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In Post-War Iraq, Use Military Forces to Secure Vital U.S. Interests, Not for Nation-Building

Baker Spring and Jack Spencer

As the Administration intensifies its efforts to build international support for a U.S.-led campaign to end Saddam Hussein's brutal and menacing regime in Iraq, some are questioning America's commitment to an effort to rebuild Iraq after such a war. The Administration has yet to present its plans for post-war Iraq. But that should be the last element of its argument that military force is needed to oust a regime that actively supports terrorism and pursues weapons of mass destruction (WMD) despite pressure from the United Nations to stop. (Details of Iraq's weapons programs are included in the paper's Appendix.)

Securing U.S. Interests. The President should make it clear that a U.S. military presence in post-war Iraq will be deployed to secure vital U.S. interests, but not as an exercise in so-called nation-building, the open-ended policy of his predecessor in which American troops were sent into troubled regions where vital U.S. security interests were not directly threatened. In many cases, the Clinton Administration used this policy reactively to accommodate the concerns of other countries, mistakenly assuming that their interests were always America's. Often this meant expanding the definition of peacekeeping beyond what it was intended to accomplish. Consequently, U.S. forces found themselves in situations not suited to the use of military force.

To make it clear that a post-war U.S. military operation in Iraq would not be another nation-building exercise, the Bush Administration should state that the U.S. military will be deployed to Iraq to secure the vital U.S. security interests for which the campaign would be undertaken in the first place. Specifically, these war aims are to:

- **Protect the American homeland, people, and institutions against attack,** which will require the U.S. military to destroy Iraq's terrorist infrastructure and weapons of mass destruction programs;

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- **Prevent the rise of Iraq as a dominant and hostile power in the Persian Gulf region,** while not allowing its elimination to become an opportunity for domination by a hostile Iran;
- **Protect Iraq's energy infrastructure against internal sabotage or foreign attack** to return Iraq to global energy markets and ensure that U.S. and world energy markets have access to its resources.

At the political level, the Administration also should utilize the post-war U.S. military presence to help give Iraq's new, presumably more friendly leaders a better opportunity to develop an inclusive, federal system of self-government. In cooperation with other countries, U.S. forces should assist in providing the basic security for the process of political and economic reconstruction to take place. However, it should not be up to U.S. military forces to construct this new government. Whatever new security structure is put in place after Saddam Hussein is gone, U.S. forces should not be saddled with the responsibility of governing the county or of creating the political entities that are to govern. That should be left to the Iraqi people and whatever interim government is created to govern the transition process.

Organizing the Post-War Force. Organizing the post-war U.S. military presence in Iraq around these three specific war aims would enable the Administration to define the scope of the military mission for the American people and to justify a continued presence in Iraq. The Administration's plan for the involvement of U.S. military forces in Iraq after the war to eliminate Saddam Hussein's brutal regime should rest on three foreign policy pillars:

1. **Post-war U.S. military activities should be focused on securing war aims, not on administering the country or creating a new government.** That should be left to the civilian authorities of an interim Iraqi government.
2. **A force sufficient to topple the Iraqi regime would be more than sufficient to conduct the post-combat military activities.** Dislodging the current regime should require a combat force of roughly 100,000 U.S. troops. This force would heavily favor air power over ground troops, and require no more than one corps of ground forces. The post-combat U.S. presence, augmented by allied forces, should include roughly 40,000 U.S. troops whose mission is to destroy the terrorist networks and cells, eliminate Iraq's WMD arsenal and infrastructure, protect its energy resources, and block Iranian hegemony in the region. U.S. military planners should not allow the missions to expand into vague "peacekeeping" activities, as they did under the Clinton Administration.
3. **Post-war military activities in Iraq should not be subject to arbitrary deadlines.** Securing the U.S. war aims cannot be accomplished according to arbitrarily established deadlines. However, the Administration should avoid making the U.S. military presence appear to be indefinite. Specific end goals for the U.S. military should be established and, once they are achieved, U.S. forces should be scaled back to enable them to prepare for other contingencies. The exit criteria should be the President's certification that each war aim has been achieved. The size of the force in Iraq should be reduced incrementally as each war aim is certified. Any U.S. and allied military forces that remain in Iraq should be to bolster the efforts of a new friendly government and to ensure that vital U.S. interests in the region remain secure.

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IN POST-WAR IRAQ, USE MILITARY FORCES TO SECURE VITAL U.S. INTERESTS, NOT FOR NATION-BUILDING

BAKER SPRING AND JACK SPENCER

As the Administration intensifies its efforts to build international support for a U.S.-led campaign to end Saddam Hussein's brutal and menacing regime in Iraq, some are questioning America's commitment to an effort to rebuild Iraq after such a war. The Administration has yet to present its plans for post-war Iraq. Its plans should be the last element of its argument that military force is needed to oust a regime that actively supports terrorism and pursues weapons of mass destruction (WMD), despite pressure from the United Nations to stop. (Details of Iraq's WMD programs are included in the Appendix.)

The Administration should make it clear that a U.S. military presence in post-war Iraq will be deployed to secure vital U.S. interests, not as an exercise in so-called nation-building—the Clinton Administration's open-ended policy of sending American troops into troubled regions where vital U.S. security interests were not directly threatened. In many cases, the Clinton Administration used this approach reactively to accommodate the concerns of other countries, mistakenly assuming that their interests were always America's. Often, this meant expanding the definition of peacekeeping beyond what it was intended to accomplish. Consequently, U.S. forces found themselves in situations not suited to the use of military force.

To make it clear that a post-war U.S. military operation in Iraq is not a nation-building exercise, the Bush Administration should state that the U.S. military will be deployed to Iraq to secure the vital U.S. security interests for which the campaign is undertaken in the first place. Specifically, these war aims should be to:

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- **Prevent the rise of Iraq as a dominant and hostile power in the Persian Gulf region,** while not allowing its elimination to become an opportunity for domination by a hostile Iran;
- **Protect Iraq's energy infrastructure against internal sabotage or foreign attack** to return Iraq to global energy markets and ensure that U.S. and world energy markets have access to its resources.

At the political level, the Administration also should utilize the post-war U.S. military presence to help give Iraq's new, presumably more friendly leaders a better opportunity to develop an inclusive federal system of government. But U.S. military forces should not be organized specifically to meet that objective. The development of a new government requires efforts beyond the means of military forces. And ensuring that the government is inclusive may require the commitment of a larger force for an extended period of time, which could jeopardize U.S. security interests in other parts of the world.

Organizing the post-war U.S. military presence in Iraq around these three specific war aims would enable the Administration to define the scope of the military mission for the American people and to justify the continued presence of about 40,000 troops in Iraq.[1] The exit criteria for the post-war forces should be the President's certification that each war aim has been achieved. The size of the force in Iraq should be reduced incrementally as each war aim is certified. U.S. and allied military forces that remain in Iraq should be seen as a reconfiguration of the forces in the Persian Gulf prior to the war in order to bolster the efforts of the new friendly government and to ensure that the vital U.S. interests in the region remain secure.

SECURING VITAL U.S. INTERESTS

The Administration's plan for the involvement of U.S. military forces in Iraq after a war to eliminate Saddam Hussein's brutal regime should rest on three foreign policy pillars:

1. **Post-war military activities should be focused on securing war aims, not on administering the country or creating a new government.** That should be left to the civilian authorities of an interim Iraqi government.
2. **A force sufficient to topple the Iraqi regime would be more than sufficient to conduct the post-combat military activities.** A combat force for dislodging the current regime in Iraq should require roughly 100,000 U.S. troops.[2] The post-combat U.S. military presence augmented by allied forces should require roughly 40,000 U.S. troops to destroy the terrorist networks and cells, eliminate Iraq's WMD arsenal and infrastructure, protect its energy resources, and block Iranian hegemony in the region. U.S. military planners should keep the focus of a U.S. post-war military presence on securing these war aims, and should not allow the missions to expand into other vague "peacekeeping" activities, as they often did under the Clinton Administration.
3. **Post-war military activities in Iraq should not be subject to arbitrary deadlines.** Securing the U.S. war aims cannot be accomplished according to arbitrarily established deadlines. However, the Administration should avoid making the U.S. military presence appear to be indefinite. Specific end goals for the U.S. military should be established and, once they are achieved, U.S. forces should be pulled out to enable them to prepare for other contingencies.

1. This force should be designed to fulfil the task of destroying terrorist cells and training camps in Iraq as well as its WMD and WMD programs and infrastructure, securing the border with Iran, and protecting Iraq's energy infrastructure. See the discussion of organizing a post-war force on page 4.
2. Based on public reports of Administration deliberations on the force needed to address the Iraqi threats. See David E. Sanger and Thom Shanker, "U.S. Exploring Baghdad Strike as Iraq Option," *The New York Times,* July 29, 2002. This force would heavily favor air power over ground troops, and would require no more than one corps of ground forces.

WHY NATION-BUILDING IS THE WRONG APPROACH

Under the Clinton Administration, the United States adopted a new approach to addressing turmoil in far-flung regions of the world called "nation-building."[3] According to the Clinton Administration's national security strategy, U.S. forces would participate in so-called peace operations that "support democracy or conflict resolution."[4] Because of this vague policy, U.S. military forces found themselves committed to many ill-defined, open-ended missions where no vital U.S. interests were at stake—such as in Somalia, Haiti, and the Balkans—in order to achieve unrealistic or inappropriate political or social goals.

Thus, under President Clinton, the policy of military interventions focused too little on national security requirements, too often on appeasing foreign views or demands, and too little on the circumstances necessary for undertaking successful peace operations. Specifically,

- **The Clinton Administration's nation-building policy frequently put U.S. military personnel at risk for reasons that had little to do with national security.** The American people, quite properly, are reluctant to put U.S. military personnel in harm's way unless the action is justified by threats to national security. The Clinton Administration ignored this wisdom when it changed the mission of U.S. military forces in Somalia from one of humanitarian relief, with relatively little risk of combat, to that of confronting Somali warlords. Removing the warlords may have been a desirable outcome, but their presence in Somalia posed an insignificant risk to the security of American citizens or their standard of living. Removing the warlords from power was an insufficient reason to place U.S. forces at greater risk. The intervention in Haiti had little to do with threats to vital U.S. security interests, while the Balkans intervention had peripheral but not vital security implications.

  Clearly, Iraq is a different situation. It is a state sponsor of terrorism that is building and obtaining weapons of mass destruction, which could find their way into the hands of terrorists. Iraq under Saddam Hussein used chemical weapons against its own people and against other states, and it launched Scud missiles against Israel during the Persian Gulf War. Since it blocked the return of U.N. weapons inspectors in 1998 in defiance of the United Nations, the regime's policies continue to threaten the stability of the region, U.S. allies, and world energy markets—all clear and vital security interests of the United States.[5] Removing that regime from power and contributing a post-war military presence in Iraq to assure stability in the region and in energy markets is justified.

- **The Clinton Administration would too often accommodate foreign interests at the expense of U.S. security.** The Clinton Administration's nation-building efforts frequently were undertaken on behalf of what President Clinton in his first inaugural address called "the will and conscience of the international community."[6] Too often, the decisions of when and how the United States would intervene militarily in a conflict were based on incoherent foreign concerns rather than specific U.S. security interests. In 1993, U.S. Ambassador to the United Nations, Madeleine Albright strongly advocated this type of "assertive multilateralism,"[7] calling on the people of the United States "to open our minds to broader strategies in multilateral forums."[8] Under-Secretary of State

3. The White House, *A National Security Strategy of Engagement and Enlargement*, July 1994.
4. *Ibid.*, p. 13.
5. On September 16, 2002, the Iraqi regime offered to re-admit U.N. weapons inspectors. The seriousness of this offer remains to be determined.
6. The White House, "Inaugural Address of William Jefferson Clinton," January 20, 1993.
7. U.S. Department of State, "Myths of Peacekeeping, Statement of U.S. Permanent Representative to the United Nations Madeleine K. Albright before the Subcommittee on International Security, International Organizations, and Human Rights of the House Committee on Foreign Affairs," *U.S. Department of State Dispatch,* Vol. 4, No. 26, June 28, 1993.
8. *Ibid.*, p. 2.

Peter Tarnoff acknowledged in an off-the-record briefing that this approach assumed a declining U.S. leadership role in international affairs.[9] He explained that the Clinton Administration believed in the concept of collective security, and that this new approach was "different by design," or intentional.

Not surprisingly, the Clinton Administration's nation-building efforts were unsustainable. The U.S. government found it impossible to match military means with the Administration's political goals. This mismatch became most evident in Bosnia, when the Clinton Administration abandoned its own ill-advised plan in deference to European and Russian plans to establish U.N.-declared safe havens. There were insufficient military forces to protect these safe havens, however, and Serbian military forces were able to overrun them and conduct a campaign of ethnic slaughter.

The Bush Administration's plan for a post-war military presence in Iraq should not suffer from the policy shortcoming in Bosnia. The Administration is clearly in the lead regarding a military intervention in Iraq. The reasons that the United States sees Iraq as a serious threat to vital U.S. interests are clear and justified, in terms of combat operations and a post-war presence. The Administration is working to achieve international consensus for the use of military force in Iraq, not to accommodate the political desires of other countries.

- **The Clinton Administration adopted an overly expansive definition of peacekeeping.** The Clinton Administration's nation-building policy also failed to keep traditional peacekeeping missions distinct from its more expansive peacemaking interventions. The United Nation's efforts to provide humanitarian assistance in Cyprus (UNFICYP) since 1964 and its efforts to provide civilian administration, aid, and rebuilding assistance in Lebanon (UNIFIL) since 1978 are good examples of traditional peacekeeping missions. Both missions were conditioned on the cessation of hostilities and an agreement among the warring parties.

  The extended peacekeeping operations of the 1990s, such as those in Somalia and the Balkans, were vastly different from the missions in Cyprus and Lebanon in scope and complexity. They were in effect liberal Wilsonian exercises in nation-building that went far beyond maintaining peace or providing aid. They sometimes necessitated using force and choosing sides in a civil conflict. U.N.-led peacekeepers were expected to *make* the peace, not just keep it. Further, soldiers trained for combat missions were expected to engage in the reconstruction of entire civil and social structures, often in countries that had very few such structures in place. The pace of operations was furious: From 1992 to 2000, the U.N. approved 34 such missions involving 182,000 troops, compared with 22 missions using 61,000 troops in its preceding 44-year history. For U.S. troops, this expansion came at the expense of their ability to train and prepare for fighting the nation's wars.

ORGANIZING THE POST-WAR FORCE BY WAR AIMS

A U.S. and allied military presence in post-war Iraq would, by definition, not be an extended operation in which making peace was the goal. Rather, it would be an exercise involving a residual force tasked with achieving the three specific war aims described in this study. The post-war military force in Iraq would be tasked primarily with confronting any remnant elements of Saddam's deposed regime and deterring other regional powers from exploiting the situation for purposes injurious to the interests of the United States and its allies.

9. Daniel Williams and John M. Goshko, "Reduced U.S. World Role Outlined but Soon Altered: High-Level Disavowals Follow Official's Talk," *The Washington Post*, May 26, 1993, p. A–1. It was later revealed that the official speaking off the record was Under-Secretary of State Peter Tarnoff.

Given the specific war aims, the post-war U.S.-led military forces should be organized around three important missions:

1. **To find and destroy the current regime's WMD arsenal and its infrastructure of support for terrorism.** The military force should be large enough to perform this mission rapidly. At the outset, this effort may require up to 5,000 specialized personnel, but as the effort progresses the size of the post-war force should be reduced. When the President is able to certify that all of Iraq's terrorist support and its weapons of mass destruction infrastructure, programs, and arsenal have been accounted for and destroyed, this element of the post-war force should be withdrawn.
2. **To secure Iraq and the region against Iranian ambitions.** The post-war force would need to be large enough to block any Iranian incursions into largely Shiite areas south of Baghdad and capable enough to block Iranian infiltration into the Kurdish areas of northern Iraq to bolster Kurdish separatist movements. Ultimately, this element of the post-war force should be the largest. The time it will take to secure this aim will likely be lengthy, since it will depend on the reconstruction of a reliable and friendly Iraqi military force capable of standing up to Iran with a relatively modest U.S. security commitment.

   At the outset, this task may require up to 30,000 U.S. military personnel, with additional allied troops numbering perhaps 15,000.[10] As Iraq's military proves itself able to defend the country against Iran, this element of the post-war force should be reduced incrementally.
3. **To provide physical protection to Iraq's energy infrastructure.** Given Iraq's relatively dispersed energy sources, this element may initially require about 5,000 U.S. military personnel and an equal number of allied personnel. It is uncertain how long this effort could take, but it is a less complex and narrower mission than the other two. At the outset, protecting the energy infrastructure should involve infantry brigades, but over time, this element of the force could gradually transition to military police brigades before eventually drawing down the force size as the situation stabilizes. This would provide the United States military commanders with the necessary flexibility to transition from a combat force to a military police presence. The United States also should seek to turn this responsibility over to reconstituted Iraqi security forces.

Using these estimates, the total U.S. contribution to the post-war force in Iraq would be roughly 40,000 troops, the allied contribution an additional 20,000. The combined force should include a corps headquarters with the flexibility needed to oversee and manage operations for the specialized task of rooting out and destroying Iraq's weapons of mass destruction programs and its terrorist infrastructure. The U.S. contribution to the post-war effort should include two divisions, one light and one heavy (armored), with the ability to patrol Iraq's border with Iran, along with other specialized units for destroying Iraq's weapons of mass destruction and securing its energy sector.

MOVING FROM A COMBAT FORCE TO A POST-WAR FORCE

Public reports indicate that the Bush Administration is considering the use of two alternative forces for toppling the current regime in Iraq: a traditional invasion force of up to roughly 250,000 personnel[11] or a far smaller "de-capitation" force of perhaps fewer than 100,000.[12] Such a de-capitation force should prove adequate to winning the war—providing the air power and limited ground force necessary to cut off Iraq's leadership from its deployed forces and to weaken its military to the point that Iraqi dissident forces could prevail in orchestrated ground assaults. This approach would avert the need for the larger force of 250,000.

If the Administration chooses the "de-capitation" force course, it should bear in mind three key points.

10. The U.S. portion of this force to protect the border with Iran should require about two divisions of 15,000 each.
11. Eric Schmitt, "U.S. Plan for Iraq Is Said to Include Attack on Three Sides," *The New York Times*, July 5, 2002, p. A–1.
12. Sanger and Shanker, "U.S. Exploring Baghdad Strike as Iraq Option," p. A–1.

First, success of the smaller force would depend on the Iraqi dissident forces conducting a successful ground campaign, which means arming them sufficiently for a campaign against the forces of Saddam Hussein and backing them with U.S. and allied air power.

Second, an aggressive public diplomacy campaign should be conducted to secure the support of U.S. friends in that region. Their participation will increase the likelihood of success in the effort. These countries must be convinced that America's war plan is all but certain to succeed, since they will not want to participate in an unsuccessful military operation against the Iraqi regime.

Third, the success of the de-capitation force will be highly dependent on the transformation of the U.S. military forces as planned by Secretary of Defense Donald Rumsfeld. The transformation effort should accelerate before combat operations against Iraq are initiated. A successful operation in Iraq also would prove the wisdom of the transformation effort, just as the Persian Gulf War justified the air-land battle doctrine designed by the U.S. military following Vietnam.

The "de-capitation" combat force should be slightly larger than the force needed to undertake post-war activities in Iraq. The combat phase of operations would establish a foundation for U.S. and allied post-war forces to position themselves at terrorist and weapons sites, along the border with Iran, and at energy infrastructure sites. The post-war force should be withdrawn incrementally as responsibilities are transferred to U.S. and coalition civilian authorities and eventually to reliable and friendly Iraqi officials and an Iraqi military.

The Bush Administration must pay attention to the drawdown because, in undertaking this war against Saddam, the post-war force will be drawn from the current fabric of the military. The Administration's Quadrennial Defense Review refers to an operation of the size described here as a "smaller-scale contingency."[13] It also wisely acknowledges that care must be taken, even with the relatively small force required for such a contingency, to avoid overstressing elements of the total military force.

MAKING THE DRAWDOWN OF THE FORCE EVENT-DRIVEN

It would be unwise to pre-determine timelines for achieving the three war aims in Iraq described above. No one can reliably predict how long it will take to locate and destroy the terrorist infrastructure and all the weapons of mass destruction. Iran's moves will depend on efforts to establish a new, responsible government and military force in Iraq. Building a responsible Iraqi military is an unpredictable process and, while securing Iraq's energy infrastructure is a more predictable task, establishing a deadline for that would be shortsighted. In short, the process for drawing down a post-war military force in Iraq must be event-driven.

Following the end of the combat operation, President Bush should state that he will certify to Congress when each assigned war aim has been completed by the post-war force, that the portion of the post-war force assigned to that task will be withdrawn following certification, and that an end to post-war military activities will be declared when all three tasks are certified complete. He should also make clear that any remaining forces in Iraq will be a peacetime presence.

By adopting this approach to drawing down the force and ultimately ending post-war activities, President Bush will have established an exit strategy for the forces he commits to Iraq that is not bound by a timeline that permits hostile forces to regroup and launch counterattacks.

CONCLUSION

The Bush Administration and most Americans are rightly concerned that Saddam Hussein's regime in Iraq is a growing and grave threat. Its support for terrorists, its violation of U.N. agreements on weapons inspections, and its programs to develop weapons of mass destruction can no longer be tolerated.

The use of military force in troubled regions must depend on direct threats to vital security interests, not just any interest. The Bush Administration should announce its plans for a post-war

13. U.S. Department of Defense, *Quadrennial Defense Review Report*, September 30, 2001, p. 21.

military force in Iraq that is designed, not for nation-building, but specifically to secure the very vital interests for which the United States seeks to remove Saddam's rogue regime from power. It should present a plan to Congress and the American public that is based on three war aims: eliminating Iraq's terrorist infrastructure and weapons of mass destruction programs, precluding a hostile Iraq—or Iran once Saddam Hussein is removed from power—from dominating the Persian Gulf region, and protecting Iraq's energy infrastructure to ensure that world energy markets continue to have access to those resources.

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APPENDIX

A SURVEY OF IRAQ'S ARSENAL AND USE OF WEAPONS OF MASS DESTRUCTION

For nearly three decades Iraq has demonstrated an insatiable desire to acquire weapons of mass destruction (WMD) and longer range delivery systems. Iraq has approached the acquisition of these weapons with dedication and creativity. In 2000, for example, Saddam Hussein imported over 4,000 Playstation and Playstation 2 video game systems, which are not subject to embargoes that prohibit Iraq from importing advanced computers. A home video-game system is not extremely capable, of course. However, according to intelligence sources, it is likely that Saddam is using these systems linked together to help in the development of sophisticated guidance systems for missiles.[14]

Nothing has deterred Saddam from advancing his WMD aspirations. Iraq's WMD programs, prone to failure, have been subjected to direct bombing campaigns and international inspection regimes, yet they continue to move forward. Even under the most tenuous of circumstances, Iraq has been able to produce one of the most lethal WMD arsenals in the world. Worse, Saddam Hussein has demonstrated his willingness to use these weapons against his enemies, both at home and beyond Iraq's borders.

In 1998, former U.N. weapons inspectors asserted that Iraq maintained substantial WMD capabilities. Former weapons inspector Scott Ritter said it would not take Iraq long to reconstitute its nuclear, chemical, and biological weapons, as well as long-range ballistic missile programs.[15] Richard Butler, executive director of the United Nations Special Commission (UNSCOM) for weapons inspections in Iraq, called its WMD capabilities "truly alarming."[16]

Since the end of the Gulf War, Iraq has conducted a policy of distraction, denial, and deception. According to an official U.S. Department of State document, the Iraqis are much more forthcoming with details on how many ballpoint pens were ordered in the 1980s than they are on WMD procurement.[17] Their failed cooperation with UNSCOM, which was charged with disarming Iraq, and their manipulation of the International Atomic Energy Agency (IAEA) evidence, demonstrates Iraq's determination to not abide by accepted international norms.

The overwhelming evidence that Saddam Hussein maintains active and fruitful chemical, biological, and nuclear weapons programs, as well as ballistic and cruise missile research and development facilities, indicates that, beyond any doubt, Saddam will use these weapons in the future.

Iraq's Ballistic Missile Program

According to the Commission to Assess the Ballistic Missile Threat to the United States (the Rumsfeld Commission):

> Iraq has maintained the skills and industrial capabilities needed to reconstitute its long-range ballistic missile program. Its plants and equipment are less developed than those of North Korea or Iran as a result of actions forced by UN Resolutions and monitoring. However, Iraq has actively continued work on the short-range (under 150 km) liquid- and solid-fueled missile programs that are allowed by the Resolutions. Once UN-imposed controls are lifted, Iraq could mount a

14. Alexander Rose, "Iraq Is Armed…With PlayStation 2," *Chicago Sun-Times*, December 27, 2001.

15. Public Broadcasting System, "NewsHour with Jim Lehrer," August 31, 1998, at *http://www.pbs.org/newshour/bb/middle_east/july-dec98/ritter_8-31.html.*

16. Richard Butler, Speech before the Carnegie Endowment for International Peace Non-Proliferation Project, Washington, D.C.: January 11–12, 1999, at *http://www.ceip.org/programs/npp/butler99.htm.*

17. U.S. Department of State, *Iraq Weapons of Mass Destruction Programs Report, U.S. Government White Paper*, February 13, 1998.

> determined effort to acquire needed plant and equipment, whether directly or indirectly.... Iraq could develop a shorter range, cover, ship-launched missile threat that could threaten the United States in a very short time.[18]

Prior to the 1991 Gulf War, Iraq employed a virtual hodgepodge of methods and sources to field an offensive ballistic missile capability. It had acquired Frog-7 missiles from the Soviet Union as early as 1969, but did not establish the core of its ballistic missile capabilities until it signed a deal with the Soviet Union in 1974. This deal gave Iraq a number of short-range Scud B missiles and transporter erector launchers (TELs). Iraq made additional major missile purchases during the Iran–Iraq War, including 350 Scud B missiles in 1984 and another 300 in 1986. This unparalleled demonstration of resourcefulness rose out of an international network of experts, suppliers, and entrepreneurs.[19]

Even before the Gulf War, Saddam Hussein had come dangerously close to deploying nuclear, biological, and chemical weapons. In fact, Iraq had fielded a few Scuds tipped with poisonous chemicals by the time the Gulf War broke out.[20] It launched 190 Al Husseins at Tehran in the 1988 "War of the Cities" and 96 at Israel, Saudi Arabia, and the Gulf states during the Gulf War.

Many believe that, if the Gulf War had not occurred, Iraq would be well on its way to deploying ballistic missiles with ranges of up to 2,500 miles (4,023 km). Nevertheless, pre-Gulf War Iraq serves as a stunning example of the ways in which any state can acquire ballistic missile technology when the appropriate resources combine with political will—it had invested some $50 billion into ballistic missile development in the decade before the war.[21]

Saddam Hussein's ballistic missile research and development facilities were severely eroded as a result of the Gulf War. U.N. Security Council Resolution 687 of April 1991 and the cease-fire arrangement mandated that Iraq destroy all nuclear, biological, and chemical weapons and ballistic missiles with ranges that exceeded 94 miles (150 km), as well as all related technologies. Although U.N. inspections were carried out to one degree or another since the end of the war, Iraq probably was able to maintain enough of its original ballistic missile infrastructure to continue to build weapons that could threaten its neighbors and the interests of the global community. In fact, reports regularly recount attempts by Iraqi officials to acquire prohibited missile and weapons technology from sources around the world.[22]

Some estimates indicate that Iraq might be hiding up to 40 Scud missiles,[23] while others suggest numbers as high as 85.[24] Scott Ritter, who had been the lead member of the UNSCOM team inspecting Iraq's weapons program after the war, estimates that the number is closer to seven to 12, with the possibility of another 25.[25]

18. "Executive Summary," *Report of the Commission to Assess the Ballistic Missile Threat to the United States*, published pursuant to Public Law 201, 104th Cong., July 15, 1998, p. 14.
19. The Scud B missiles had insufficient range. By the early 1980s, Iraq had found it could not purchase deployable longer range ballistic missiles on the market, so it began a modernization program to develop them. Connections in the USSR, United States, China, West Germany, Egypt, Brazil, and Argentina enabled it to build research and development facilities to upgrade and produce ballistic missile technologies. Reports suggest that, at the very least, Iraq is able to produce most of the necessary components of ballistic missiles. See Janne Nolan, *Trappings of Power: Ballistic Missiles in the Third World* (Washington, D.C.: Brookings Institution, 1991), pp. 54–58.
20. *Ballistic Missile Proliferation: An Emerging Threat 1992* (Arlington, Va.: Systems Planning Corporation, 1992), p. 36.
21. Brian Duffy, Louise Lief, Peter Car, Richard Chesnoff, Stephen Hedges, Joannie Schrof, and Ted Slafsky, "The World's Most Dangerous Man," *U.S. News and World Report*, June 4, 1990, p. 38.
22. See "Iraq's Missile-Tech Quest Spotted," *The Washington Times*, November 30, 1998, p. A15; the resignation letter of William S. Ritter, Jr., August 26, 1998; and "Information on Biological Weapons Programme Reported Hidden," *UN Chronicle*, December, 1995, p. 24.
23. *Exploring U.S. Missile Defense Requirements in 2010: What Are the Policy and Technology Challenges?* Institute for Foreign Policy Analysis, April 1997, p. 450.
24. Center for Defense and International Security Studies, at *http://www.cdiss.org/map_irq.htm.*

Although U.N. Resolution 687 prohibited Iraq from possessing ballistic missiles with ranges that exceed 94 miles and all related facilities, Iraq still possesses the knowledge, trained personnel, and specific equipment to continue to produce ballistic missiles. This fact led some analysts to suggest that Iraq could field as many as 150 Scud missiles by 2000.[26] Since UNSCOM was forced to withdraw its staff on December 16, 1998, Iraq's eventual deployment of longer range ballistic missiles is much more possible now that it is no longer subject to thorough outside scrutiny. In 1999, the National Intelligence Council estimated in its National Intelligence Estimate (NIE) that "[a]lthough the Gulf War and subsequent United Nations activities destroyed much of Iraq's missile infrastructure, Iraq could test an ICBM capable of reaching the United States during the next 15 years" (by 2014).[27]

Cruise Missile Capabilities

France and Russia supplied Iraq with most of its cruise missile technology with their export of the **Exocet**, with a range of 50–75 km, and the **SS–N–2 Styx**, with a range of 45–100 km. Between 1980 and 1988, Iraq launched nearly 100 French Exocet missiles against Iran, destroying ships and oil wells and sinking five Iranian vessels with the Russian SS–N–2 Styx missile. Indeed, Iraq fired cruise missiles against American targets in May 1987, when it fired Exocets at the USS *Stark*.[28]

Iraq maintains modified versions of the Russian SS–N–2C Styx missile in the FAW series of cruise missiles (FAW 70/150/200),[29] and with a maximum range of 200 km, the FAW missiles have more than twice the maximum range of the Russian missile. Although some of the FAW 70 missiles are likely renamed Chinese HY–1/HY–2 missiles, Iraq probably has the means to build them domestically. Several FAW 70 missiles were fired at American ships during the Gulf War, but failed to reach their targets. Development of the FAW 200 is uncertain since U.N. Resolution 687 required their production to cease and existing missiles destroyed. However, this supposes that Saddam Hussein would have kept his word following the 1991 Gulf War, which is likely not the case.

Other cruise missile schemes employed by Iraq included using ballistic or surface-to-air missile (SAM) technology to achieve cruise missile–like results. For example, Iraq modified its Ababil missile, which is based on a Russian SAM, to act as a land-air cruise missile. It has a range of 500 km with a maximum payload of 250 kg. There is also Project 144 to design a surface-to-surface missile capable of carrying nuclear warheads over long distances. Project 144 used Scud missile technology and the second-stage engine of the Al Abid satellite launcher, which has a maximum range of 1,250 miles. Iraq began Project 144 in 1989 and planned to complete the project by 1993.[30] Its current status is unknown.

Iraq's Chemical Weapons Program

Iraq began a chemical weapons research program in the 1970s. Initially, research concentrated on such agents as tear gas, mustard blister agent, tabun, and sarin gas. Batch production, or the production of larger quantities, began in the early 1980s and, by 1982, these chemicals were part of the Iraqi arsenal.[31]

Tear gas (CS) research and production began in the 1970s as a means of riot control under the auspices of the Committee for National Security, not the military. Exposure to CS causes tearing, coughing, sneezing, etc.[32] Production for military purposes commenced during the early years of the Iran–Iraq War. UNSCOM inspectors were unable to

25. John Donnelly, "Ritter: Iraq has Potential 37 Scuds," *Defense Week,* September 21, 1998, p. 1.
26. Wyn Bowen, "Extra Ballistic Missile Shadow Lengthens," *Jane's International Defence Review*, February 1, 1997, p. 1.
27. National Intelligence Council, *Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015,* September 1999, p. 10.
28. Center for Defense and International Security Studies, "Cruise Missiles, a Brief History: Post WWII," 1996, at *http://www.cdiss.org/cmhist2.htm.*
29. Duncan Lennox, ed., *Jane's Strategic Weapon Systems* (U.K.: Jane's Information Group Ltd., 2000), p. 87.
30. Federation of American Scientists, "Project 144/Project 1728," *Weapons of Mass Destruction*, November 3, 1998, at *http://www.fas.org/nuke/guide/iraq/missile/tammuz-1.htm.*

determine the quantities produced; however, it is known that the Iraqis filled munitions with the gas.

Mustard blister agent (HD) is considered nonlethal, but complications from exposure can result in death. HD exposure affects the eyes, lungs, and skin. Inhalation causes irritation in the throat, tightness of the chest, hoarseness, and coughing. If not treated during the early stages of contamination, individuals may suffer bronchopneumonia and high fever.[33] Iraq first produced HD in 1981 at a high quality that was at least 80 percent pure. The earliest declarations indicated a cache of 3,080 tons, but that estimation was reduced in 1995 to 2,850 tons.[34]

Tabun (GA), the first nerve agent discovered, is a tasteless, colorless liquid with a slightly fruity odor that was first developed as an insecticide in Germany in 1936. Contact with the agent causes respiratory complications, nausea, vomiting, muscular disruptions, headache, coma, and eventually, breathing cessation and death.[35] Although Iraq attempted to weaponize GA, development was wrought with problems. Initial production produced an agent only 60 percent pure, making storage difficult. Production problems included salt blockages in the pipes during synthesis. Iraq abandoned the effort and transferred research, development, and production assets to a **sarin** (GB/GF) gas program.[36] The sarin gas program also had problems. Production again yielded a low (60 percent) purity, causing storage problems. To compensate, precursor chemicals were stored separately and mixed in munitions immediately prior to use.

Iraq also dedicated research and development assets to its VX nerve agent program, a paramount project after September 1987. VX, also discovered under the auspices of insecticide research in the 1950s, is an oily, clear, tasteless, odorless liquid. It can be amber-colored resembling motor oil. Symptoms of overexposure range from constriction of pupils and headaches to tightness in the chest, vomiting, muscle twitches, diarrhea, and eventually, convulsions and respiratory failure.[37] Between 1987 and 1988, the Iraqi government imported 250 tons of phosphorous pentasulphide and 200 tons of di-isopropylamine, two of the key precursors for VX. It produced 660 tons of another precursor, methyl phosphonyl chloride, but claims to have used only 1 ton of it.[38] The last precursor, ethylene oxide, is a general purpose chemical that is readily available.

The entire VX program is said to have been unsuccessful. Experimental quantities (260 kg) of VX were reportedly produced. Iraq admitted to having filled three 250-gauge aerial bombs with VX for trial purposes.[39] It declared that it abandoned the program in September 1988. Iraqi reports claim the remaining quantities of phosphorous pentasul-

31. The Iraqis focused on G- and V-agents. G-agents (tabun-GA; sarin-GB; soman-GD; and cyclosarin-GF) are named for their discovery by German scientists, starting in the 1930s with tabun. V-agents (methylphosphonothioate-VX) are more advanced and more toxic than G-agents, thus designated "V" for "venomous." See *eMedicine*, "Nerve Agents," October 16, 2001, at *http://www.emedicine.com/emerg/topic898.htm*; and U.S. Army Soldier and Biological Chemical Command, "VX: Chemical Agent Fact Sheet," April 30, 2001, at *http://www.sbccom.army.mil/services/edu/vx.htm.*
32. Marshall Brain, "Question of the Day: What Does Tear Gas Do?," *How Stuff Works,* 1998–2002, at *http://www.howstuffworks.com/question340.htm.*
33. U.S. Army Soldier and Biological Chemical Command, "Mustard: Chemical Agent Fact Sheet," April 30, 2001, at *http://www.sbccom.army.mil/services/edu/mustard.htm.*
34. Federation of American Scientists, "Iraq: Chemical Weapons Programs," November 8, 1998, at *http://www.fas.org/nuke/guide/iraq/cw/program.htm.*
35. U.S. Army Soldier and Biological Chemical Command, "Tabun: Chemical Agent Fact Sheet," April 30, 2001, at *http://www.sbccom.army.mil/services/edu/tabun.htm.*
36. Federation of American Scientists, "Iraq: Chemical Weapons Programs."
37. U.S. Army Soldier and Biological Chemical Command, "VX: Chemical Agent Fact Sheet."
38. United Nations, *Report of the Secretary General on the Status of the Implementation of the Special Commission's Plan for the Ongoing Monitoring and Verification of Iraq's Compliance With Relevant Parts of Section C of Security Council Resolution 687*, Document S/1995/284, April 10, 1995, §36.
39. *Ibid.*, §37.

phide and di-isopropylamine were burned, discarded, or destroyed by 1991, but UNSCOM could not confirm the quantities destroyed. Nearly 250 tons of VX nerve agent remain unaccounted for.[40] Scott Ritter confirmed that the UNSCOM teams had found undeniable proof of the VX program as recent as June of 1998.[41] After 1995, Iraq admitted to falsely reporting its chemical weapons arsenals, including producing more VX than previously divulged, and that it had perfected techniques to give VX a longer shelf life—further indications that the program had not been abandoned.[42]

Iraq's Use of Chemical Weapons. Like with ballistic and cruise missiles, Iraq has not shied away from the use of chemical weapons to achieve military aims. In 1982, it used riot control–level agents against Iranian attacks. Iraq quickly began using more deadly agents, such as mustard in 1983 and tabun in 1984, the first time that a nerve agent had been used in a war.

The State Department lists 10 incidents of chemical attacks by Iraq between August 1983 and March 1988 against Iranian and Kurdish populations, with casualty tolls in the tens of thousands.[43] The Central Intelligence Agency maintains that Iraq did not intentionally use chemical agents during the Gulf War for fear of U.S. and coalition retaliation. The conclusion is based on inconsistencies in casualties compared with those seen during the Iran–Iraq War.[44]

From 1992 to 1998, UNSCOM oversaw the destruction of 40,000 chemical munitions, 480,000 liters of chemical agents, 1.8 million liters of chemical precursors, and eight types of delivery systems.[45] These quantities include 30 tons of tabun, 70 tons of sarin, and 600 tons of mustard blister agent stored in bulk and munitions.[46] The Iraqis declared that 2,500 munitions containing about 17 metric tons of sarin that had been stored at the Muthanna chemical facility were destroyed by coalition bombing during the Gulf War.[47]

Iraq has rebuilt its chemical weapons program since 1991. While many of its facilities were crippled in the Gulf War, it has retained the human knowledge needed to revive these programs. There are 41 sites with equipment that can be converted quickly to manufacture chemical weapons agents and their precursors, and four sites capable of producing chemical munitions. It is estimated that Iraq is able to organize its assets and production to manufacture chemical weapons in a matter of days or weeks.[48]

Biological Weapons Program

In 1974, the Iraqi government adopted a policy to acquire biological weapons technology. A year later, research and production were initiated, but they had largely failed by 1978.[49] The program was revived in 1985 at the Muthanna chemical plant and by 1986, Iraq was importing strains of bacterial growth from Europe. Research was focused on Bacillus anthracis (anthrax) and Clostridium botulinum (botulinum toxin).

Inhalation is the most common means of contraction in biological warfare. Initial symptoms of **inhalation anthrax** are similar to those of a common cold. Within days, severe breathing problems and shock occur, followed often by death.[50] **Botulinum toxin** causes muscle paralysis, evident in blurred vision, drooping eyelids, slurred speech,

40. *Ibid.*, §38.

41. Jeremy Rose, "Inside UNSCOM: The Scott Ritter Tape," Interview from The State of the World Forum in San Francisco, 1998, at *http://www.casi.org.uk/discuss/1998/msg00337.html*.

42. U.S. Department of State, *Iraq Weapons of Mass Destruction Programs*, *U.S. Government White Paper,* February 13, 1998.

43. *Ibid*.

44. Central Intelligence Agency, *CIA Report on Intelligence Related to Gulf War Illnesses*, August 2, 1996.

45. U.S. Department of State, *Iraq Weapons of Mass Destruction Programs*.

46. United Nations, *Report of the Secretary General on the Status of the Implementation of the Special Commission's Plan*, §34.

47. Central Intelligence Agency, *CIA Report on Intelligence Related to Gulf War Illnesses*.

48. Federation of American Scientists, "Iraq: Chemical Weapons Programs."

49. Federation of American Scientists, "Iraq: Biological Weapons Programs," November 3, 1998, at *http://www.fas.org/nuke/guide/iraq/bw/program.htm*.

difficulty swallowing, dry mouth, and muscle weakness. If untreated, it could cause paralysis in the limbs, trunk, and respiratory muscles.[51] Iraq had developed adequate bioweapon expertise by 1987 when it officially began full-scale production of botulinum toxin and anthrax for weaponization.

Within a year, Iraq expanded its bioweapons program to include research into the weaponization of Clostridium perfringens and aflatoxin.[52] **Clostridium perfringens** causes a condition known as gas gangrene. The bacteria can produce several types of toxins that cause potentially fatal syndromes, such as tissue death, blood destruction, decreased circulation in the affected area, and leaking of the blood vessels.[53] **Aflatoxin** is naturally occurring in grain crops and foods such as peanuts, millet, pecans, corn, and cottonseed. The U.S. Food and Drug Administration says aflatoxins produce acute necrosis (cell or organ death), cirrhosis (a progressive liver disease resulting in liver failure), and cancer in several (not all) animal species.[54]

In 1988, Iraq dedicated significant resources to the weaponization of **ricin**, a toxin derived from castor beans, which is highly attractive as a biological agent because of its stability and wide availability.[55] Following inhalation, ricin breaks down lung tissue, resulting in hemorrhagic pneumonia and eventually death. Tests were conducted but the project was considered a failure and abandoned.

Iraq also conducted research on the effectiveness of wheat cover smut, hemorrhagic conjunctivitis virus, rotavirus, and camel pox as bioweapons. Large-scale production of **wheat cover smut**, a fungal contaminant of grain food crops, was carried out between 1987 and 1988, but the project was not developed further. **Hemorrhagic conjunctivitis** causes extreme pain and temporary blindness. **Rotavirus** causes diarrhea with the possibility of dehydration and death. **Camel pox** causes fever and skin rash in camels, but rarely affects humans. Little additional work was done on these toxins.

By 1990, Saddam Hussein had commenced a crash program to produce and weaponize bioweapons; after the invasion of Kuwait, the program intensified. In December 1990, Iraq attempted to attach a spraying device onto a modified aircraft drop tank, which would be fitted to a piloted fighter or even an unmanned aerial vehicle (UAV). It was intended to spray nearly 2,000 liters of **anthrax** over enemy territory. Although Iraq claims that the prototype has been destroyed, field trials were conducted in 1991.[56]

Current Status of Iraq's Bioweapons Program. In total, Iraq declared production of nearly 19,000 liters of concentrated botulinum toxin (10,000 liters of this in munitions), 8,500 liters of anthrax (6,500 liters in munitions), and 2,200 liters of aflatoxin (1,580 in munitions).[57] All biological agents and delivery systems supposedly were destroyed before or following the Gulf War,[58] but no Iraqi official recalls the time of the orders, given orally, or the destruction dates.[59]

Ken Alibek, a former Soviet scientist, testified to the U.S. House Armed Services Committee that Russia had planned to sell large fermenters to Iraq after the Gulf War.[60] Iraq's medical, veterinary, and

50. Centers for Disease Control and Prevention, *Anthrax: Frequently Asked Questions*, October 18, 2001, at *http://www.cdc.gov/ncidod/dbmd/diseaseinfo/anthrax_g.htm#What is anthrax.*
51. Centers for Disease Control and Prevention, *Botulism: Frequently Asked Questions*, October 18, 2001, at *http://www.cdc.gov/ncidod/dbmd/diseaseinfo/botulism_g.htm.*
52. Federation of American Scientists, "Iraq: Biological Weapons Programs."
53. National Library of Medicine, "Gas Gangrene," *MEDLINEplus Medical Encyclopedia,* February 21, 2002, at *http://www.nlm.nih.gov/medlineplus/ency/article/000620.htm.*
54. U.S. Department of State, "Table F: Aflatoxin," *GulfLink*, February 13, 2001, at *http://www.gulflink.osd.mil/bw_ii/bw_tabf.htm.*
55. Texas Department of Health, *Ricin as a Bioterrorist Agent*, at *http://www.tdh.state.tx.us/bioterrorism/facts/ricin.html.*
56. Federation of American Scientists, "Iraq: Biological Weapons Programs."
57. *Ibid.*
58. Office of the Assistant Secretary of Defense, "Iraq's Chemical and Biological Weapons Capability," Senior Officials News Briefing, November 14, 1997.
59. Federation of American Scientists, "Iraq: Biological Weapons Programs."

university facilities, many of which are staffed by former scientists in the bioweapons programs, are believed to be capable of research and development of biological weapons on demand.[61]

A biological weapons laboratory in Iraq is believed to be manufacturing a virus code named "Blue Nile."[62] U.S. intelligence agents suspect that agent is the **Ebola virus**, a highly fatal hemorrhagic contagion. The Tahhaddy ("Challenge") lab may have 85 employees. On July 30, 2002, Secretary of Defense Donald Rumsfeld concluded that it would be reasonable to assess that Iraq's biological weapons production capabilities now are mobile, hidden in trailers and train cars.[63] On August 14, an article in *The Washington Times* reported satellite intelligence that proved at least one of Iraq's biological weapons factories is active.[64] That factory, outside Baghdad, was bombed by coalition forces during the Gulf War in 1991.

Saddam Hussein not only tested his biological weapons on animals, especially large mammals, but it is strongly suspected that testing has been done on humans as well. Iraq's Deputy Prime Minister Tariq Aziz adamantly denies this, but UNSCOM reported that teams found two human-size inhalation chambers.[65] According to Scott Ritter, live tests of binary biological and chemical weapons were conducted in 1995 on nearly 50 subjects taken from Abu Ghaib prison.[66]

Iraq's Nuclear Weapons Program

Like in its other WMD programs, Iraq's strategy has been to harness a diverse group of sources and relationships to build a successful program. Its nuclear program, with a code name of "Petrochemical-3," was divided into four groups:

1. Group I, production of uranium through diffusion barriers and centrifuges;
2. Group II, production of uranium through chemical and electromagnetic methods;
3. Group III, computer monitoring; and
4. Group IV, weaponization.[67]

Khidhir Hamza, a former Iraqi nuclear engineer, estimates that by the year 2005, Iraq will have enough weapons-grade uranium to build three nuclear bombs.[68] Although Iraq signed the 1969 Non-Proliferation Treaty, it has never ceased its quest to weaponize nuclear energy. By 1971, its nuclear program had been underway for several years under the cover of a nuclear power program. Iraq manipulated the International Atomic Energy Agency to support its efforts. The IAEA not only approved of but also arranged the purchase of basic plutonium production components as well as the training to operate the equipment.

In 1973, Iraq acquired a 40-megawatt research reactor, a fuel-manufacturing plant, and nuclear fuel processing facilities.[69] Hamza testified before the U.S. Senate that Iraq has enlisted a number of

60. Dr. Kenneth Alibek, Testimony before the Armed Services Committee, U.S. House of Representatives, 106th Cong., October 20, 1999, at *http://www.house.gov/hasc/testimony/106thcongress/99-10-20alibek.htm.*
61. Federation of American Scientists, "Iraq: Biological Weapons Programs."
62. Joby Warrick, "In Assessing Iraq's Arsenal, The 'Reality is Uncertainty': Details of Bioweapons Lab Emerge, but Not Proof," *The Washington Post,* July 31, 2002, p. A01.
63. Kelly Motz, "What Has Iraq Been Up to Recently in its Weapons Programs?" *Iraq Watch*, at *http://www.iraqwatch.org/updates/update.asp?id=wpn200208021707* (September 12, 2002).
64. Bill Gertz, "Iraqi Germ Plant Active," *The Washington Times*, August 14, 2002, p. A1.
65. Laurie Mylroie, "Special Report: Iraq in the Absence of Weapons Inspectors," *Middle East Intelligence Bulletin*, July 1, 2000, at *http://www.meib.org/articles/0007_mel.htm.*
66. Scott Ritter, *Endgame: Solving the Iraq Problem–Once and For All* (New York: Simon & Schuster, 1999), p. 105.
67. "Iraq's Nuclear Weapon Program," *Iraq Watch*, at *http://www.iraqwatch.org/wmd/nuclear.html* (September 12, 2002).
68. Julian Borger, "Iraq 'Close to Nuclear Bomb Goal,'" *Guardian Unlimited*, August 1, 2002, at *http://www.guardian.co.uk/Iraq/Story/0,2763,767235,00.htm.*
69. Khidhir Hamza, "Inside Saddam's Secret Nuclear Plan," *Bulletin of the Atomic Scientists,* Vol. 54, No. 5 (September/October 1998).

foreign corporations to aid in its nuclear procurement efforts. For example, corporations in India import equipment that they then ship to Iraq through Malaysia.[70]

When the Banco Nazionale del Lavoro scandal came out of the debate in the U.S. House in 1992 over foreign banking reform in the United States, the Italian-based branch in Atlanta was found to have loaned over $4 billion to Iraq between 1986 and 1990. About $2 billion of this went to Iraq's Ministry of Industry and Military Industrialization, and consequently was used to procure nuclear technology.[71] No later than 1988 Iraq had tried to acquire nuclear technology for uranium enrichment from Great Britain, Germany, the Netherlands, and France.[72]

Iraq kept its nuclear program well-hidden until the Gulf War, and even today little is known about it. Saddam Hussein continues to seek nuclear weapons and acquire associated technologies in novel ways. For example, in 1998 he ordered six lithotripters, high-tech machines used in the medical community to pulverize kidney stones without surgery. Operating each machine requires an electronic switch, so he also ordered 120 spare switches, and these same switches can be used to trigger nuclear explosions. The discrepancy in the order was noticed, and Saddam was denied the "spare" switches; but Saddam did receive the lithotripters and eight switches. The United Nations and the U.S. government believe it is likely he obtained many more.[73]

Prior to the Gulf War, U.S. intelligence listed two possible nuclear facilities for target during Operation Desert Storm. After the war, UNSCOM identified more than 20 sites in Iraq involved in its nuclear program.[74]

The priority Saddam Hussein places on the nuclear program is reflected in the number of personnel and funds assigned to it. Though Iraq's biological and chemical programs were assigned a few hundred engineers each, the nuclear program employed 12,000. After the Gulf War, 5,000 more engineers were added to the program.[75]

Acquiring Nuclear Materials. With the technical knowledge and resources in place to produce a nuclear weapon, Saddam needed only to gain access to weapons-grade nuclear material. Iraq sought uranium-235, an element that had to be separated from uranium-238 or plutonium, which was manufactured in reactors.

Iraq had advanced its nuclear program so rapidly that, in 1981, Israel was compelled to destroy the Osirak nuclear research facility near Baghdad.[76] The damage severely debilitated the program, which relied on foreign imported nuclear material. Iraq then decided to reduce its dependence on foreign suppliers. It invested billions of dollars into the "calutron" program, which used a process called electromagnetic isotope separation (EMIS) to enrich uranium.[77] The system was not very economical and did not produce the quantities of weapons-grade material Iraq desired. Iraq claimed that only about half a kilogram of uranium at an average

70. U.S. Senate, Foreign Relations Committee, "U.S. Senator Joseph Biden Holds Hearing on Military Involvement in Iraq," July 31, 2002.
71. U.S. House of Representatives, "Details on Iraq's Procurement Network," *Congressional Record*, August 10, 1992.
72. Federation of American Scientists, "Iraq Special Weapons: What Did We Know and When Did We Know It?" November 3, 1998, at *http://www.fas.org/nuke/guide/iraq/nuke/when.htm.*
73. Gary Milhollin, "Iraq Sanctions," Congressional Testimony, Federal Document Clearing House, March 22, 2000.
74. Federation of American Scientists, "Iraq Special Weapons."
75. CBS News, "Saddam's Bomb-Maker: Iraqi Defector Details How Determined Saddam Hussein Is to Gain Nuclear Power and How Frightening Close He May Be to Realizing That Plan," *60 Minutes II,* January 27, 1999, transcript at *http://www.nci.org/a/60min2-Iraq.htm.*
76. Donald Neff, "Israel Bombs Iraq's Osirak Nuclear Research Facility," *Washington Report on Middle East Affairs,* June 1995, pp. 81–82.
77. Federation of American Scientists, "Iraqi Nuclear Weapons," November 3, 1998, at *http://www.fas.org/nuke/guide/iraq/nuke/program.htm.*

enrichment level of 4 percent had been produced through EMIS.[78]

Iraq also attempted to develop a gas centrifuge enrichment capability, relying heavily on foreign technology and knowledge. Uranium-235 is separated from uranium-238 in a centrifuge, as heavier atoms spin away from lighter ones. In the late 1980s, Iraq began experimenting with a "model 1" centrifuge.[79] Early models used oil bearings and thus ran into vibration problems, also consuming a lot of power. Between 1988 and 1991, the Iraqis received help from German scientists in building a new "model 2" centrifuge, a Zippe-type gas centrifuge that uses magnetic bearings and a maraging steel (two times harder than stainless steel and 85 percent harder than pure titanium) rotor that spins at sub-critical levels.[80] Using the German design and equipment, Iraq succeeding in producing an output of 1.9 kg SW[81] (of uranium-235) in 1990.[82]

The program was meant to be vast, beginning with a 50-machine cascade[83] and progressing to a 500-machine cascade by 1996. The final IAEA inspection concluded that Iraq would have the capacity to produce 25 kg per year of highly enriched uranium (HEU), enough to make about 1.5 nuclear bombs per year.[84]

Gaseous diffusion is the most widely used method of uranium enrichment. More than 57 percent of the world's enriched uranium goes through the gaseous diffusion process.[85] According to Hamza, the Iraqis perfected this method in 1993. Hamza expects gaseous diffusion to be the method of choice in Iraq's nuclear program.[86]

New opportunities to acquire nuclear materials have emerged since the end of the Cold War. Russia's economic problems have become a security nightmare for its nuclear facilities, such as plants at Seversk, Zelenogorsk, and Novouralsk,[87] which account for 30 percent of the world's gas centrifuge enrichment capability.[88]

Iraq's ties to Russia from the Iran–Iraq War may open the door for weapons-grade plutonium and uranium procurement through bribery.[89] After Saddam Hussein's son-in-law, General Hussein Kamel, defected, he revealed that Iraq had planned to build a nuclear bomb out of IAEA-safeguarded nuclear fuel just before the Gulf War.[90]

Hamza predicted Iraq would have had a nuclear bomb in 1991 similar in destruction capabilities to the bomb dropped on Hiroshima had Hussein not invaded Kuwait.[91] The Hiroshima bomb had a gun-like trigger[92] to spark the nuclear reaction. The Iraqis opted to explore an implosion-type design,[93]

78. *Ibid.*
79. "Iraq's Nuclear Weapon Program," *Iraq Watch*.
80. *Ibid.*
81. SW stands for separative work, the effort necessary to separate uranium-235 (weapons ready) from uranium-238.
82. "Iraq's Nuclear Weapon Program," *Iraq Watch*.
83. Federation of American Scientists, "Iraqi Nuclear Weapons."
84. "Iraq's Nuclear Weapon Program," *Iraq Watch*.
85. Uranium Information Centre Ltd., "Uranium Enrichment," *Nuclear Issues Briefing Paper* No. 33, February 2002, at *http://www.uic.com.au/nip33.htm.*
86. "Iraq's Nuclear Weapon Program," *Iraq Watch*.
87. CBS News, "Saddam's Bomb-Maker."
88. Uranium Information Centre Ltd., "Uranium Enrichment."
89. CBS News, "Saddam's Bomb-Maker."
90. Steven Dolley and Paul Leventhal, "Overview of IAEA Nuclear Inspections in Iraq," *Nuclear Control Institute*, June 14, 2001.
91. CBS News, "Saddam's Bomb-Maker."
92. In a gun-trigger fission bomb, like the "Little Boy" dropped on Hiroshima, a barometric pressure sensor sets of a series of steps. An explosive charge sends a "bullet" down the shaft of the bomb, which strikes a uranium sphere to initiate the fission reaction and explode the bomb.
93. "Iraq's Nuclear Weapon Program," *Iraq Watch*.

which would make it small enough to fit on a Scud missile. The model is similar to the implosion-triggered "Fat Man" designed in the Manhattan Project, which had a 23-kiloton yield.

The issue of weaponization was dependent on the delivery systems of the time. Group IV was advised to keep the total payload weight to less than 1 ton. While the Scud or the Al Hussein—Iraqi modification of the Scud—remain the most attractive delivery systems, Iraq studied the possibility of a vehicle based on the second-stage engine of the Al Abid satellite launcher. Iraq seeks a better method because of the range limitations of the Al Hussein and Al Abbas (300 km/186 mi.).[94]

Radiological Weapons

Saddam Hussein is not only trying to develop traditional nuclear weapons but also radiological weapons, the so-called dirty bombs. In 1987, Iraq tested a bomb that would spread nuclear radiation over an area, causing birth defects, cancer, and death.[95] The bomb prototypes weighed 1,400 kg and carried radioactive material (2 curies[96]) derived from irradiated impurities in zirconium oxide.[97] Further prototypes were designed from the casings of 100 Muthanna–3 (renamed Muthanna–4) aerial chemical bombs.[98] The Muthanna–4 was then modified to a 400 kg weight so that aircraft could carry more. Eighty casings of the modified Muthanna–4 were produced, and their whereabouts are unknown.[99] Of the original 100 Muthanna–4 casings, 25 were said to have been destroyed and 75 were sent to the Al Qa'Qa State Establishment for an unknown fate.[100]

94. Federation of American Scientists, "Iraqi Nuclear Weapons."

95. William J. Broad, "Iraq Tested Bomb Meant to Carry Radioactive Cloud," *New York Times,* April 29, 2001.

96. One curie is the measure of activity of 1 gram of radium.

97. United Nations, "Tenth Report of the Executive Chairman of the Special Commission established by the Secretary-General Pursuant to Paragraph 9 (b) (i) of Security Council Resolution 687 (1991), and Paragraph 3 of Resolution 699 (1991) on the Activities of the Special Commission," Document S/1995/1038, December 17, 1995, §75.

98. *Ibid.*, §74.

99. *Ibid.*, §76.

100. Federation of American Scientists, "Radiological Weapons," at *http://www.fas.org/nuke/guide/iraq/other/radiological.htm*.