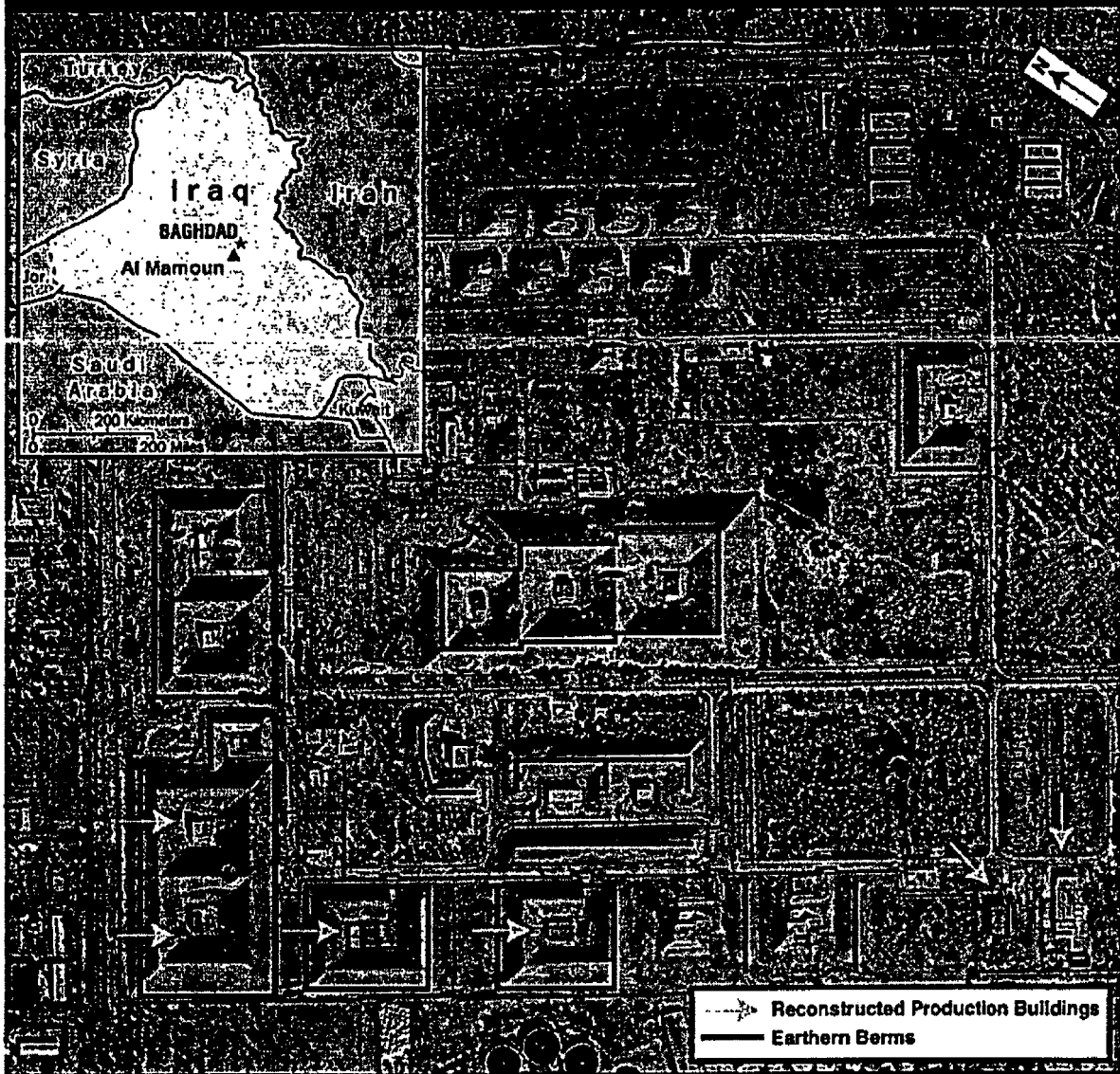
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**Iraq: Ballistic-Missile-Related Facilities**



### IRAQ: Al Mamoun Solid-Propellant Production Plant



- The Al-Mutasim Solid Rocket Motor and Test Facility, previously associated with Iraq's Badr-2000 solid-propellant missile program, has been rebuilt and expanded in recent years. The al-Mutasim site supports solid-propellant motor assembly, rework, and testing for the UN-authorized Ababil-100, but the size of certain facilities there, particularly those newly constructed between the assembly rework and static test areas, suggests that Baghdad is preparing to develop systems that are prohibited by the UN.
- At the Al-Mamoun Solid Rocket Motor Production Plant and Research, Development, Testing and Evaluation (RDT&E) Facility, the Iraqis, since the December 1998 departure of inspectors, have rebuilt structures damaged in the Gulf War and dismantled by UNSCOM that were originally built to manufacture solid

propellant motors for the Badr-2000 program. They also have built a new building and are reconstructing other buildings originally designed to fill large Badr-2000 motor casings with solid propellant.

- Also at al-Mamoun, the Iraqis have rebuilt two structures used to “mix” solid propellant for the Badr-2000 missile. The new buildings—about as large as the original ones—are ideally suited to house large, UN-prohibited mixers. In fact, the only logical explanation for the size and configuration of these mixing buildings is that Iraq intends to develop longer-range, prohibited missiles.

**Iraq has managed to rebuild and expand its missile development infrastructure under sanctions.** Iraqi intermediaries have sought production technology, machine tools, and raw materials in violation of the arms embargo.

- The Iraqis have completed a new ammonium perchlorate production plant at Mamoun that supports Iraq’s solid propellant missile program. Ammonium perchlorate is a common oxidizer used in solid propellant missile motors. Baghdad would not have been able to complete this facility without help from abroad.
- In August 1995, Iraq was caught trying to acquire sensitive *ballistic missile guidance components including gyroscopes originally used in Russian strategic nuclear SLBMs*, demonstrating that Baghdad has been pursuing proscribed, advanced, long-range missile technology for some time. Iraqi officials admitted that, despite international prohibitions, they had received a similar shipment earlier that year.

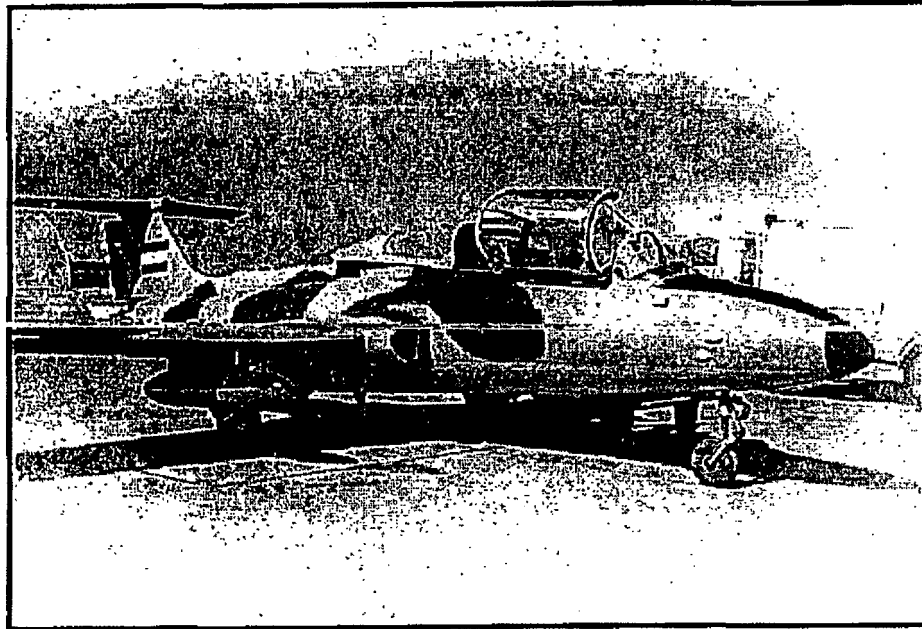
### **Unmanned Aerial Vehicle Program and Other Aircraft**

**Iraq is continuing to develop other platforms capable of delivering chemical and biological agents.** Immediately before the Gulf War, Baghdad attempted to convert a MiG-21 into an unmanned aerial vehicle (UAV) to carry spray tanks capable of dispensing chemical or biological agents. UNSCOM assessed that the program to develop the spray system was successful, but the conversion of the MiG-21 was not. More recently, Baghdad has attempted to convert the L-29 jet trainer aircraft into a UAV that can be fitted with the CBW spray tanks, most likely a continuation of previous efforts with the MiG-21. Although much less sophisticated than ballistic missiles as a delivery platform, an aircraft, manned or unmanned, is the most efficient way to disseminate chemical and biological weapons over a large, distant area.

- Iraq already has produced modified drop-tanks that can disperse biological or chemical agents effectively. Before the Gulf war, the Iraqis successfully experimented with aircraft-mounted spray tanks capable of releasing up to 2,000 liters of an anthrax simulant over a target area. Iraq also has modified commercial crop sprayers successfully and tested them with an anthrax simulant delivered from helicopters.

## Iraqi L-29 UAV Test-Bed Aircraft at Samarra East Airbase

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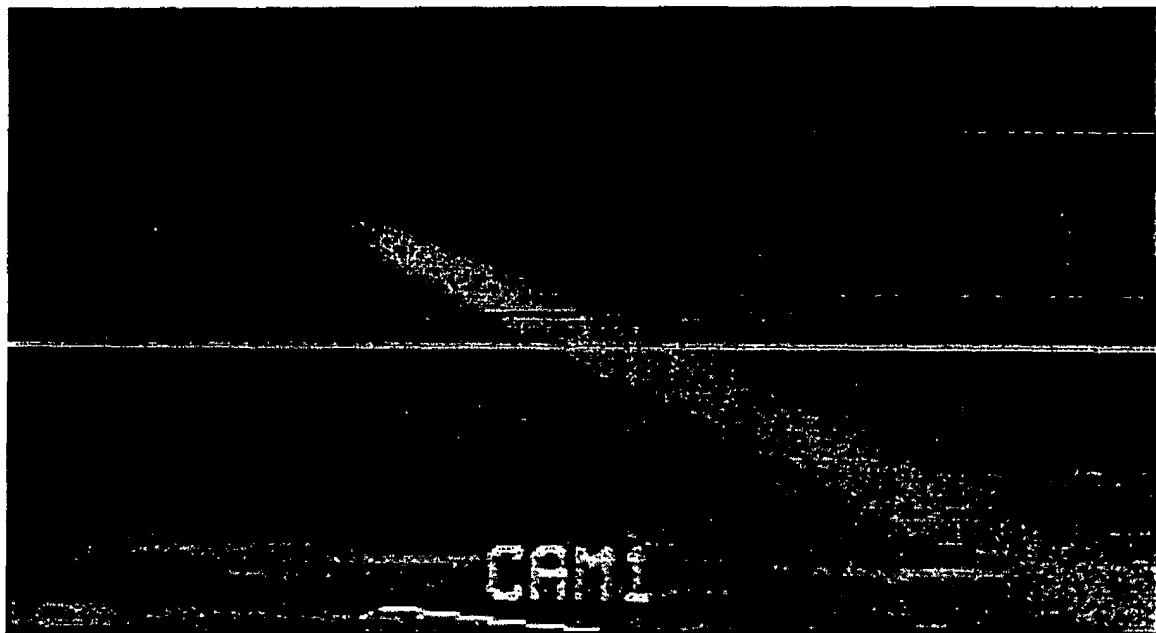


- Baghdad has a history of experimenting with a variety of unmanned platforms. Iraq's use of newer, more capable airframes would increase range and payload, while smaller platforms might be harder to detect and therefore more survivable. This capability represents a serious threat to Iraq's neighbors and to international military forces in the region.
- Iraq used tactical fighter aircraft and helicopters to deliver chemical agents, loaded in bombs and rockets, during the Iran-Iraq war. Baghdad probably is considering again using manned aircraft as delivery platforms depending on the operational scenario.

### Procurement in Support of WMD Programs

Iraq has been able to import dual-use, WMD-relevant equipment and material through procurements both within and outside the UN sanctions regime. **Baghdad diverts some of the \$10 billion worth of goods now entering Iraq every year for humanitarian needs to support the military and WMD programs instead.**

- UN monitors at Iraq's borders do not inspect the cargo—worth hundreds of millions of dollars—that enters Iraq every year outside of the Oil-for-Food program; some of these goods clearly support Iraq's military and WMD programs. For example, Baghdad imports fiber-optic communication systems outside of UN auspices to support the Iraqi military.



*Test of dissemination of BW agents from a modified drop tank carried by a Mirage F1. The drop tank was filled with 1000 liters of slurry Bacillus subtilis, a simulant for B. anthracis, and disseminated over Abu Obeydi Airbase in January 1991. The photo is from a videotape provided by Iraq to UNSCOM.*

- Iraq imports goods using planes, trains, trucks, and ships without any type of international inspections—in violation of UN Security Council resolutions.

Even within the UN-authorized Oil-for-Food program, Iraq does not hide the fact that it wants to purchase military and WMD-related goods. For example, **Baghdad diverted UN-approved trucks for military purposes and construction equipment to rehabilitate WMD-affiliated facilities, even though these items were approved only to help the civilian population.**

- Iraq has been able to repair modern industrial machine tools that previously supported production of WMD or missile components and has imported additional tools that it may use to reconstitute Baghdad's unconventional weapons arsenal.
- On several occasions, Iraq has asked to purchase goods—such as neutron generators and servo valves—that the UN Monitoring, Verification, and Inspection Commission (UNMOVIC) views as linchpins for Iraqi prohibited programs; alternative, non-dual-use items would serve the civilian purpose purportedly intended for this equipment.

UNMOVIC began screening contracts pursuant to UN Security Council Resolution 1284 in December 1999 and since has identified more than 100 contracts containing dual-use items as defined in UNSCR 1051 that can be diverted into WMD programs. UNMOVIC also has requested that suppliers provide technical information on hundreds of other goods because of concerns about potential misuse of dual-use equipment. In many cases, Iraq has requested technology that clearly exceeds requirements for the stated commercial end-use when it easily could substitute items that could not be used for WMD.

- On some UN contracts, Baghdad claimed that the requested goods are designed to rehabilitate facilities—such as the Al Qa'im phosphate plant and Fallujah—that in the past were used to support both industrial and WMD programs.