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Weapons of Mass Destruction in the Middle East

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Foreign Affairs, Defense, and Trade Division

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ABSTRACT

The primary purpose of this report is to describe the nuclear, biological, and chemical weapons (weapons of mass destruction or WMD) and missile programs of the countries and terrorist groups in the Middle East. An introductory section puts these weapons programs into the context of the region's strategic environment and U.S. national interests. The concluding section discusses briefly the policy options that are available to the U.S. government and to Congress, in particular, to counter the growing threat. The report does not attempt to evaluate the efficacy of current or future policies. As major changes occur in the status of WMD programs, this report will be updated.

Weapons of Mass Destruction in the Middle East

Summary

The numerous wars and constant tensions among the states of the Middle East have made the region fertile ground for the development of weapons of mass destruction (WMD). Some Middle Eastern countries are trying to acquire WMD to compensate for conventional weapons imbalances or to match WMD programs undertaken by neighboring states. Many observers believe that deterrence against WMD is crucial in the Middle East because such weapons have been used there in combat on several occasions, most notably by Iraq during its eight year war against Iran. The Middle East is also home to some of the most active terrorist groups in the world; five of the seven countries named by the United States as sponsors of terrorism are located in the region. There is some concern that WMD capabilities might be transferred from the proliferant states to terrorist groups.

A survey of WMD programs in the Middle East indicates that many of the countries of the region have at least some WMD development efforts under way. Some countries in the Middle East, such as Iran, have well developed programs in virtually all categories of WMD (chemical, biological, and nuclear) as well as missiles. Other countries in the region, such as Algeria or Egypt, have pursued WMD capabilities sporadically. Others, such as the Persian Gulf monarchy states, have generally refrained from developing WMD, apparently preferring instead to place themselves under a U.S. security umbrella.

Possibly because of the longstanding suspicions among many Middle Eastern countries, there has been little intra-regional cooperation on WMD development. Iraq, although its own WMD programs are banned under post-Gulf war U.N. resolutions, has supplied some expertise in chemical weapons to Sudan. Iran has brokered missile sales by North Korea to Syria. However, most of the Middle Eastern countries have preferred to forge individual ties to WMD technology suppliers. The primary suppliers have been Russia, China, and North Korea, three countries that have been willing to risk international criticism to further their political or economic objectives in the Middle East.

The United States has tried numerous mechanisms to control Middle Eastern proliferation or blunt its effects. The United States has worked with its allies and other countries to strengthen global non-proliferation regimes, although several Middle Eastern countries have refused to join such regimes. The United States, sometimes in concert with its allies, has tried to impose sanctions on Middle Eastern proliferants or their suppliers. In some cases, such as that of Libya's chemical weapons program, the United States has threatened to undertake military action against a suspected WMD facility. More recently, the United States has placed greater faith in regional or sub-regional missile defense systems, such as the U.S.-Israeli Arrow ballistic missile interception system. The United States also has proposed that the Persian Gulf monarchies acquire an integrated missile defense system to protect them against Iran's growing ballistic missile program and any retained or rebuilt Iraqi missiles.

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Weapons of Mass Destruction in the Middle East

The Strategic Environment

The Middle East has long been one of the most heavily armed regions of the world. It now has achieved one of the highest concentrations of countries with nuclear, biological, or chemical weapons (weapons of mass destruction, or WMD) and missile delivery systems.[1] As the following pages will show, most countries in the region now have some form of WMD as well as missiles. If current trends continue, in the coming decade additional countries in the region will obtain WMD and missiles, they will expand their WMD arsenals, and will increase the lethality of their WMD. Terrorist groups, some of which are allied with countries discussed in this paper, are also reportedly attempting to acquire chemical, biological, or even radiological weapons.

Motivations

There are many motivations for nations in the Middle East to acquire WMD and means for their delivery. Of particular concern are countries that may seek WMD to intimidate, coerce, conquer, or destroy neighboring countries, or to interfere with U.S. ability to project force in the region. Some nations seek the prestige and status of a great power, often in an effort to satisfy nationalist domestic sentiment or to emerge as leader of a regional grouping. Other countries primarily want to ensure their security against regional rivals or against major world powers. Security considerations might include efforts to develop systems equivalent to those possessed by rivals, or perhaps to compensate for conventional military weakness. Some countries might try to develop WMD in an effort to obtain financial or political concessions.

Security concerns seem paramount in the Middle East. There have been five major wars between Israel and its neighbors since Israel was founded in May 1948. Although no WMD were used in any of those wars, Israel and most of its erstwhile adversaries have increased their WMD capabilities. Egypt used chemical weapons during its intervention in Yemen in 1963-67 and Libya used them against Chadian troops in 1987. In the eastern half of the region, Iraq has started two wars since 1980; it invaded Iran that year, touching off an eight year war in which Iraq and, to a lesser extent, Iran employed chemical weapons. In 1988, Iraq also used nerve agents against the Kurdish town of Halabja and other Kurdish villages in Iraq.[2] Two

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[1]South Asia and Northeast Asia also have high concentrations.

[2]Carus, W. Seth. *The Genie Unleashed: Iraq's Chemical and Biological Weapons Program*, Policy Papers, Number 14, Washington Institute for Near East Policy, 1989, pp. 3 and 21,

(continued...)

years later, Iraq invaded Kuwait, and the coalition partners and Israel were greatly concerned that Iraq might again use CW or BW. Some analysts speculated that such an attack might bring nuclear retaliation from the United States or perhaps even from Israel, and Iraq does not appear to have used such agents in the Gulf War. The frequent wars, the past uses of CW, and threats of nuclear attacks have probably been primary factors leading to WMD proliferation in the Middle East.

The Middle East is also a region in which ballistic missiles have been used in combat with conventional (high-explosive) warheads. Egypt and Syria used missiles and rockets against Israel in the 1973 Arab-Israeli War.[3] Iran and Iraq fired missiles at the armed forces and cities of each other during the 1980-88 Iran-Iraq war, causing especially heavy damage to Iran. During the 1991 Gulf war, Iraq fired ballistic missiles against Israel and U.S. and allied troops in Saudi Arabia and Bahrain. The Communist regime in Afghanistan fired Scud missiles against its Islamic opponents (the "mujahedin") in a losing battle to preserve its grip on power after the 1989 Soviet pullout from that country, and captured missiles were later deployed by the Taliban and opposition contingents. Scuds also were fired by the secessionist South during the civil war in Yemen in 1994.

Certain countries of the Near East have shown a strong appetite for large armed forces and new conventional weapons, which could be heightening security fears among many states of the region.[4] According to most experts, a perceived imbalance in conventional forces is one of the most important motivations for any country to develop WMD. Iraq's development during the 1980s of one of the world's largest chemical weapons programs was almost certainly prompted by Iran's ability to mobilize large "human wave" offensives against it during the Iran-Iraq war. During 1991-94, the Near East region accounted for 60.8% of the total value of all developing nations' arms transfer agreements. During 1995-98, the region accounted for 44.2% of all such agreements. Among the major conventional acquisitions, Iran acquired three diesel Kilo-class submarines from Russia in the early 1990s. Israel bought three submarines from Germany and numerous fighter aircraft from the United States. Iran also acquired fast patrol craft from China equipped with sea-skimming Chinese-made C-802 cruise missiles. Iran is developing medium and long range ballistic missiles, possibly in an effort to deter Israel's highly capable Air Force from striking Iran's nuclear reactor project at Bushehr or other high-value targets in Iran. Iran might also be attempting to counter Iraqi aggression or a future U.S. attack, or to intimidate the Gulf states. These acquisitions by Iran might help explain why Iraq has been reluctant to cooperate with U.N. weapons inspectors charged by the U.N. Security Council with eliminating Iraq's WMD. Although Iran's acquisitions have not prompted the Persian Gulf monarchies to acquire WMD, that potential exists if Iran's

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[2](...continued)
see also his note 7.

[3]Bermudez, Joseph S. Jr. “Egypt’s Missile Development,” in *The International Missile Bazaar: The New Suppliers’ Network*, William C. Potter and Harlan W. Jencks (eds.), Boulder, Colorado: Westview Press, 1994, p. 28.

[4]The information in this section is derived from CRS Report for Congress RL30275. Conventional Arms Transfers to Developing Nations, 1991-1998. August 4, 1999, by Richard F. Grimmett.

acquisitions continue, if Iraq rebuilds its WMD, or if the United States scales back its security commitments in the Gulf. Israel's conventional superiority and its WMD might have prompted Syria to acquire missiles from North Korea and to develop VX nerve agent.

The sense of insecurity among the countries of the Middle East is magnified by the presence in the region of five out of the seven countries identified by the Secretary of State as sponsors of international terrorism. The five are: Iran, Iraq, Libya, Syria, and Sudan. Each hosts terrorist groups that are working against countries in the region, and often against the United States as well. One of the other designated state sponsors, North Korea, has supplied missile technology to several countries in the Middle East region, including Iran, Libya, Syria, and Egypt. Another country covered in this paper, Afghanistan, hosts the exiled terrorist leader Usama bin Ladin, who is believed to have acquired at least a rudimentary chemical weapons capability. Afghanistan is not designated a state sponsor of terrorism, but it has been named by the Administration as a country that is not cooperating with U.S. anti-terrorism efforts.

The strategic environment of the Near East is affected to some extent by the neighboring region of South Asia. During 1998, both India and Pakistan confirmed that they have nuclear weapons by conducting nuclear tests. Pakistan is an Islamic state, as are most of the countries in the Near East, and some have long believed that other Islamic countries might look to a nuclear Pakistan to provide them with nuclear technology. Others express concern about growing military ties between Israel and India. Pakistan, as well as India, are discussed in this paper as potential suppliers. However, the WMD programs of these two countries are not discussed in this paper because their arms race and years of conflict are outside the Near East region itself. (See CRS Report 98-570F, IB93097, and IB94041.)

The Risks

Not all U.S. policy makers agree on the extent to which Middle East WMDs threaten vital U.S. interests. The leaders of some Middle East countries, as well as those of Russia, China, and France, tend to be less concerned with this threat than have been the last few U.S. Presidents. The following pages will attempt to provide a fairly detailed and objective accounting of the WMD capabilities and aspirations of the various states in the Middle East. It seems clear that strong policies are needed to prevent Iraq from acquiring WMD, that Iran must be watched closely and dissuaded from acquiring and using WMD, that the region needs continued or expanded nonproliferation measures, and that regional stability may be enhanced by allied WMD defensive capabilities. There are some important unresolved questions: How intent are Iran’s leaders on building nuclear weapons, and could they be dissuaded? How likely is Iraq to build nuclear, biological, and chemical weapons if inspectors remain absent and how quickly could it do so if UN sanctions are eased? Which countries in the region can now produce effective biological weapons? Which terrorist groups can now wield effective WMD weapons? What external sources are supplying WMD, technology, and materials for their production? What measures other than the acquisition of WMD could ameliorate the security concerns of regional states and groups?

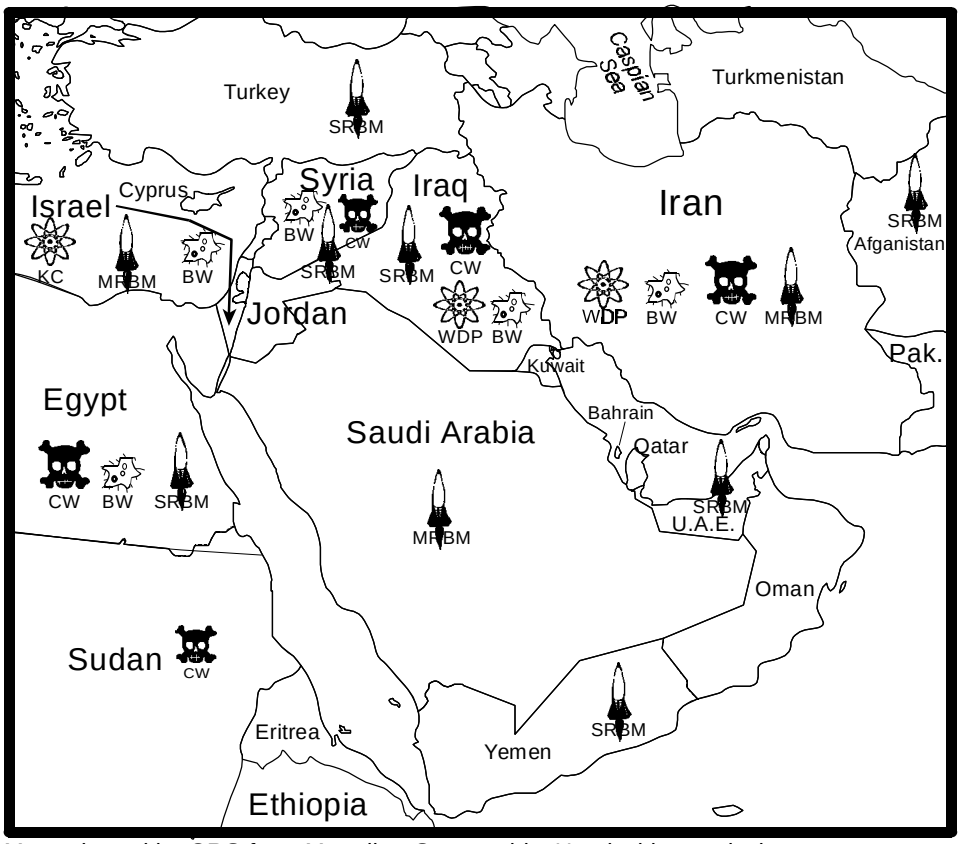
Another disputed variable in the risk equation is the likelihood that one or more actors in the Middle East will use WMD and with what effect. There is not a clear understanding of the conditions and purposes that might lead a Middle East country or terrorist group to launch a WMD attack, against whom it might be launched, what type and scale of weapons might be used, and how effective would U.S. conventional and nuclear forces, or regional forces and defenses, be in deterring such an attack.

In particular it might be asked, what might be the effect of such an attack on vital U.S. national interests? It can probably be agreed that the effect would be crucial if U.S. troops, installations, or territory were attacked with WMD. The effect would probably also be considered crucial if the U.S. ability to maintain or project force into the region were compromised; if a U.S. ally or close friend were attacked; if the attack established regional hegemony; or if the attack caused or threatened a major disruption in the supply of oil to Europe and Asia (even if U.S. oil sources were not directly affected).

The importance to the United States of a WMD attack in the Middle East is less clear if it were to involve two or more states that are not closely aligned with the United States, or if an ally attacked an adversary of the United States. The United States government did little in direct response to the use of CW by Iran and Iraq against each other during the Iran-Iraq War and the use of CW by the Iraqi government against Kurds within its borders in 1988. (Since 1984, the U.S. has worked with other industrialized countries to stem the proliferation of CW and BW.) What the United States stands to lose in such attacks is less tangible. Even if vital U.S. interests are not a stake, these uses of WMD might threaten the international stigma against using nuclear, chemical, or biological weapons, and might reduce international support for nonproliferation policies, thereby diminishing world peace and stability. These, and a number of other U.S. policy objectives, may not be worth fighting for if intervening U.S. troops would be exposed to a likely WMD attack.

A labyrinth of multilateral, regional, bilateral, and unilateral policies exist to counter the growing WMD threat in the Middle East. The adequacy of these policies and the urgency of doing more depend on one's view of the current and developing threat, the likelihood of WMD use, and the effectiveness of various policy components. This report does not evaluate existing policies or options for change, but briefly outlines the measures that might be employed to address this threat.

Nuclear, Biological, and Chemical Weapons and Ballistic Missiles in the Middle East



Map adapted by CRS from Magellan Geographix. Used with permission.

LEGEND

KC = Known Nuclear Capacity
WDP = Nuclear Weapon Development Program

CW — Reported Chemical Weapon Program

BW — Reported Biological Weapon Program

ICBM = Intercontinental Ballistic Missiles
IRBM = Intermediate Range
MRBM = Medium Range
SRBM = Short Range
SLBM = Submarine Launched

Table 1. State of Proliferation

Country	Nuclear Weapons	Chemical Weapons	Biological Weapons	Ballistic Missiles
Algeria	—— [a]	——	——	——
Egypt	——	Likely	Likely	SRBM
Iran	Seeking	Known [b]	Likely	MRBM
Iraq	Seeking	Known [c]	Known	SRBM
Israel	Known [d]	Suspected	Likely	MRBM
Libya	Seeking	Known [e]	Seeking	SRBM
Saudi Arabia	—— [f]	Suspected? [g]	——	MRBM
Sudan	——	Likely [h]	Seeking? [i]	——
Syria	——	Known	Seeking	SRBM

In the table above, these terms are used as follows:

Known: The nation has either admitted the possession or use of the weapon, possession/use has been corroborated by the United States government, or possession has been widely reported by credible sources.

Likely: The nation is thought to have produced or acquired the weapon, but no definitive information is openly available in government statements, press reports, or the academic community.

Seeking: The nation is attempting to acquire or develop a weapon program, but it is not clear that it has acquired or produced the weapon.

Suspected: There are reports that the nation has or is developing the weapon, but there is not enough evidence to confirm or deny the reports.

Ended: The nation has terminated the weapon program or weapons were destroyed or returned to another country.

—— : There is no publicly reported credible information available that points to the existence of a weapons program.

Missiles: The table indicates the range group of the longest range ballistic missile in the possession of each country that also has nuclear, chemical, or biological weapons. India, Iran, North Korea, and Pakistan are developing, but do not yet possess, longer range ballistic missiles.

SRBM: Short Range Ballistic Missile, 70-1000 km (43-621 mi.)
MRBM: Medium Range Ballistic Missile, 1001-3500 km (622-2175 mi.)
IRBM: Intermediate Range Ballistic Missile, 3501-5000 km (2176-3107 mi.)
ICBM: Intercontinental Ballistic Missile, 5001+ km (3108+ mi.)
SLBM: Submarine Launched Ballistic Missile

Sources: Primary sources used in the production of the table were:

Proliferation Threat and Response. Office of the Secretary of Defense: April 1996, and November 1997.

The Arms Control Reporter. Institute for Defense and Disarmament Studies.

Adherence To and Compliance With Arms Control Agreements. Arms Control and Disarmament Agency: 1996 Annual Report.

The Nonproliferation Review. Center for Nonproliferation Studies at the Monterey Institute of International Studies. Vol 4.

Report of the Commission to Assess the Ballistic Missile Threat to the United States, Executive Summary, July 15, 1998.

Footnotes:

[a] A few indicators suggest a possible military use of Algeria's 15 MW Es Salam reactor at Ain Oussera, and evoked suspicion that Algeria is developing nuclear weapons. Rodney W. Jones, Mark G. McDonough with Toby Dalton and Gregory Koblentz, *Tracking Nuclear Proliferation*, Carnegie Endowment for International Peace, 1998, p.163. In addition Algeria renewed its nuclear ties with China in 1996 when it signed a "second stage" agreement for nuclear cooperation.

[b] Iran used chemical weapons in 1987 during the Iran-Iraq War. Iran also supplied Libya with chemical weapons which were later used in Chad. *Proliferation: Threat and Response,* 1996, pp. 15-16.

[c] Iraq claims its CW and BW stockpiles have been destroyed, but U.N. inspection officials still suspect small stockpiles, possibly including missile warheads, remain.

[d] Although press reports and the academic community generally report that Israel has nuclear weapons, many of which could be deployed with its missile force, neither the Israeli nor U.S. government has acknowledged their existence.

[e] Libya used Iranian supplied chemical weapons in Chad, however, *Proliferation: Threat and Response*, 1996, states that Libya has begun domestic production of chemical weapons.

[f] Saudi Arabia has reportedly shown interest in funding the Iraqi and Pakistani nuclear programs and may be seeking to acquire a nuclear capacity. See: Shahram Chubin, "Eliminating Weapons of Mass Destruction: The Persian Gulf Case," The Henry L. Stimson Center, March 1997, p. 20; "Saudi Arabia: Weapons of Mass Destruction Capabilities and Programs," Center for Nonproliferation Studies, Monterey Institute of International Studies; Jane Perlez, "Saudi's Visit To Arms Site In Pakistan Worries U.S.," *New York Times*, July 10, 1999; Paul Taylor, "West Concerned at Saudi-Pakistan Nuclear Link," *Reuters*, August 3, 1999; Paul Lewis, "Defector Says Saudis Sought Nuclear Arms," *New York Times,* August 7, 1994.

[g] There are unconfirmed reports that Saudi Arabia may have developed chemical warheads for is CSS-2 missiles. NBC Capabilities, Saudi Arabia, " Jane's NBC Defense Systems 1998-1999. Also, *Defense and Foreign Affairs Weekly*, April 1991, reports Chinese assistance to Saudi in developing chemical warheads. Also, in the Arms Control Reporter "may possess" as of 3.13.91, 704.E-0.10, 5-92.

[h] In a Report to Congress, the Director of Central Intelligence stated that: "Sudan has been developing the capability to produce chemical weapons for many years...has obtained help from many countries including Iraq". Director of Central Intelligence, Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, July 1999.

[i] The same DCI Report to Congress states that "Given its history of developing chemical weapons and its close relationship with Iraq, Sudan may be interested in a Biological weapons program as well".

Table 2. Commitments to International Regimes by Middle Eastern Countries with Some Reported WMD

Country	NPT	CWC	BWC	CTBT	IAEA
Algeria	Party	Ratified		Signed	Member
Egypt	Party		Signed	Signed	Member
Iran	Party	Ratified	Party	Signed	Member
Iraq	Party		Party		Member
Israel		Signed		Signed	Member
Libya	Party		Party		Member
Saudi Arabia	Party	Party	Party		Member
Sudan	Party	Party			Member
Syria	Party		Signed		Member

Table 3. Commitments to International Regimes by Other Middle Eastern Countries

Country	NPT	CWC	BWC	CTBT	IAEA
Afghanistan	Party	Signed	Party	--	Member
Bahrain	Party	Party	Party	Signed	Member
Jordan	Party	Party	Party	Signed & Ratified	Member
Kuwait	Party	Party	Party	Signed	Member
Lebanon	Party	–	Party	–	Member
Oman	Party	Party	Party	Signed	Member
Qatar	Party	Party	Party	Signed & Ratified	Member
Turkey	Party	Party	Party	Signed	Member
U.A.E.	Party	Signed	Signed	Signed	Member
Yemen	Party	Signed	Party	Signed	Member

NPT - Nuclear Nonproliferation Treaty
CWC - Chemical Weapons Convention
BWC - Biological Weapons Convention
CTBT - Comprehensive Test Ban Treaty
NSG - Nuclear Supply Group

MTCR - Missile Technology Control Regime
IAEA - International Atomic Energy Agency
Note: Most countries in the Middle East are not formal members of the Nuclear Suppliers Group, Zangger Committee, Australia Group, Missile Technology Control Regime, or Wassenaar Arrangement. However, Turkey is a member of MTCR and the Wassenaar Arrangement and Israel is considered an adherent to the MTCR.

Sources:
U.S. Department of State<http://www.state.gov>
International Atomic Energy Agency <http://www.iaea.or.at>
"Inventory of International Nonproliferation Organizations and Regimes," Center for Nonproliferation Studies, Monterey Institute of International Studies:
<http://cns.miis.edu/pubs/reports/pdfs/9707inve.pdf>

WMD Capabilities By Country

The following is an assessment of nuclear, chemical, and biological programs reported in Algeria, Egypt, Iran, Iraq, Israel, Libya, Saudi Arabia, Sudan, and Syria. A few regional countries have missiles but apparently no WMD programs (Afghanistan, Turkey, United Arab Emirates, and Yemen) and are discussed briefly in a later section. Other countries in the Middle East apparently have no WMD or missile programs (Bahrain, Jordan, Kuwait, Lebanon, Oman, and Qatar).

Algeria

Nuclear Weapons. Algeria has two nuclear reactors: 1 Megawatt (MW) research reactor at Draria and the 15 MW Es Salam reactor at Ain Oussera. The smaller one has no direct military significance and has been subject to IAEA monitoring since it began operating in 1989. But some aspects of the larger one, which was built secretly with assistance from China, evoked suspicion that Algeria was interested in developing nuclear weapons capability. In particular, a 15 MW heavy water reactor of this type is theoretically cable of producing about 2-3 kg of plutonium per year.[5] In addition, Algeria has hot cell facilities, used to produce radioactive isotopes that could extract plutonium from spent reactor fuel.

In May 1991 Algeria agreed to place The Ain Oussera reactor under IAEA safeguards. The reactor was built secretly until U.S. intelligence agencies discovered its construction in 1991, raising suspicion about Algeria's intentions. Although its entire nuclear program is subject to inspection, separation of plutonium from spent reactor fuel would raise questions about Algeria's nuclear intentions, though there is no evidence of this to date.

Chemical Weapons. There is no confirmed evidence that Algeria is pursuing the development of CW capabilities.

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[5]David Albright, Frans Berkhout and William Walker, *Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies*, SIPRI, (New York: Oxford University Press, 1997), p. 364.

Biological Weapons. There is no evidence that Algeria is pursuing the development of offensive BW capabilities.

Egypt

Nuclear Weapons. Egypt has two research reactors located at Inshas: 2 MW and 22 MW. Both are under IAEA safeguards, and there is no evidence of a nuclear weapons program. For many years Egypt expressed interest in developing civilian nuclear power but did not purchase the large reactors and infrastructure needed to produce nuclear energy. Egypt has not expressed interest in developing nuclear weapons, but remains highly critical of Israel's nuclear stance, and routinely sponsors resolutions at the United Nations condemning Israel's nuclear program. In 1998 President Mubarak said that Egypt would only develop nuclear weapons if it is threatened by Israel.[6]

Chemical Weapons. Egypt produced and used mustard gas in the Yemeni civil war in the 1960's, and maintains stockpiles of mustard and nerve gas. Egypt supplied Syria with CW in the 1970's and Iraq with chemical agents and technologies in the 1980's, while Iraq was at war with Iran. According to Western experts, Egypt has several mustard and nerve gas production facilities,[7] and some experts have reported that two Egyptian pesticide plants, Kafr El Dawar and Kafr El Zayat, may be involved in CW agent production[8] and in efforts to obtain feedstock for the production of nerve gas.[9]

Biological Weapons. According to the Arms Control and Disarmament Agency (ACTA), Egypt had developed BW agents by 1972 and there is no evidence indicating that the BW program has been eliminated. Therefore "it remains likely that the Egyptian capability to conduct BW still exists."[10]

Ballistic Missiles. Egypt has been developing ballistic missiles since the 1950s, with the assistance of German scientists and others, and had partially tested 370km and 600km missiles by 1965.[11] In further tests in the early 1970s and in combat use, these missiles traveled only a few kilometers and were very inaccurate. In 1973, the Soviet Union transferred Scud-B missiles and FROG-7A rockets to Egypt which were used against Israel in the 1973 war. In the early 1980s, Egypt began cooperating with North Korea, transferring Scud-B missiles in exchange for

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[6]"Mubarak: Egypt to Go Nuclear if Threatened," *Xinhua News Agency - Ceis Woodside*, October 5, 1998; "Weapons of Mass Destruction in the Middle East," *Center for Nonproliferation Studies, Monterey Institute for International Studies,* at www.cns.miis.edu/research/wmdme/egypt.htm.

[7]Cordesman, p. 24.

[8]Dany, Shoham, "Chemical and Biological Weapons in Egypt," *The Nonproliferation Review*, Spring-Summer 1998, p. 53.

[9]Cordesman, p. 17.

[10]U.S. Arms Control and Disarmament Agency, *Adherence and Compliance with Arms Control Agreements, 1997 Annual Report , 1997.*

[11]Cordesman, p.18.

North Korean missile production technology.[12] North Korea later provided technology for the production of Scud-C missiles. The "Condor 2" was an Argentine program, that was joined by Egypt and Iraq, for the development of a missile with a range of 800km-1,200 km with a 500 kg warhead. The program was terminated in 1990[13], with pressure from the U.S. and other MTCR parties. Currently, Egypt is believed to have:

- Over 100 Scud-B missiles with a range of 300km and 1000kg payload[14]
- Approximately 90 "Project T" missiles. Project T is a program that is developing the Scud-B missile to bring it nearly to Scud-C capabilities, extending the range to 450 km. Development probably began in 1990.[15]
- Scud-C missiles with a range of 550km and 500kg payload.

The CIA determined that, during the second half of 1998, Egypt continued to obtain ballistic missile components and associated equipment from North Korea, as part of the two countries' long standing cooperation.[16] In addition, three companies in Egypt - Arab British Dynamics, Helwan Machinery and Equipment Company, and the Kader Factory for Developed Industries- were sanctioned in 1999 under the Arms Export Control Act and the Export Administration Act of 1979, for missile technology proliferation activities.[17]

Iran

Nuclear Weapons. Iran has two partially completed, German-supplied, 1,300 MW power reactors at Bushehr which were damaged by Iraqi bombing raids during the Iran-Iraq war. Russia agreed to complete Unit 1 at Bushehr, and is currently working to fit a Russian-designed VVER-1000 light-water power reactor to the existing German infrastructure, despite U.S. efforts to block the project. The U.S. opposes the project because it could be used by Iran to build the infrastructure needed for a weapons program or as a conduit for illicit acquisition of nuclear equipment or materials. The project has experienced serious construction delays due to financial and technical problems. However, work on the Bushehr reactor is proceeding with about 1000 Russian technicians at the site. The reactor is scheduled for completion in 2003. The Russia-Iran agreement also included a side protocol, under which Iran was to receive a 30-50 MW research reactor, 2000 tons of natural uranium, training of 10-20 graduate students per year at Russian academic institutions, and a gas-centrifuge

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[12]Bermudez, Joseph S. Jr. "Egypt's Missile Development," in *The International Missile Bazaar*, William C. Potter and Harlan W. Jencks (eds.), Boulder, Westview Press, 1994, pp. 27-30.

[13]"Military - Egypt," *Jane's Sentinel* Security Assessment - *North Africa - Update 4,* 1999.

[14]Weapons of Mass Destruction in the Middle East - Egypt, *Center for Nonproliferation Studies, Monterey Institute for International Studies,* at www.cns.miis.edu/research/wmdme/egypt.htm

[15]Ibid; "Military, Egypt", *Jane's Sentinel Security Assessment - North Africa - Update 4,* 1999.

[16]Director of Central Intelligence, *Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions*, July 1999, p.8.

[17]*Federal Register* Vol. 64, No. 73, April 16, 1999, p. 18957.

enrichment plant. The enrichment plant was canceled in response to U.S. pressure. However, Russia refused to abandon other aspects of the protocol.[18]

Iran possesses five research reactors: a small U.S.-supplied 5MW reactor located at Teheran, a small Chinese-supplied neutron-source reactor, a small Chinese-supplied zero-power reactor, and two Chinese-supplied sub-critical reactors, all located at Esfahan.[19] China also supplied the Karaj nuclear research facility with an electromagnetic isotope separator (Calutron) that can be used to enrich small quantities of uranium. In 1997, after pressure from the United States, China agreed to provide no new nuclear assistance to Iran, although two small ongoing projects would be completed.[20]

Iran has uranium deposits in Yazd province and an inoperable uranium-ore concentration plant near Teheran. Most experts believe that its enrichment program concentrates on developing gas centrifuges. In 1996, then CIA Director John M. Deutch said: "Iran is attempting to develop the capability to produce both plutonium and highly enriched uranium. In an attempt to shorten the time line to a weapon, Iran has launched a parallel effort to purchase fissile material mainly from sources in the former Soviet Union."[21]

Iran denies having any intention to develop nuclear weapons and has allowed the IAEA to conduct special visits to Iran since 1992. The visits found no evidence of activities that are inconsistent with peaceful uses. However, Iran has not yet allowed the IAEA to deploy new inspection methods, developed after the discovery of covert programs in Iraq and North Korea. One U.S. academic said Iran "may well be the next nuclear power in the Middle East."[22]

Chemical Weapons. Iran began production of CW early in the mid 1980s in response to several instances of Iraqi use of CW during the Iran-Iraq war. Iran also made limited use of CW in the war against Iraq.

Since the early 1990s, Iran has put forward a concerted effort to develop its chemical warfare capabilities, due in part to the lessons of the war in Iraq, and information on Iraqi attempts to develop the nerve agent VX. Iran is known to have

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[18]Russian Nuclear and Missile Exports to Iran, *CNS Issue Brief on WMD in the Middle East*, Center for Nonproliferation Studies, Monterey Institute of International Studies; Russian--Iranian Nuclear Cooperation, Center for Nonproliferation Studies, Monterey Institute of International Studies; Albright, Berkhout, and Walker, *Plutonium and Highly Enriched Uranium 1996*, p. 354.

[19]Nuclear Engineering International, *World Nuclear Industry Handbook*, 1999, p. 259; Andrew Koch and Jeanette Wolf, "Iran's Nuclear Facilities: a Profile," Center for Nonproliferation Studies, Monterey Institute for International Studies, 1998.

[20]Shahram Chubin, "Eliminating Weapons of Mass Destruction: The Persian Gulf Case," The Henry L. Stimson Center, March 1997, p. 6; *Iran: Arms and Technology Acquisitions*," by Kenneth Katzman, CRS Report 97-474 F, March 15, 1999, p. 5; Albright, Berkhout, and Walker, *Plutonium and Highly Enriched Uranium 1996*, p. 360.

[21]Testimony of John M. Deutch, Director of Central Intelligence, before the Permanent Subcommittee on Investigations of the Senate Committee on Government Affairs, March 20, 1996.

[22]Eisenstadt, Michael. "Living with a Nuclear Iran?" *Survival*, London, Autumn 1999.

produced and stockpiled blister, blood, and choking agents, as well as artillery shells and bombs to deliver them, specifically:[23]

- Iran began stockpiling cyanide, phosgene, and mustard gas weapons after 1985. According to CIA testimony, production capacity may have reached 1,000 tons per year.

- By 1994 production of nerve gas weapons had commenced.

- Iranian means of delivery include 155 mm artillery shells, mortar rounds, bombs, and possibly chemical warheads for its Scuds.

Iran aims at developing indigenous CW capabilities and is continuously attempting to upgrade its CW infrastructure and munitions arsenal.[24] To this end Iran seeks foreign assistance, upon which it is reliant for much of its CW and related technologies:

- 500 tons of phosphorous pentasulphide, which is a primary precursor of the nerve agent VX and controlled by the Australia Group, were reportedly delivered to Iran by the Chinese corporation SinoChem in 1996.[25] In May 1997, the U.S. imposed sanctions on seven Chinese firms for selling precursors for nerve gas and equipment for the production of nerve gas.[26]

- German intelligence recently reported on Iranian efforts to acquire production equipment for tabun and sarin, using three different Indian companies as fronts.[27]

- A July 1999 DCI report to Congress stated that during the second half of 1998, Iran obtained foreign material and equipment that could be used to create a self-sufficient CW infrastructure.[28]

The Department of Defense determined that China is a key supplier of CW technologies and equipment to Iran, and therefore Chinese export policy will have a significant effect on Iranian ability to obtain indigenous CW capabilities.[29]

Biological Weapons. Iran's biological warfare program began during the 1980s, but it is probable that development was accelerated following the 1995

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[23]"Weapons of Mass Destruction in the Middle East," *Center for Nonproliferation Studies, The Monterey Institute of International Studies*, www.cns.miis.edu/research/wmdme/iran.html

[24]U.S. Department of Defense, *Proliferation: Threat and Response*, Nov. 1997, p. 27.

[25]Shirley A. Kan, *Chinese Proliferation of Weapons of Mass Destruction: Current policy Issues*, Congressional Research Service Issue Brief, IB92056.

[26]*The Arms Control Reporter*, 707.E-2.175, 10-98.

[27]Ibid.

[28]Director of Central Intelligence, *Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions*, July 1999.

[29]U.S. Department of Defense, *Proliferation: Threat and Response*, Washington, DC, 1997, p. 27.

revelations about the scope of the Iraqi BW effort.[30] According to the former United States Arms Control and Disarmament Agency (ACDA), the Iranian BW program is concealed within Iran's biotechnology and pharmaceutical industries to obscure its activities. To this end, the Iranian military has used medical, educational, and research organizations to research, produce, and procure BW agents. Thus, ACDA maintains that "The United States reiterates its previous findings that Iran probably has produced BW agents and apparently has weaponized a small quantity of agents."[31]

There are unconfirmed reports that Iran is conducting BW research in a plant in Damghan.[32] Other reports claim that Iran keeps stocks of anthrax and botulism in Tabriz. Some experts believe Iran is developing the capability to deliver BW by Scud missiles, aircraft, or aerosol.[33]

Iran continues to seek dual-use biotechnical equipment from Russia and other countries, supposedly for civilian purposes. There have been unconfirmed reports that Iran previously purchased growth cultures for the production of mycotoxins, and had obtained some bio-weapon technology from Swiss and German companies.[34] According to the Director of Central Intelligence, foreign assistance is important for Iran's BW capabilities and is difficult to prevent due to the legitimate uses of much of the equipment and materials.[35]

Ballistic Missiles. During the Iran-Iraq War of 1980 to 1988, Iran acquired Soviet-made Scud-B missiles from Libya and North Korea and began reverse-engineering Scuds. After the war, Iran bought additional missiles and production technology for the Scud-B and C from North Korea and reportedly helped fund the development of the Nodong missile and possibly longer range missiles. Iran also received a variety of materials and technology from several Russian companies and institutes.[36] China has also been a primary source of technical assistance for developing and testing missiles, perhaps providing M-9 and M-11 technology.[37] In

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[30]Ibid.

[31]U.S. Arms Control and Disarmament Agency, *Adherence and Compliance with Arms Control Agreements, 1997 Annual Report, 1997*.

[32]" Special Report-Chemical and Biological Warfare Programs" *Jane's Intelligence Review-Special Report*, June 1, 1995. Also, Center for Nonproliferation Studies, *Weapons destruction in the Middle East-Iran*, Monterey Institute for International Studies, www.cns.miis.edu/research/wmdme/iran.html

[33]"Biological Warfare: the Poor Man's Atomic Bomb-Iran" *Jane's Intelligence Review*, March 1, 1999; Cordesman, p. 37.

[34]"Special Report-Chemical and Biological Warfare Programs," *Jane's Intelligence Review-Special Report*, June 1, 1995.

[35]Director of Central Intelligence, *Report to Congress on the Acquisition of Technology relating to Weapons of Mass Destruction and Advanced Conventional Munitions*, 7/98-12/98, July 1999.

[36]For further discussion of the Iranian program and Russian assistance see, CRS Report 98-299F, *Russian Missile Technology and Nuclear Reactor Transfers to Iran.*

[37]Dir. of Central Intelligence, *Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions July - Dec. 1996*, July 1997,

(continued...)

1998, Iran had over 300 Scud-B missiles and about 60 Scud-C missiles according to an Israeli official.[38] Iran produces a number of liquid-fuel missiles, including the Scud-B and Scud-C (also called the Iran 7000).

Using technology acquired from North Korea, Russia, and China, Iran produced and flight tested the Shahab 3 on July 22, 1998. In the test it traveled about 100 seconds before malfunctioning. This liquid-fuel, single stage, 1300-1500 km (800 -940 mile), mobile missile with a 1000 kg warhead is said to be nearly identical to the Nodong. The missile is now reported to be operational and in limited production. It could reach Iraq, Israel, most of Saudi Arabia, and part of Turkey. Iran is also developing the Shahab 4, a ballistic missile with a range estimated to be from 2000 km (1240 miles) to 4000 km (2489 miles). This missile is reportedly based on the Soviet SS-4, liquid-fuel MRBM, that was ordered destroyed under the INF Treaty.[39] Russian engineers and institutes have passed missile technology to Iran, and some of it was said to have been SS-4 technology, including the RD-214 engine design.

The country is also reportedly working on two intercontinental range ballistic missiles (with ranges of 5,500 km and 10,000 km) that Israeli Prime Minister, recently referred to as Shahab 5 and Shahab 6. He stated the Shahab 5 could reach much of Europe and the longer range missile would be able to reach Northeastern United States. He also said Iran is building hardened missile silos to protect against U.S. or Israeli pre-emptive attacks.[40] The 1998 report of The Commission to Assess the Ballistic Missile Threat to the United States estimated Iran has the ability to "demonstrate an ICBM-range ballistic missile ... within five years of a decision to proceed...."[41] In the meantime, Iran is said to have tested a ship-launched ballistic missile that could greatly extend the country's ability to strike distant targets.[42]

The Zelzal missile series uses solid-fuel rockets based on technology reportedly obtained from China, Russia, and Germany. Iran produces the Zelzal-1 (range 100-150 km) and the Zelzal-2 (range 350-400 km) and is developing the Zelzal-3 (range 1,000-1,500 km).[43] The Mushak series consists of shorter-range missiles that also use solid-fuel motors. Iran has been the recipient of missile

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[37](...continued)
p 4; Dana Lennox, "Offensive Weapons Table" *Jane's Strategic Weapons System,* #30.

[38]Landau, Uzi. Chairman of the Foreign Affairs and Defense Committee, the Knesset. Testimony before the U.S. Congress Interparliamentary Commission on National Security, Sept. 14, 1998.

[39]*Jane's Defence Weekly*, February 17, 1999, p. 5.

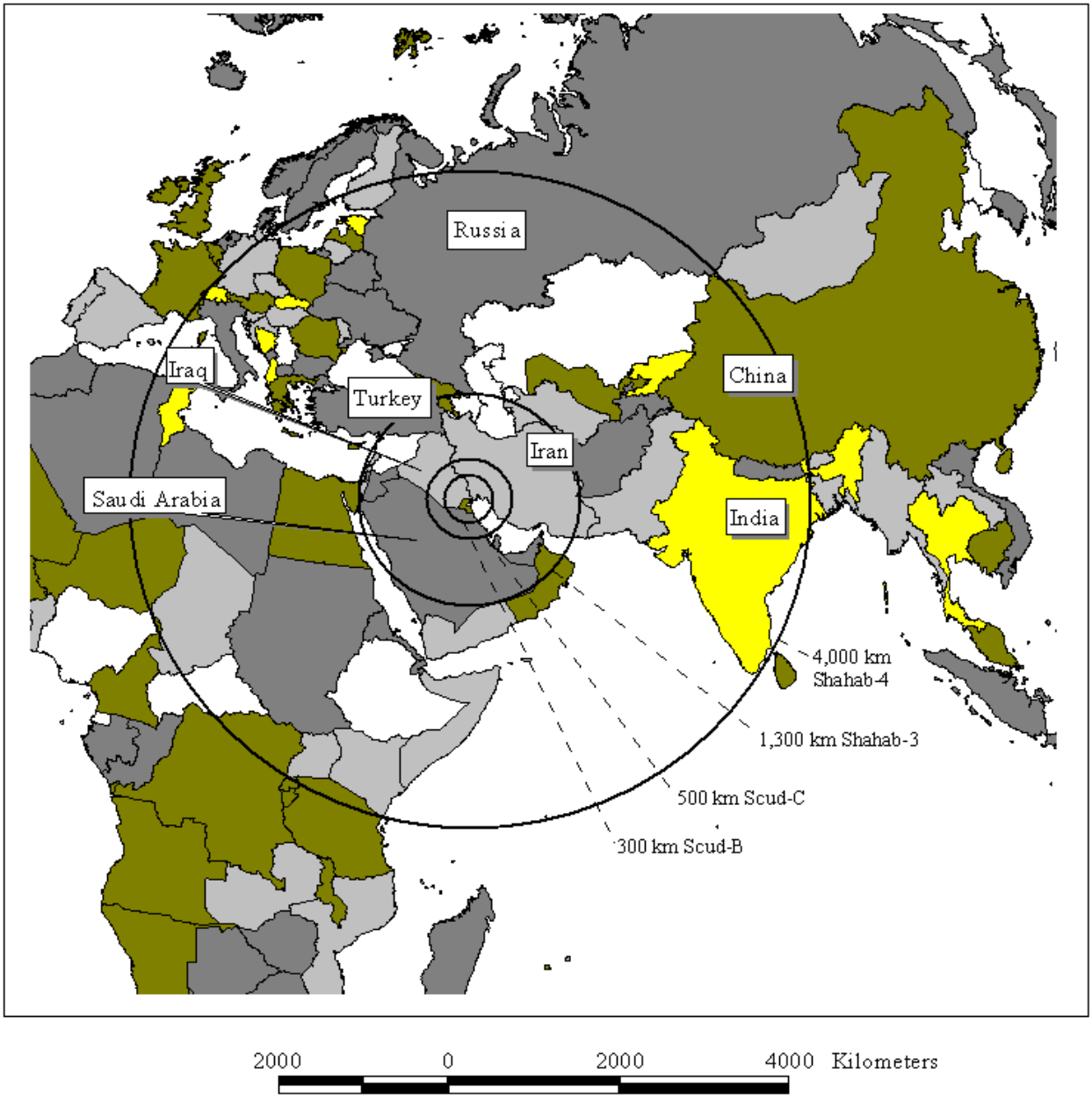
[40]*Washington Times*, October 1, 1998, p. 13.

[41]Executive Summary, *Report of the Commission to Assess the Ballistic Missile Threat to the United States,* Pursuant to Public Law 104-201, July 15, 1998, pp. 13-14.

[42]*Defense News*, March 15, 1999, p. 27.

[43]"Iran Brief," Sept. 9, 1996, pp. 1-2, abstract in *Center for Nonproliferation Studies Database, Monterey Institute.*

Ranges of Iran's Missiles



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technology from several sources but is increasingly gaining the ability to serve as a supplier of missiles and missile technology. There was some speculation that North Korea might have received Iranian assistance with the solid-fuel third stage used in its attempted satellite launch on August 31, 1998.

Iraq

Nuclear Weapons. Prior to the Gulf War, Iraq had an extensive nuclear program, with 10,000 personnel, numerous facilities, and an approximate cost of $10 billion. It had three reactors located at the Al Tuwaitha Nuclear Research Center: the French-supplied Osiraq/Tammuz I 40 MW light-water reactor, destroyed by an Israeli air attack in June 1981; the French-supplied Isis/Tammuz II 800 kW reactor; and the Soviet-supplied IRT-5000 5 MW light-water reactor, both destroyed by coalition attacks in 1991. Iraq also had an extensive uranium enrichment program, which included multiple enrichment techniques, and a laboratory-scale project to produce plutonium. Iraq possessed a nuclear weapons design facility that was also destroyed by U.S. forces. Much of Iraq's nuclear infrastructure, including the enrichment facilities, violated its NPT and IAEA obligations.

Following the Gulf War, U.N. Resolution 687 established the U.N. Special Commission (UNSCOM). Under this mandate, U.N. inspectors uncovered about 40 nuclear research facilities, including three clandestine uranium enrichment programs, and the laboratory-scale plutonium separation program. Additionally, UNSCOM removed Highly Enriched Uranium (HEU) fuel that Iraq reportedly planned to divert for use in weapons.[44] UNSCOM and IAEA inspectors withdrew from Iraq in December 1998 after Iraq refused to cooperate any further with the inspectors. In February 1999 the IAEA said questions remained about Iraq's nuclear disarmament, including questions about extensive technical documentation, and about external assistance to Iraq's nuclear program.[45] Iraq retains considerable nuclear know-how, including a large number of experienced nuclear experts (about 7,000 scientists and engineers), may have conducted some recent research on nuclear weapons, and probably remains interested in acquiring nuclear weapons.

Chemical Weapons. Prior to the Gulf war, Iraq possessed several types of chemical weapons, including blister (mustard) and nerve agents (tabun and sarin), and various means of delivery including rockets, mortars, artillery, aerial bombs, spray tanks, and Scud-type missiles. Iraq has used chemical weapons, including blister and nerve agents, on several occasions during the Iran-Iraq war in attacks on Iranians, causing up to 10,000 casualties at a time.[46]

Coalition air attacks during the Gulf War and UNSCOM activities in Iraq after it, led to the destruction of many chemical weapons, agents, production equipment,

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[44]Kenneth Katzman, *Iraqi Compliance with Cease-Fire Agreements*, CRS Issue Brief 92117, July 6, 1999, p. 4.

[45]"Iraq's Compliance with the U.N. Security Council," *Communication from the President of the United States*, March 4, 1999, pp. 6-7.

[46] United States Information Agency, "Iraq's Weapons of Mass Destruction Programs" *U.S. Government White Paper*, February 13, 199.

and delivery systems.[47] However, because Iraq has systematically attempted to deceive UNSCOM as to the scope of its prior programs, the current state of its chemical warfare program is uncertain. As a result of the defection of Sadam's son-in-law and WMD czar Hussein Kamel in August of 1995, facts about covert Iraqi warfare capabilities were revealed, including[48]:

- Iraq had a program for the development of VX nerve agent beginning in 1985, and was able to produce a quantity of precursors that would suffice for the production of 400 tons of VX annually.

- Iraq had weaponized VX.

- Iraq tested an Al-Hussein variant of the Scud missile with a chemical warhead and a range of 600-650 km.

Despite Iraqi claims to the contrary, UNSCOM contends that large quantities of agents and delivery systems remain unaccounted for, including:[49]

- 200 tons of VX nerve gas, 200 tons of G agent (sarin), and 200 tons of mustard gas.

- 15,000 artillery shells, 2,000 aerial bombs, and an unknown number of aerial spray tanks.

- 15,000-25,000 rockets.

Iraq retains its ability to reconstitute its CW program quietly, and it might retain some CW capabilities. In a July 1999 report to Congress, the Director of Central Intelligence stated: " Iraq would exploit any opportunity to reconstitute its pre-Gulf war capabilities as rapidly as possible once sanctions are lifted. Iraq retains the expertise to resume chemical agent production within a few weeks or months, depending on the type of agent and the decision to do so."[50]

Biological Weapons. Prior to the Gulf war Iraq had the largest biological weapon program in the Middle East, despite it being a party to the Biological and Toxins Weapons Convention. By the time postwar U.N. inspection began, Iraq had developed a variety of biological agents such as bacteria, viruses and fungal toxins, and had weaponized anthrax, botulinum and aflatoxin.[51] For years, Iraq had denied offensive BW capabilities and admitted only to conducting defensive research, but the

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[47]For a discussion on UNSCOM's activity, see *Iraqi Chemical and Biological Weapons (CBW) Capabilities*, by Steve Bowman, CRS Report 98-129 F, September 1998.

[48]*Proliferation: Threat and Response*, Washington, D.C., 1997, p. 31.

[49]"Iraq's Weapons of Mass Destruction Programs" *U.S. Government White Paper*, February 13, 1998, United States Information Agency.

[50]Director of Central Intelligence, *Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions*, July 1999.

[51]*Proliferation: Threat and Response*, Washington, D.C., 1997, p. 32.

defection of Sadam's son-in-law and WMD czar Hussein Kamil in 1995 revealed the scope of the Iraqi biological warfare program. Iraq then admitted the production of BW agents and munitions for offensive purposes, but UNSCOM believes that it greatly understated its production levels and may have concealed BW agents.[52]

Agent production and delivery systems attributed to Iraq:[53]

- Anthrax. Iraq declared a production total of 85,000 liters. UNSCOM estimates that the actual quantity produced was likely three to four times higher, but can not confirm this.

- Botulinum toxin. Iraq declared a production total of 380,000 liters. UNSCOM estimates that the actual quantity produced was double that amount, but can not confirm this.

- Gas-Gangrene. Iraq declared a production total of 3,400 liters. The actual quantity might be higher, but UNSCOM can not confirm.

- Aflatoxin. Iraq declared a total of 2,200 liters. In UNSCOM's view, the time frame claimed by Iraq does not correlate with the quantity declared to have been produced.

- Ricin. Iraq declared a production total of 10 liters. The actual quantity may be higher, but UNSCOM is not able to confirm actual production levels.

- Iraq claims to have destroyed 25 Al-Hussein missile warheads with anthrax (5), botulinum (16), and aflatoxin (4). UNSCOM can not confirm the unilateral destruction due to conflicting accounts by Iraq.

- Iraq claims to have destroyed 157 R-400 aerial bombs filled with anthrax (50), botulinum toxin (100), and aflatoxin (7). UNSCOM can not confirm this number, but has found the remains of at least 23 of the bombs.

- Iraq claims to have produced 4 aircraft aerosol spray tanks, but it is possible that more than 4 were manufactured.

- Iraq reportedly imported 31,000 kg of BW agent growth media, of which 3,500 kg remain unaccounted for.

Coalition air strikes damaged many Iraqi BW facilities, but Iraq had relocated most of its agent production equipment to the Al Hakam and other facilities, that were unknown at the time of the Gulf War. The equipment in the Al Hakam facility was destroyed by UNSCOM in June of 1996 along with some equipment in another

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[52]*Iraq Weapons of Mass Destruction Programs,* Appendix A, pp. 9-13.

[53]Ibid. Media refers to substances used to provide nutrients for the growth and multiplication of micro-organisms.

facility (Daura), but Iraq had also buried biological agent stockpiles and BW-filled munitions in areas likely to escape bombing.[54]

According to a National Security Council paper, Iraq has vast experience in biological warfare that would allow it to resume a small-scale BW program rapidly at facilities that currently produce legitimate pharmaceuticals. Iraq "could quickly and covertly switch production of legitimate biological products to anthrax by changing seed material".[55] According to the Director of Central Intelligence, Iraq's lack of cooperation indicates its intent to reconstitute its BW capabilities when the opportunity arises.[56] However, there is no evidence to date that Iraq has reconstituted its BW program.

Ballistic Missiles. The Soviet Union sold over 818 Scud-B missiles to Iraq beginning in the early 1970's and continuing through the Iran-Iraq War. With the help of a team of international engineers, Iraq improved many of these Scud missiles, increasing the fuel and oxidizer tanks and reducing the size of the warhead to produce Al-Hussein missiles with double the range (600 km rather than the 300 km of the Scud). The Al-Abbas was the second upgrade of the Scud and had a range of about 900 km. It had more fuel and an even smaller warhead than the Al-Hussein and was apparently unreliable and unstable in flight. Simultaneously, Iraq acquired the technology, materials, and many of the components to design and produce its own missiles. It worked on liquid fuel and solid fuel rockets, clustered rockets and multi-stage rockets.

In 1998, the Department of Defense estimated that Iraq still had several dozen Al-Hussein missiles and a few Al-Abbas missiles, while UNSCOM estimated that Iraq may still have had warheads filled with CW or BW material.[57] By the time it left Iraq in December 1998, UNSCOM had accounted for about 70 of 75 CW/BW-capable missile warheads, some of which were unilaterally destroyed by Iraq.

Under the UN Security Council Resolution that ended the Gulf War, Iraq can develop and produce missiles with a range of 150 km or less. It has developed and tested the Al-Samoud (150 km range) which uses a liquid fuel rocket based on the Soviet SA-2 surface-to-air missile and it is developing the Ababil (130-140 km) which will have a solid fuel rocket. If export sanctions were lifted, it is estimated Iraq could begin producing Scud missiles within a year based on retained technology and production capacity for Al-Samoud and Ababil, and its probable ability to obtain missile components (gyroscopes, accelerometers, etc.), machine tools, fuel production facilities, and materials.

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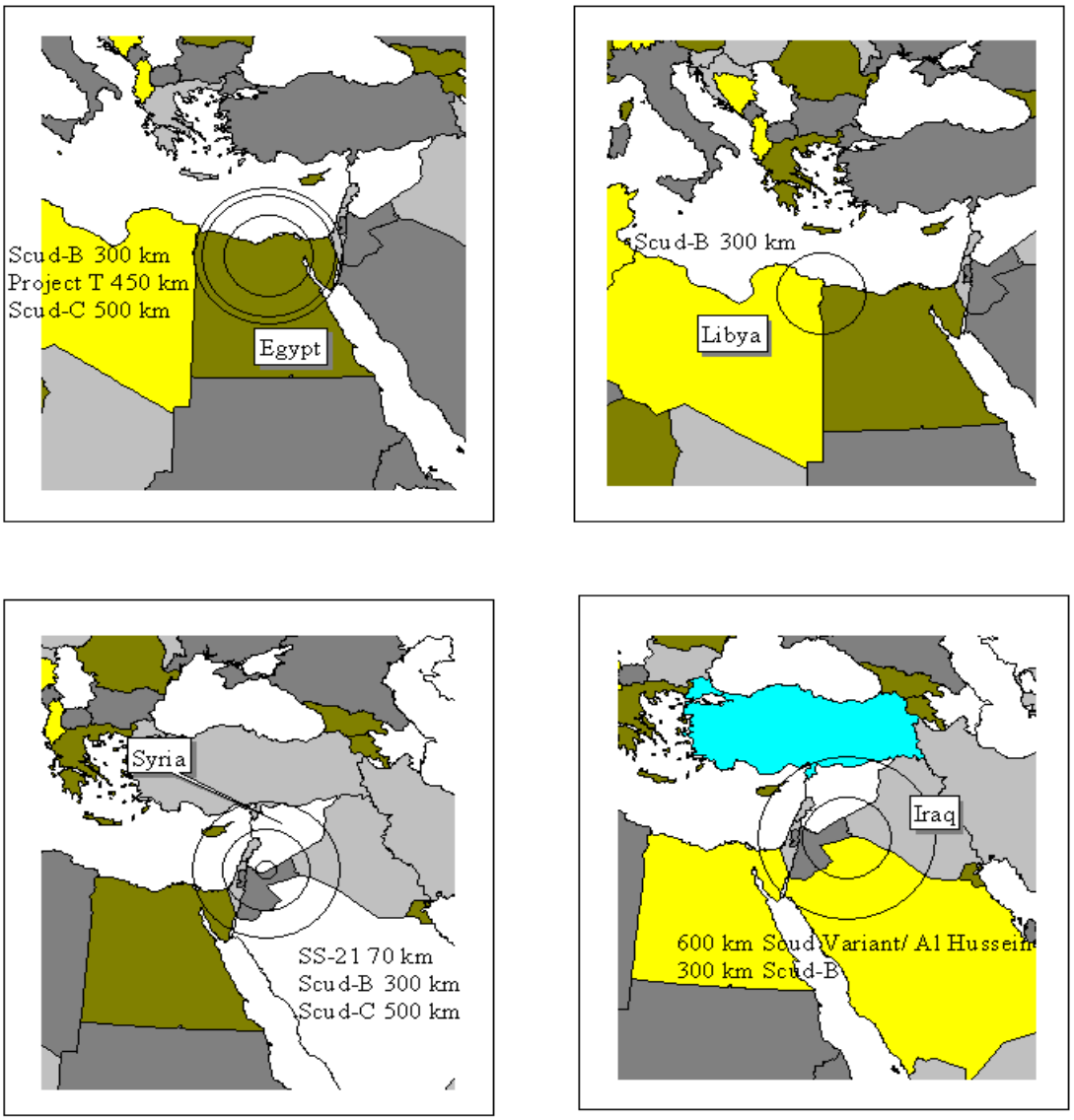
[54]*Proliferation: Threat and Response*, 1997, p. 32.

[55]U.S. National Security Council, *Fact Sheet: Iraq's Program of Mass Destruction*, November 14, 1997. Www.usia.gov/reagional/nea/gulgsec/nsc1119.htm

[56]*Report to Congress on the Acquisition of Technology relating to Weapons of Mass Destruction and Advanced Conventional Munitions for the period 7/98 - 12/98*, July 1999.

[57]*Washington Times*, February 11, 1998, p. 1.

Ranges of Missiles in Egypt, Libya, Syria, and Iraq



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Map Scale: 1:40,000,000

Israel

Nuclear Weapons. Israel maintains a policy of "nuclear ambiguity" and has never officially acknowledged that it has nuclear weapons. Israel has consistently stated that it will not be the first country to introduce nuclear weapons into the Middle East. Nevertheless, it is widely considered to be a *de facto* nuclear-weapon state due to a large body of evidence indicating a sophisticated nuclear weapon program. The evidence includes descriptions of Israel's weapons from a former worker in Israel's main nuclear weapons facility.[58] It is not known to have tested nuclear weapons, but is thought to maintain between 100 and 200 nuclear weapons as a deterrent against regional threats to its national survival.[59].

Israel has two reactors. The first is the French supplied 40-150 MW heavy water, natural uranium-fueled, research reactor at Dimona. It is thought to be used to produce plutonium for weapons. The Dimona facility is also thought to house a plutonium extraction plant and other weapons-related infrastructure.[60] The second reactor is a 5 MW HEU research reactor at Soreq, which is covered by a partial IAEA safeguards agreement.

Chemical Weapons. Although Israel denies it has chemical weapons and it signed the Chemical Weapons Convention in 1993, several non-government sources report Israel produces mustard and nerve gas, probably maintains stockpiles, and probably has chemical weapon delivery systems. Supporting this allegation, are reports that an Israeli aircraft crashed near Amsterdam on October 4, 1992 carrying 190 liters of the chemical DMMP which is used in the manufacture of sarin nerve agent. Chemical agents are said to be produced at the Institute for Biological Research in Nez Ziona.[61]

Biological Weapons. There are numerous reports in newspapers and academic and defense journals that Israel has an offensive biological weapons program although there is little to indicate it produces or stockpiles biological weapons.[62] It is not a signatory of the Biological Weapons Convention and has

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[58]Peter Hounam, "The Secrets of Israel's Nuclear Arsenal," *London Sunday Times*, October 5, 1986.

[59] Avner Cohen, *Israel and the Bomb*, (New York: Columbia University Press, 1999); Seymour Hersh, *The Sampson Option* (New York: Random Books, 1991); Harold Hough, "Israel's Nuclear Infrastructure," *Jane's Intelligence Review*, November, 1994.

[60] Rodney Jones, et al. *Tracking Nuclear Proliferation* (Washington DC: Carnegie Endowment for International Peace, 1998), p. 213.

[61]*Jane's Sentinel Security Assessment*, Eastern Mediterranean, Armed Forces, Israel, section 3.10.10; Rosenblum, Mort. "'Poor Man's Bomb' is a Biological Nightmare in Waiting," *The San Diego-Union Tribune, Dec. 26, 1998, p. A36; Al-Hawadith*, May 7-13, 1999, pp. 16-20, in FBIS, FTS 19990529000083.

[62]Leitenberg, Milton. "Biological Weapons, International Sanctions and Proliferation," *Asian Perspective*, vol. 21, no. 3, Winter 1997, p. 11; U.S. Congress. Office of Technology Assessment. "Proliferation of Weapons of Mass Destruction: Assessing the Risks," August

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reportedly done extensive research that has led to the capability to produce weapons such as, according to one unsubstantiated report, "anthrax, botulinum toxin or other pathogens."[63] A Wall Street Journal article included Israel as one of several countries that have a verifiable biological weapon capability.[64]

Ballistic Missiles. Israel has a mature missile development and production program dating back to the early 1960s. France helped Israel develop the Jericho 1 missile, which has two solid propellant stages, carries a 1,000 kg (2,200 lb.) warhead and has a range of 500 km (300 miles). It is reported that 50 Jericho 1 missiles are deployed on mobile launchers in Hirbat Zachariah, southwest of Jerusalem. From the mid-1970s to the late-1980s, Israel developed and tested the two-stage Jericho 2 with a payload of 1,000 kg and a range of more than 1,500 km (900+ miles). One hundred of these are reportedly deployed underground in the same area on wheeled transporter-erector-launchers or railroad flat cars. For several years, Israel has reportedly been developing the Jericho 3 that may have a range of 4,800 km (almost 3,000 miles) that would enable it to reach all of the Middle East and areas beyond. It was scheduled for deployment in 1999 or 2000. Israel also has two space launch vehicles that are reportedly associated with its ballistic missiles. The Shavit booster is said to be based on the Jericho 2 with a liquid fuel third stage. Israel markets the Next space launch vehicle that has a liquid upper stage atop three solid propellant stages and may be based on the Jericho 3. Jericho 1 missiles reportedly can carry a conventional high explosive (HE) , or chemical, or 20 kiloton nuclear warhead. The Jericho 2 reportedly is capable of carrying an HE or a one megaton nuclear warhead.[65]

Libya

Nuclear Weapons. Libya has long been interested in acquiring or developing nuclear weapons. It has actively sought assistance in developing an indigenous nuclear infrastructure, including attempts to persuade India to share sensitive nuclear technology in the 1970s as part of their nuclear-cooperation agreement.[66] Libya has a Soviet-supplied 10 MW nuclear research reactor located at Tajura, that is subject to IAEA safeguards, but its nuclear program is still in its embryonic stage due to economic problems, mismanagement and reluctance of foreign suppliers to provide

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[62](...continued)
1993, p. 65.

[63]Rosenblum, Mort. "'Poor Man's Bomb' is a Biological Nightmare in Waiting," *The San Diego-Union Tribune, Dec. 26, 1998, p. A36.*

[64]King, Neil Jr. "Iraq is One Of Many With A Doomsday Arsenal," *Wall Street Journal,* Feb. 18, 1998, p. 14.

[65]*Jane's Strategic Weapon Systems,* Offensive Weapons, Israel, Sept. 1999; Blanche, Ed. "Israel Addresses the threats of the New Millennium--Part One", *Jane's Intelligence Review,* February 1999, p. 25; *Jane's Sentinel Security Assessment,* Armed Forces, Israel, section 3.10.7, online; "Jane's: Photos show Israel's nuclear missile base vulnerable to attack," AP, July 30, 1997, 12:41 PET; "Israel's Shavit booster suffers a second failure," *Flight International,* February 4-10, 1998, p. 22; Peterson, Scott. "New Shield for More-Vulnerable Israel: US," *Christian Science Monitor,* Nov. 5, 1998, p. 1.

[66]Leonard S. Spector, *Going Nuclear,* (Cambridge: Ballinger Publishing Company, 1987), p. 147.

assistance.[67] Recent discussions between Libya and Russia indicate possible renewed Russian support for Libya's nuclear effort at Tajura, although significant new construction has not been reported.[68]

Chemical Weapons. Following tests in 1988, it is estimated Libya produced 100 tons or more of blister and nerve agents in its facility in Rabta. The Rabta facility was reportedly capable of an annual production of 100 tons of chemical agents, as well as bombs and warheads to contain them, but the production rate has reportedly been very low.[69] Libya also began constructing another CW facility in Tarhunah, southeast of Tripoli.[70] This underground facility is reported to have two or three 200-450 feet long tunnels, with 100 feet of sandstone and reinforced concrete above to protect it from bombing.[71] Work on the plant appeared to have slowed following U.S. pressure on foreign governments to stop supplying equipment and materials for the plant, an Egyptian visit to the plant, and implied U.S. threats of striking the plant.[72] However, Libya is reportedly continuing its pursuit of indigenous CW production capabilities, and there are reports that it is being assisted by Chinese, North Korean, German, and Swiss technical support and advisors.

Biological Weapons. Libya has been seeking BW capabilities for many years now, with little apparent success. The Libyan program remains in early research and development stages, despite reports of attempts to recruit BW scientists from the former Soviet Union, South Africa, Iran, and Iraq.[73] The Department of Defense determined that while Libya may be able to produce laboratory quantities of agents, given the limitations of its biotechnical infrastructure, it is "unlikely that Libya will be able to transition to production of militarily useful quantities of biological warfare agent until well after the turn of the century."[74]

Ballistic Missiles. Libya has long been trying to improve its missile capabilities. Currently, Libya has an aging Scud B (SRBM) force of about 240 missiles and 80 launchers. In 1987 Libya fired Scud missiles at a military base on the Italian island of Lampedusa in response to the U.S. air attack against terrorist and military infrastructure. In addition, Libya has been developing the Al-Fatah, a longer range ballistic missile (950km), using Scud-B technology, and has reportedly engaged Iran to purchase technological know-how and material.[75] Libya has also been seeking to acquire longer range missiles such as the North Korean Nodong, but according to

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[67]*Proliferation: Threat and Response*, 1997, pp. 34-35.

[68]Ibid.

[69]Cordesman, p.14.

[70]*Proliferation: Threat and Response* p. 36

[71]Robert, Waller, "Libyan CW Raises the Issue of Preemption," Jane's Intelligence Review, November 1, 1996.

[72]Clyde Mark, *Libya: Suspected Chemical* Weapons *Facility at Tarhunah,* CRS Report 96-849, p. 4.

[73]"Libya" *Jane's US Chemical-Biological Defense Guidebook*, November 7, 1997

[74]*Proliferation: Threat and Response*, 1997, p. 37.

[75]"Military, Libya", *Jane's Sentinel Security Assessment - North Africa - Update 2,* 1998.

the Department of Defense this effort has been unsuccessful, mainly due to U.N. sanctions.[76] In 1999, the CIA reported that "Libya continued to obtain ballistic missile-related equipment, materials, and technology during the second half of 1998."[77] In January 2000, British officials intercepted a shipment of missile components on its way from a Chinese company called Hontex on its way to Libya.[78]

Saudi Arabia

Nuclear Weapons. Saudi Arabia does not possess significant nuclear infrastructure, however, it reportedly may have been involved in funding nuclear programs in Iraq (prior to the Gulf war), and Pakistan.[79] Other Gulf states such as U.A.E. and Dubai may have served as transfer points for smuggling nuclear technology.[80]

Chemical Weapons. There is no clear evidence but there have been some unconfirmed reports that Saudi Arabia has developed chemical warheads for its CSS-2 missiles.[81] Some experts believe Saudi Arabia has motivation to seek chemical warheads, since its missiles have such low lethality with conventional high-explosive warheads, that they can not serve as a deterrent.[82] Saudi Arabia possesses anti-riot irritants and other non-persistent chemical agents.

Biological Weapons. There is no evidence that Saudi Arabia is seeking the development of BW capabilities.

Ballistic Missiles. In 1988, the United States learned that Saudi Arabia had purchased about 60 CSS-2 (DF-3) medium range ballistic missiles from China. The nuclear warheads of the Chinese missiles were replaced with a large conventional warhead, reducing the range from about 3,500 km to about 2,800 km (1,736 miles). The missiles are difficult to fuel and maintain and may not be operational. In the late

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[76] *Proliferation Threat and Response*, 1997. p. 37.

[77] *Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions*, July 1999, p.5.

[78] "Britain Catches Libya Trying to Skirt Arms Ban," *Washington Post*, Jan.10, 2000, p. 14.

[79] Lewis, Paul. "Defector Says Saudis Sought Nuclear Arms," *New York Times*, August 7, 1994; Shahram Chubin, "Eliminating Weapons of Mass Destruction: The Persian Gulf Case," *The Henry L. Stimson Center*, March 1997, p. 20; Jane Perlez, "Saudi's Visit To Arms Site In Pakistan Worries U.S.," *New York Times*, July 10, 1999; Paul Taylor, "West Concerned at Saudi-Pakistan Nuclear Link," *Reuters*, August 3, 1999.

[80] "Nuclear Plot Is Foiled," *London Sunday Express*, July 25, 1999; "British Customs Seize Nuclear Material Bound for Pakistan," *The Indian Express Update*, g2i-digest, Vol. 1, No. 2494, July 25, 1999; "Dubai: The Commercial Gateway to Iran," *The Risk Report*, Vol. 2, No. 2, March 1996.

[81] "NBC Capabilities, Saudi Arabia, " *Jane's NBC Defense Systems 1998-1999.* Also, *Defense and Foreign Affairs Weekly*, April 1991, reports Chinese assistance to Saudi in developing chemical warheads. Also, in the *Arms Control Reporter* "may possess" as of 3.13.91, 704.E-0.10, 5-92.

[82] Dany Shoham, "Does Saudi Arabia Have or Seek Chemical or Biological Weapons?" The Nonproliferation Review, Spring-Summer 1999, p. 124.

1990s the Saudis were shopping for replacement missiles but apparently have not purchased any yet.

Sudan

Nuclear weapons. Sudan does not possess nuclear facilities or materials. While Sudan does not possess indigenous nuclear capability, it may have served as a transfer point for smuggling nuclear technology.[83]

Chemical weapons. According to a 1999 DCI report, Sudan has been developing the capability to produce CW for many years. In August 1998, the Al-Shifa pharmaceutical plant in northeast Khartoum was attacked and destroyed by Tomahawk cruise missiles, launched from U.S. naval vessels in the Red Sea. U.S. officials stated that the Al-Shifa facility was linked to Osama bin Ladin's international terrorist network, and was producing a precursor unique to the production of VX.[84]. Sudan claimed that the facility was a pharmaceutical plant manufacturing antibiotics, anti-malaria drugs, and veterinary pharmaceuticals.

Other experts and individuals in the international community questioned both the CW involvement evidence and the connection of Al-Shifa to bin-Ladin.[85] Despite this criticism, U.S. officials maintain their position that Al-Shifa was involved in CW activity. In a press conference in February 1999, National Security Advisor Sandy Berger stated that prior to the attack "We knew that bin Ladin was seeking chemical weapons," and "we know that he worked with the Sudanese government to acquire chemical weapons."[86] In August 1999, the United Nations declared that it was investigating Sudan's use of CW in a bombing raid on Laniya, a relief center in rebel-held Southern Sudan.[87] The investigation came after the Sudan People's Liberation Army claimed residents in the bombed areas were turning ill,[88] and three UN relief workers fell sick as well. Regardless of the controversy over the attack on Al-Shifa, there is evidence that Sudan has acquired CW capabilities.[89] Sudan has obtained assistance from other countries, primarily Iraq.[90] Thomas Pickering, Under Secretary for Political Affairs at the State Department, stated "we see evidence that is quite

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[83]"Sudan: Weapons of Mass Destruction Capabilities and Programs," *Center for Nonproliferation Studies, Monterey Institute of International Studies Database*.

[84]The Arms Control Reporter, 10-98, 704.E-2.179.

[85]French Foreign Minster Vedrine and Italian Foreign Minister Dini expressed doubts. "Countering Dual Use Facilities," Jane's Intelligence Review, March 1 1999. Experts disputed the physical evidence. Arms Control Reporter, 10-98, 704.E-2.179.

[86]"Osama Bin Laden and the Terrorist Search for WMD," *Jane's Intelligence Review*, June 1, 1999.

[87]"UN Inquiry on Sudan Germ Weapon Scare," *New York Times*, August 3, 1999, p. A3.

[88]"Sudanese Rebels Accuse Government of Using Chemical Weapons," *Dow Jones Newswire*, July 30, 1999.

[89]*Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, July 1999*; Cordesman, p.57.

[90]*Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, July 1999.*

clear on contacts between Sudan and Iraq. In fact, Al-Shifa officials, early on in the company's history were in touch with Iraqi officials associated with Iraq's VX program."[91] There were also reports that Iraq was involved in another facility in Khartoum suspected of producing CW. Some of these reports claim that, according to unnamed diplomats and a former Sudanese government official, hundreds of Iraqi experts in different fields have worked in Sudan.

Biological Weapons. According to the Director of Central Intelligence, Sudan's history of CW development and its close relationship with Iraq indicates that it may also be interested in acquiring BW capabilities.[92] In August 1999, the United Nations declared that it was investigating possible Sudanese use of CW or BW in a bombing raid on Laniya, a relief center in rebel-held Southern Sudan.[93]

Syria

Nuclear Weapons. Syria has a small Chinese-supplied 30 KW neutron-source reactor in Damascus. Syria is a party to the NPT, and the reactor is subject to IAEA safeguards. In 1998, a Syrian-Russian joint commission reportedly discussed bilateral cooperation in the peaceful use of nuclear energy, involving possible construction of two power reactors.[94] Despite some concern that Syria might acquire nuclear technology that could provide the basis for a weapons program, it is still constrained by financial and technical problems.

Chemical Weapons. Syria first developed chemical weapons in the 1970s using Soviet exports and assistance, and is currently believed to have stockpiled hundreds of tons of CW including sarin, VX, and mustard gas. One major facility is located near Homs and reportedly produces several hundred tons of nerve gas annually.[95]

Syria has weaponized sarin into aerial munitions and Scud-C warheads,[96] and appears to have begun production of warheads using VX in 1997. Some experts believe that Syria "may also have VX and sarin in modified Soviet ZAB - incendiary

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[91] *Arms Control Reporter*, October 1998, 704.E-2.180.

[92] *Report to Congress on the Acquisition of Technology relating to Weapons of Mass Destruction and Advanced Conventional Munitions*, 7/98-12/98, July 1999.

[93] "UN Inquiry on Sudan Germ Weapon Scare," *New York Times*, August 3, 1999, p. A-3.

[94] Issam Hamza, "Russia to Help Syria in Nuclear Energy," *Reuters*, February 21, 1998; "Syria Signs Agreement With Russia to Build Two Nuclear Reactors," *BBC Monitoring Middle East*, London, May 30, 1999 (Text of report by Dubai newspaper *Al-Bayan*).

[95] "Syria's SCUDs and Chemical Weapons," Center for Nonproliferation Studies, Monterey Institute for International Studies.

[96] *Proliferation: Threat and Response*, p. 38.

bombs and PTAB-500 cluster bombs."[97] There are also reports that a new facility is being built near Aleppo.[98]

Though trying to develop indigenous production capabilities, Syria remains dependent on foreign sources for chemical precursors and production equipment. According to the DCI, it sought CW-related precursors from several countries in the later part of 1998.[99]

Biological Weapons. According to the U.S. Arms Control and Disarmament Agency, (ACDA) "it is probable that Syria is developing an offensive BW capability."[100] Syria appears to be engaged in an extensive research effort and there are reports that it has production capability of anthrax and botulism,[101] and has also experimented with typhoid germs, poisonous mushrooms, and bacterial viruses.[102] Syria is also reportedly seeking assistance from Western and Chinese firms in developing biological missile warheads.[103] Syria signed the 1972 Biological and Toxin Weapons Convention, but has not ratified it.

Ballistic Missiles. Syria has large and growing ballistic missile forces in the region. It first acquired Scud-B missiles in 1974 from the Soviet Union, and currently has up to 200 Scud-B missiles, with a range of 300km and a payload of 1000kg. In the 1980s, Syria obtained shorter range SS-21s (Scarab) with a 70km range and a 480kg payload.[104]

In 1991, Syria first received Scud-C missiles from North Korea; the sale was brokered by Iran. Syria is currently believed to have between 50-80 of these missiles with a range of up to 600km. Moreover, Syria has underground missile production and assembly facilities that have been built with Iranian, Chinese, and North Korean assistance, and is now capable of building both Scud-C and B missiles. Syria has up to 36 launchers for its Scud missiles. [105] In addition, Syria may be developing an

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[97]Cordesman, p.23.

[98]"Syria's SCUDs and Chemical Weapons," Center for Nonproliferation Studies, Monterey Institute for International Studies

[99]*Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions*, July 1999.

[100]*Adherence and Compliance with Arms Control Agreements, 1997 Annual Report*, 1997.

[101]Cordesman, p. 25.

[102]"Syria Said Producing Chemical Weapons," *FBIS* Doc. ID: FTS19981914000591. Istanbul Sabah (internet version), October 14, 1998.

[103] Eisenstadt, Michael. "Syria's Strategic Weapons," *Jane's Intelligence Review*, April 1993.

[104]*Proliferation: Threat and Response* p. 40; Eisenstadt, "Syria's Strategic Weapons," ibid; "Weapons of Mass Destruction in the Middle East - Syria," *Center for Nonproliferation Studies, Monterey Institute for International Studies*, at www.cns.miis.edu/research/wmdme/Syria.htm

[105]Cordesman, p. 23; Eisenstadt, "Syria's Strategic Weapons," ibid..

indigenous capability to produce copies of the Chinese M-9 missile with 600km range and 500kg payload.[106]

According to the office of the Secretary of Defense, Syria has probably produced chemical warheads for some of its Scud missiles, and according to other sources, may be producing biological warheads for the Scuds.[107]

Additional Countries with Missile Programs But No WMD

Afghanistan

There is no evidence that Afghanistan, either the ruling Taliban or its opponents, have a nuclear, chemical, or biological program.

There are indications that both major contending factions in Afghanistan have Scud missiles, inherited from the Soviet occupation period (1979-1989). Commander Ahmad Shah Masud's forces controlled Kabul during 1992-97, and he reportedly took an undetermined number of Scuds in the Afghan arsenal with him when he retreated from Kabul in September 1996. In 1997, he apparently set up two to four Scud missile launch bases in his base in the Panjshir Valley.[108]

Russian news sources indicate that the Taliban might have seized some Scuds during their campaign to capture Kabul. In October 1995, when the militia was still on the outskirts of Kabul, the Taliban claimed to have captured a former Scud missile base near the Darulaman district of Kabul.[109] Another report says the Taliban, along with its seizure of the capital in September 1996, captured 15 Scuds in Kabul, as well as an unknown number of short-range tactical missiles.[110]

Turkey

Nuclear Weapons. Turkey has two nuclear research reactors: 5 MW and 250 KW. Both are under IAEA safeguards. Turkey may plan to build two nuclear power reactors by the year 2006.[111] However, such a decision would be controversial

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[106]Blanche, Ed and Duncan Lennox. "Shifting Balance; Briefing, Ballistic Missile Forces," *Jane's Defence Weekly"* March 10, 1999, p. 69.

[107]*Proliferation: Threat and Response* pp. 38-40; "Syria's SCUDs and Chemical Weapons," *Center for Nonproliferation Studies, Monterey Institute for International Studies, at* www.cns.miis.edu/research/wmdme/Syria/scud.htm; Eisenstadt, "Syria's Strategic Weapons," ibid; Cordesman, p. 23.

[108]"Massoud Sets Up Scud Bases in Panjshir," *Jane's Defence Weekly*, May 21, 1997, p. 12.

[109]"Taliban Reportedly Launches New Attacks Near Kabul," FBIS-NES-95-199, October 14, 1995.

[110]"Pakistan May Get Scuds From Taliban," *Indian Express*, October 3, 1996, p. 3.

[111]"Turkey: Weapons of Mass Destruction Capabilities and Programs," Center for Nonproliferation

(continued...)

and would require significant foreign supply and financing. There is no evidence Turkey is attempting to develop nuclear weapons.

Chemical Weapons. Turkey does not seem to be pursuing the development of CW capabilities.

Biological Weapons. Turkey does not seem to be seeking the development of BW capabilities.

Ballistic Missiles. Turkey has ordered 120 MGM-140 Army Tactical Missile Systems (ATACMS) from the United States. The block 1 version has a 560 kg (1230 lbs.) warhead and a range of 165 km (100+ miles).[112]

United Arab Emirates

Nuclear Weapons. The U.A.E. does not possess significant nuclear infrastructure, however, it may have served as a transfer point for smuggling nuclear technology.[113]

Chemical Weapons. There is no clear evidence that the U.A.E. is pursuing CW programs.

Biological Weapons. The U.A.E. does not seem to be seeking the development of BW capabilities.

Ballistic Missiles. The U.A.E. has acquired a number of Scud-B missiles but apparently does not have WMD warheads.

Yemen

Nuclear, Chemical and Biological Weapons. Yemen does not possess nuclear facilities, nor is it known to be seeking the development of chemical or biological weapons.

Ballistic Missiles. The Soviet Union supplied its client state, South Yemen with Scud-B (300 km range, 1,000 kg warhead) and SS-21 Scarab (70 km, 482 kg) missiles. South Yemen merged with North Yemen in 1990. Southern rebels fired some of these missiles during a civil war in 1994, but the North won the civil war and

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[111](...continued)
Studies, Monterey Institute of International Studies.

[112]*Jane's Strategic Weapon Systems,* Offensive Weapons, USA, Jan. 1999.

[113]"Nuclear Plot Is Foiled," *London Sunday Express*, July 25, 1999; "British Customs Seize Nuclear Material Bound for Pakistan," *The Indian Express Update*, g2i-digest, Vol. 1, No. 2494, July 25, 1999; "Dubai: The Commercial Gateway to Iran," *The Risk Report*, Vol. 2, No. 2, March 1996.

took possession of all remaining missiles. It is not known how many remain in Yemen's inventory.[114]

Options for Pursuing U.S. Nonproliferation Interests in the Middle East

The United States combines cooperative and coercive measures to achieve its nonproliferation and counterproliferation objectives in the Middle East. These measures include: maintaining strong bilateral relationships with key allies, multilateral diplomacy, and preparations for military options should they become necessary. Major components of these U.S. policies are outlined below. Congress supports these efforts primarily by providing statutory authority and funding.

State-to-State Relations

Close political and military relationships with key allies such as Egypt, Israel, Saudi Arabia, and other countries are very important for U.S. efforts to counter the spread of WMD or their use in the region. Many of these relationships are strongly influenced by the Middle East peace process, which is a top priority for U.S. foreign policy that sometimes takes precedence over proliferation concerns. Nevertheless, U.S. allies in the region have supported U.S. diplomatic and military efforts to counter the spread of WMD to countries opposed to U.S. interests. For example, allied support was critical to U.S. political and military operations against Iraq throughout the 1990 Gulf War and the ongoing embargo. On the other hand, some key U.S. allies in the region, including Israel and Egypt, have sought WMD and missiles of their own and do not always support U.S. nonproliferation policies. Sometimes, U.S. allies may interpret continued economic and political support as a "green light" to develop WMD and missiles without risk of consequences from the United States. While nonproliferation sometimes takes a back seat to other priorities, such as maintaining good relations with countries that are important to the Middle East peace process, a breakthrough in the peace process might ease some of the underlying security concerns that motivate countries to acquire WMD.

Sanctions are another tool the U.S. uses to support its nonproliferation objectives. Various laws authorize the President to impose unilateral sanctions on countries that acquire, use, or help other countries to get WMD or missiles. Such sanctions can cut U.S. assistance/cooperation and impose restrictions on U.S. technology exports. The effectiveness of sanctions often depends on persuading other countries to support or respect U.S. sanctions. Even without multilateral support, sanctions can still highlight strong U.S. opposition to WMD proliferation. However, strong sanctions are rarely imposed on U.S. friends or allies that acquire WMD.

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[114] "The Nonproliferation Review," *Center for Nonproliferation Studies, Monterey Institute of International Studies*, Winter 1997, vol. 4, no. 2, p. 167; *Washington Post*, May 12, 1994, p. A 18.

Multilateral Diplomacy: Nonproliferation Regimes

Global treaties such as the NPT, the Chemical Weapons Convention (CWC), and the Biological Weapons Convention are another important part of U.S. nonproliferation efforts. The NPT's near universal membership provides a useful tool to rally international support for U.S. nonproliferation efforts. (Israel, however, is one of the four remaining non-members of the Treaty.) The NPT's global inspection system provides assurances that civil nuclear technology has not been diverted to military uses. The NPT inspection system was upgraded after it failed to detect Iraq's nuclear weapons program. Many view Iran as the next test of the system's ability to detect covert weapons programs. The CWC and the BWC also have inspections, but face even bigger difficulties detecting covert weapons-related activities. Membership in the regimes -- as well as compliance -- is problematic in the Middle East. (See Tables 2 and 3.)

In addition to formal treaties, some countries cooperate to control exports of materials and equipment that can be used to make WMD or missiles. The main supplier groups are: the Nuclear Suppliers Group, the Australia Group (for chemical and biological materials), the Missile Technology Control Regime (for missile technology), and the Wassenaar agreement (for conventional arms and dual use goods). The U.S. supports these groups and tries to persuade other countries to adopt responsible controls on exports of dual-use technologies that can be used for WMD. While the supplier regimes can be useful, they are voluntary and, without verification or enforcement, depend on their members to police their own exports.

The United States also promotes its nonproliferation policies at the United Nations and at other international organizations such as the International Atomic Energy Agency and the Organization for the Prevention of Chemical Weapons. The United Nations Security Council supported U.S. policies toward Iraq and established a Special Commission to eliminate Iraq's WMD and ballistic missiles, although support for the U.N. Special Commission has waned and Russia, China, and France have opposed U.S. efforts to install a new inspection system. Support from the United Nations, especially in the Security Council, can lend legitimacy to U.S. nonproliferation efforts and expand international support for them. On the other hand, the U.S. is often criticized at the UN for its own WMD capabilities and for its silence on Israel's WMD.

Military Options: Counterproliferation, Intelligence, and Deterrence

Because some potential adversaries (in the Middle East and elsewhere) currently have WMD and missile delivery systems, and because diplomacy may fail to prevent further WMD proliferation, the U.S. Armed Forces have developed programs to help prevent the spread of WMD, to deter or prevent their use, and to protect against their effects. Defense cooperation and arms transfers to U.S. allies can ease concerns about security that can lead them to consider acquiring WMD, and also signal potential adversaries that acquisition or use of WMD may evoke a strong military response. U.S. conventional and nuclear defense capabilities and the threat

of retaliation help deter WMD attacks against U.S. forces, territory, or allies. Counterproliferation capabilities have been expanded in recent years to include more advanced "passive" and "active" defense measures. Passive counterproliferation tools include protective gear such as gas masks and detectors to warn of the presence of WMD. Active measures include missile defenses to protect U.S. territory, forces and allies, precision-guided penetrating munitions and special operation forces to attack WMD installations, and intelligence gathering and processing capabilities. Intelligence is a particularly critical element of U.S. nonproliferation efforts, without which many policy options would not be possible. Intelligence agencies track foreign WMD programs, monitor treaty compliance, and attempt to detect transfers of WMD goods and technology. The U.S. cooperates with certain allies to prepare for possible counterproliferation actions. Although U.S. forces successfully attacked some WMD facilities in Iraq during the Gulf War, political and technical hurdles (hidden underground bunkers, locations near civilians, etc.) make counterproliferation a last resort if other options have failed.

Congress. Congress supports nonproliferation and counterproliferation through legislation authorizing and appropriating funds for diplomacy and for military options. Sanctions legislation gives the President authority to punish proliferators and countries that assist them; export control legislation gives the executive branch authority to restrict transfers of sensitive technology to countries of concern. Congress also conducts oversight of the executive branch nonproliferation and Middle East policies.