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Iraq's Military Forces: 1988-1993

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Note

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I. Strategy, Military Expenditures, and Arms Transfers¹

Iran may now be the rising military power in the Gulf, but Iraq's present regime is more of a threat in terms of aggressiveness and risk taking. As long as Saddam Hussein and the present Ba'ath elite is in power, Iraq is almost certain to be revanchist and aggressive in character. This may not lead to overt Iraqi use of military forces against other states, or to large scale conflicts, but it is almost certain to lead to constant Iraqi tests of Western resolve and growing Iraqi efforts to intimidate the southern Gulf states.

While Iraq's character may change under a future regime, this is uncertain. There are moderate and democratic Iraqi opposition movements, but they have little power or internal influence in Iraq. Iraq's politics are highly nationalistic and violent in character, and they are the politics of small competing Sunni power elites and clan groupings. Even if Saddam falls, his most likely successor is another small autocratic elite. The military remains the second most powerful element in Iraq, and seems likely to be the only real rival to some new Sunni "extended family".

A new elite may be somewhat more pragmatic in character, and turn inwards to deal with the problems posed by Iraq's present economic crisis, the Kurds, and the Shi'ites. Even a more pragmatic regime, however, is likely to perceive itself as surrounded by enemies, and to maintain a high level of military spending. It will seek weapons of mass destruction as long as Iran or any other state in the region possesses them -- probably including Israel. Further, any new Iraqi regime must deal with the threat posed by ethnic and sectarian conflict, and with the fact that Iraq's strategic position is exposed in many ways. It is likely to see the growing military capabilities of Iran and Turkey as a threat, and to see the West and southern Gulf states as at least potentially hostile. It is unlikely to trust Iran, and Iraq has a 1,448 kilometer land boundary with Iran. It is likely to feel it must compete with its Gulf neighbors for a share of oil revenues, and with Iran in developing weapons of mass destruction.

The issue of Kuwait is also unlikely to vanish, even if a new regime recognizes the new Iraqi-Kuwaiti boundary. The issue of reparations may poison Iraqi-Kuwait relations for years, and memories will be slow to die. Iraq's access to the Persian Gulf now consists of a 58 kilometer coastline on relatively shallow Gulf waters. Its only major port on the Gulf is Basra, which can only be reached via the Shatt al-Arab -- a river whose waters Iraq shares with Iran. Due to a U.N.-sponsored border demarcation, Iraq has lost much of its only naval

base at Umm Qasr, and even if it builds a new port, it will have to use a channel shared with Kuwait and dominated by the Kuwaiti Islands of Warbah and Bubiyan.²

The Internal Political Impact of the Gulf War and the Cease Fire

Iraq's defeat in the Gulf War has been as damaging to Iraq's military forces as the Iran-Iraq War was to Iran's forces, and the Gulf War seriously damaged many of Iraq's military units and facilities. At the same time, the Gulf War has scarcely eliminated the threat from Iraq. It has not changed Iraq's basic political character, and has left Iraq one of the strongest military powers in the region. It has created new seeds of violence with Iraq's Kurds and Shi'ites, with Iran, Kuwait, Saudi Arabia, and Syria. It has not eliminated all of Iraq's weapons of mass destruction, and it has been followed by a long series of post war clashes between Iraq and the West.³

The cease-fire in the Gulf War initially seemed to promise a very different future. These terms of this cease-fire were contained in U.N. Security Council Resolution 687, which was adopted on April 3, 1991. The resolution requires Iraq to (a) recognize the adjusted Kuwaiti-Iraqi border, (b) accept a U.N. guarantee of the border, (c) allow the U.N. to establish a peace observer force in a zone along the Iraqi-Kuwait border 10 kilometers in Iraq and 5 kilometers in Kuwait, (d) reaffirm its commitment to the chemical warfare and Nuclear Non-Proliferation Treaties, (e) allow the U.N. to inspect the destruction of all biological, chemical, and nuclear weapons, long-range ballistic missiles, and related facilities, equipment, supplies; (f) accept liability for Kuwait's losses, (g) accept liability for all pre-war debts, (h) return or account for all Kuwaiti prisoners, and (i) renounce terrorism. Iraq accepted these terms on April 4. Iraq also accepted the terms of U.N. Security Council Resolution 688, which dealt with human rights.

If Iraq had fully complied with the terms of these resolutions, it would have become a very different country. In practice, however, Saddam Hussein and the ruling elite of the Ba'ath Party made every possible effort to avoid compliance. Iraq complied with the U.N. in leaving Kuwait, but rejected the border settlement and later reasserted its claim to Kuwait. It resisted any effort to moderate the regime, limit the government's control over its Shi'ites and Kurds, and end its use of terrorism. It resisted U.N. efforts to destroy Iraq's weapons of mass destruction, and challenged U.N. efforts to provide relief wherever possible.

The first signs of this determination to challenge the U.N. emerged even before the U.N. voted on the final terms of the cease-fire agreement with the U.N.. On March 5, 1991, two days after the initial agreement to halt the fighting, Saddam Hussein appointed his cousin, Ali Hassan al-Majid as Minister of the Interior. Majid had led the suppression of the

Kurds in 1988, and his appointment was clearly designed to help Saddam take a hard line in suppressing Kurdish and Shi'ite uprisings.

In the period immediately following the war, Saddam ruthlessly put down a Shi'ite uprising in the south -- which was centered around Basra and Najaf, but encompassed most of the south. He was equally ruthless in putting down the major Kurdish uprising in the north. In both cases, the small military forces that Shi'ite and Kurdish ethnic groups were able to muster proved no match for Iraq's main force combat units, in spite of the damage they had received during the war.

Saddam began a political struggle with the U.N. over the issue of sanctions and humanitarian aid. He refused to agree on the terms offered in U.N. Security Council Resolutions 706 and 712, which would have allowed Iraq to begin exporting oil under U.N. control and with intrusive monitoring.⁴ He used his control over the Iraqi government to force a level of austerity on his people that allowed him to maintain his military machine and security apparatus, although he used rationing to ensure that the Iraqi people kept living standards at least slightly above the subsistence level. He used some of the funds he obtained through this austerity policy to ensure that the military, Ba'ath officials, internal security apparatus, and some politically sensitive Sunni groups maintained reasonable living standards, and may also have drawn on secret deposits that Iraq had made overseas before the Gulf War.

Post-war Shifts Within Iraq's Power Structure

In order to consolidate his power over the Ba'ath, the armed forces, and the nation, Saddam also began a series of purges, changes in political and military leadership, and shifts in the organization of his government. This process is difficult to put in perspective because Iraqi politics have always been authoritarian and violent, because there are so many exaggerated reports of purges and executions, because Saddam has already rotated senior heads of the military and security services to prevent power blocs from developing that might turn against him, and because Saddam has always relied heavily on his family, tribe, and the Tikriti clan to head key security positions. Saddam does, however, seem to have encountered at least some post-war challenges to his regime, and to have become steadily more dependent on his extended family.

Ironically, he began this process cloaking his actions with an image of moderation. Right after the war, Saddam talked of democratic reform and ethnic autonomy. On March 23, 1991, he announced that he was making a former Foreign Minister -- Sa'dun Hammadi - - Prime Minister. Hammadi was a Ba'ath party veteran, but was also Shi'ite who had advocated a somewhat more liberal, democratic, and less anti-Western form of Ba'athism. Iraq announced its tentative acceptance of Kurdish autonomy on March 24. Iraq announced

on May 8, 1991, that the ruling Revolutionary Command Council (RCC) of the Ba'ath would be abolished and replaced with a more democratic government. In March, 1991, it declared an amnesty for deserters who were not officers, and the coverage of this amnesty was expanded on July 21.

Whatever Saddam's original intentions may have been, at a time when he was under intense political pressure, these actions gradually became little more than a smoke screen. Saddam and the Ba'ath leadership proceeded to systematically purge the military and Ba'ath, suppress any real dissent, violate the civil rights of Iraqi citizens, putting additional military pressure on the Kurds and Shi'ites. When the RCC finally did announce the law allowing opposition parties on July, 4, 1991, it was changed to create vaguely defined security restrictions that allowed the government to ban virtually any party it wanted and explicitly forbade any ethnic or sectarian parties. By the time the new law was actually passed on September 3, 1991, it had no real meaning. Further, Saddam removed Prime Minister Hammadi from power on September 16. While Hammadi was replaced with another Shi'ite - - Mohammed Hamza Zubeidi -- Zubeidi was little more than a stooge. Even cosmetic efforts at liberalization ended, and the Ba'ath elite had effectively restored its control over most of Iraq.

Saddam carried out the first of at least six major shake-ups of his military command structure between November, 1990, and early 1994 -- four of which were completed before June, 1991. Saddam replaced his Minister of Defense Lt. General Sa'di Tu'ma 'Abbas al-Juburi -- a professional soldier and hero of the Iran-Iraq War -- with his paternal cousin and son-in-law, Hussein Kamil al-Majid, on April 6, 1991. Saddam Hussein also replaced the Shi'ite Lt. General Hussein Rashid Muhammad al-Tikriti as Chief of Staff with Lt. General Iyad Futayyih Khalifa al-Rawi, the commander of the Republican Guard in June, 1991. Rashid, who had been chief-of-staff since November, 1990, was a respected combat commander, and a former commander of the Guard who had overseen its expansion during the Iran-Iraq War.

Some experts feel that Saddam made these shifts in a way that tacitly exploited the fact that al-Juburi was a Shi'ite, and Rashid was Kurd, to signal that part of the blame for Iraq's defeat could be ascribed to other ethnic groups. Yet, al-Juburi was retained as a senior military advisor and Rashid was later made supervisor of the Republican Guard -- a position that ranks above the Guard's operational commander. Accordingly, the shifts may have been part of a long series of rotations designed to prevent any center of power from threatening Saddam's authority.

Unconfirmed reports surfaced later that Saddam executed or imprisoned 18 generals during June through August, 1991, for an assassination plot. These reports seem very

uncertain. What is clear, however, is that Saddam continued his policy of shifting and rotating commanders to ensure that no group of military or internal security forces would become loyal to a potential rival. He removed Major General Wafiq Jasim Samarraï as head of military intelligence, purged its command, and put in more loyal officers. .

The public stance of the Iraqi government during this period was that it did not face any internal problems and could meet all external threats. On October 12, 1991, Saddam announced that Iraq could withstand the U.N. sanctions for "twenty years" at an Iraqi-organized "conference of Arab popular forces" Yet, there are indications that Saddam was having growing problems with the Juburi clan. These problems were important because the Juburis had collaborated with Saddam's tribe for many years, and a number of Juburis had reached senior positions in the armed forces and internal security apparatus.⁵

Saddam may also have had problems closer to home. On November 6, 1991, he removed Hussein Kamil al-Majid from the post of Defense Minister, and replaced him with Interior Minister Ali Hassan al-Majid, another paternal cousin and Hussein Kamil al-Majid's cousin.⁶ Ali Hassan al-Majid had led the repression of the Kurds in 1988. Saddam also temporarily closed down Babil, the newspaper published by his elder son, Uday -- after the Uday had taken the side of Hussein Kamil.

This shift was unexpected because Hussein Kamil al-Majid had risen rapidly in the regime in previous years. Kamil had led the build-up of Iraq's military industries and mass destruction weapons programs as Minister of Industries and Military Industrialization. Some experts feel Saddam's action was the result of a rift within the two main branches of Saddam's clan -- and intelligence reports surfaced later that rival security forces of Ali Hassan al-Majid and Hussein Kamil al-Majid had clashed when Ali Hassan replaced Hussein Kamil al-Majid. Others feel that Saddam needed firmer military support. Kamil's age (about 37), and lack of formal military training or experience, seem to have created friction with senior military officers.⁷

Saddam Hussein also appointed Sa'dun Hammadi, he ex-"reform" Prime Minister, as a Presidential adviser at this time. The position had little real influence but Saddam's "rehabilitation" of Hammadi may have been part of a broader series of attempts to rebuild support from Shi'ites and other leaders in the Ba'ath Party that were not part of Saddam's immediate coterie.

In the months that followed, Saddam Hussein continued to increase the role of his tribe and extended family, including members of the Ibrahim and Majid branches, in senior security positions. On November 13, 1991, he appointed a maternal half-brother, Watban al-Tikriti, to replace Ali Hassan al-Majid as Interior Minister. He also appointed Barzan al-Tikriti (another half-brother) as Iraq's Permanent Representative in Geneva and a foreign

affairs adviser to Saddam. He appointed Sabawi al-Tikriti as head of the General Intelligence Service.⁸ All three brothers had fallen out of favor during the 1980s, and Watban had been removed from power when and Barzan (another Saddam half-brother) Barzan al-Tikriti was purged as intelligence chief in 1983. Barzan, Watban, and their brother Sabawi have all been slowly rehabilitated since 1988.⁹

On December 4, Saddam began to heal whatever divisions had led him to fire Hussein Kamil al-Majid from the post of Defense Minister and close down Babil. He allowed Babil, to resume publication with Uday as editor. The first issue described a cordial lunch attended by Saddam and other major members of the Tikriti clan. Saddam then restored Hussein Kamil al-Majid to power. He appointed him as a presidential adviser on February 13, 1992. Al-Majid retained his rank of Lieutenant General and the privileges of a Cabinet minister, and Hussein Kamil al-Majid was later restored to his role in charge of Iraq's defense industries. These moves seem to have been critical steps in restoring the unity of the Tikriti clan.

More publicly, Saddam Hussein dismissed the Minister of Health, Abd al-Salam al-Sa'id on December 23, 1991 -- making him the scapegoat for the deteriorating economic and public health conditions caused by the U.N. sanctions.¹⁰ This followed a pattern where Saddam would find officials and businessmen outside his key supporters he could blame for Iraq's problems. Saddam also took a progressively harder line on internal security issues. The same day he fired al-Said, the Interior Ministry warned that an amnesty for turning in unlicensed firearms would only last 10 more days. Uday called for the public execution of dissidents in his newspaper, Babil, on January 1, 1992.

Saddam Hussein continued his policy of rotating many of his key commanders to forestall any risk of a coup. General Hussein Rashid was brought back to power as supervisor of the Republican Guards in June, 1992. Lt. General Iyad Futayyih Khalifa al-Rawi, another hero of the Iran-Iraq War and a key Saddam Hussein loyalist, was made chief-of-staff. At the same time, Saddam added still more family members to senior positions, while retaining other family members in positions they had occupied for years. Kamal Yassin, a member of the Ba'ath ruling council and Saddam's brother-in-law and cousin -- was made deputy head of the Ba'ath military bureau. His brother, Irshid Yassin, remained head of Saddam's personal security force -- a position he had occupied since 1986.

Saddam may have had other reasons for these moves. In late June, 1992, unconfirmed reports surfaced that Saddam may had blocked a nascent coup attempt within the military. Initial reports claimed that a mechanized brigade of the Republican Guard, under the command of Brigadier Sabri Mahmoud in Taji, an industrial area northwest of Baghdad, was preparing an assault on Saddam Hussein's headquarters in Baghdad, when the

coup was detected and halted by Iraqi security forces. Other reports talked of fighting between the military security forces. These may have included clashes between elements of his personal security force, the Special Republican Guards, and the regular Republican Guards in Baghdad and Kirkuk during June 30 to July 2.

At least some elements of these reports seem to be correct. There has been no confirmation of these details, however, and a few U.S. experts feel that the coup reports were inspired by a series of command upheavals that followed a new large-scale purge of military officers, possibly totaling up to 135 officers. According to these reports, Saddam called a large meeting of his loyal officers together, charged the U.S. and Jordan with supporting a military coup against him, and used this as a rationale for his purge. While Jordan denied any complicity in a plot against Saddam, Jordan did begin to enforce sanctions on transshipments of goods and oil to Iraq, although it refused to allow U.N. inspectors in Aqaba ¹¹

The Iraqi cabinet was reorganized again on July 30, 1992. Saddam made his Foreign Minister, Ahmed Hussein, the Finance Minister and promoted the Deputy Foreign Minister, Mohammed Sa'id Sahhaf, to Foreign Minister. He dismissed the former Finance Minister, Majid Abed Jaafer, and made the head of the Iraqi Atomic Energy Organization, Humam Abd al-Khaliq Abd al-Ghafur, the Minister of Education. The reasons for these changes are unclear, but they seem to have been designed to tighten control over domestic affairs and they indicate that Saddam remained under pressure.

There were repeated unconfirmed reports of additional arrests and executions in late 1992, and during the course of 1993, some of which affected the Juburi clan. For example, reports appeared in mid-September, 1992, that Saddam Hussein had executed a total of 26-30 more officers, including General Abed Mutleq Juburi. In October, he was accused of executing 19 more officers, including two officers blamed for being insufficiently ruthless in putting down the Shi'ite rebellion in the south: Brigadier Anwar Ismael Hentoosh, and Brigadier Amir Rashid Hasson.¹² It is difficult, however, to determine whether these reports are correct and how serious Saddam's problems with the Juburis really were. Saddam's problems with some Juburi officials and commanders began as early as 1989, and many Juburis continued in positions of responsibility at the beginning of 1994.¹³

Unconfirmed reports appeared of the execution or arrest of former Interior Minister Samir Abd al-Wahab al-Shaykhali in April, 1993, and there was definitely another series of arrests and executions of civilians and military officers in August through September, 1993. These arrests and executions began on August 20, 1993. They eventually involved a mixture of military officers and civilians associated with the Juburi clan, Ubayd clan, and Saddam Hussein's home town of Tikrit. Up to 100-150 men were involved, and evidently Jassim

Mawlud Mukhlis and Saqr Mukhlis. Saqr was the son of the Mawlud Mukhlis who was the Tikriti landlord who was the original patron who had opened up the officer corps to Tikritis under the monarchy. Another well known Iraqi who was executed was Brigadier General Raqhib Tikriti, a military physician who was head of the Iraqi Physician's Association.

While there are no reports of fighting or troop movements that indicate a coup attempt actually took place, there are unconfirmed reports that the arrests followed an effort to obtain Western support for a coup. These reports indicate that the plotters asked for Western air support over Baghdad, assurances the Kurds would not seize Kirkuk, and assurances that Iran would not intervene in the south.¹⁴

A number of U.S. and British experts feel that these arrests were the result of a serious assassination attempt. Yet, Saddam Hussein and the Ba'ath elite may have been reacting to threats that as yet had no been transformed into plans. Saddam made little effort to lower his visibility. He also indulged in media events that seemed designed to show his wealth in spite of Iraq's growing economic problems. One such example was the widely televised presentation of a gold coach to Saddam by a group of Ba'ath "admirers".¹⁵

During the rest of 1993, Saddam mixed rebuilding of his military forces, showpiece economic projects, and personal self-glorification with efforts to blame Iraq's ills on the West and Arab "traitors". Saddam did, however, show some signs that he faced growing popular unrest. There were unconfirmed reports in late 1993 that Saddam had mined Iraq's oil fields and threatened to destroy them if he should be attacked, and that he had set up a major new alternative command post in Tikrit to provide an alternative to relying on Baghdad.¹⁶ More importantly, on November 26, 1993, Iraq appeared to agree to U.N. terms for long-term monitoring of its weapons of mass destruction activities and facilities. It did so in return for U.N. lifting oil embargo as called for in U.N. Security Council Resolutions 688 and 715. While Iraq did meet all the U.N.'s terms, there were reports from Baghdad that this decision was the result of a meeting Saddam had held with both senior political and military officials, and that a number of his supporters including several senior generals, argued that this step was necessary to give Iraq the oil revenues and import flexibility it needed to reduce popular unrest.¹⁷

The Post-war Role of Iraq's Intelligence and Internal Security Services

Saddam Hussein has survived the Gulf War, and has been able to rebuild most of his pre-war power structure intact. He has, however, had to narrow his base of support to what is increasingly becoming a "family" regime, and has had to continuously strengthen his security and intelligence forces. These forces include both intelligence units, and military and paramilitary units like the Republican Guards, Special Republican Guards, and Saddam

Hussein's bodyguards, which total up to 15,000 men. They include intelligence and security services that help protect Saddam Hussein and the Ba'ath elite. These organizations are all headed by officers supposedly loyal to Saddam Hussein, and some of whom are related to him, members of his Al Bu Nasser tribe, or the other two branches of the Tikriti clan.

Even these forces are the subject of constant changes in command, at least some of which involve arrests or executions. The main intelligence and security services include:¹⁸

- o The Presidential Affairs Department or Special Security Service (Amn al-Khass). This organization operates within the presidential palace. It watches over the Republican Guards and other security forces, and has also been used to make purchases of key weapons and technologies. It has some military elements, including armor. Some experts feel it manages Saddam Hussein's secret foreign accounts, intelligence operations involving the purchase of foreign arms and technology, and some aspects of security within Iraq's military industries. It was headed by Major General Fanar Zibin Hassan al-Tikriti during the Gulf War, and is now by Saddam's younger son, Qusay.
- o The Protective Forces (Quwat al-Himaya), headed by Major Ruzuq Sulayman.
- o The General Intelligence Service (Al-Mukhabarat al-Amma). The General Intelligence Service is the largest of Iraq's intelligence services, and also dates back to the time of the monarchy. It was originally manned largely by professional police and army officers, but is now manned largely by Ba'athists who have been carefully selected for their personal loyalty to Saddam. It plays a role in internal security. More importantly, it conducts intelligence and assassination operations overseas, and has links to extremist and terrorist organizations. It was converted to a de facto extension of Saddam's personal office under the direction of Ali Hassan al-Majid, who controlled the organization for several years before 1987. Saddam Hussein has been extremely careful to rotate heads of the General Intelligence Service, and at the same time, to ensure they are loyal. Ali Hassan al-Majid was replaced by General Abd al-Rahman Ahmad Abd al-Rhaman al-Duri. He was replaced by Saddam's half-brother Siba'wi Ibrahim, who was replaced in turn by Major General Sabir Abd al-Aziz Hussein al-Duri after the Gulf War.
- o Military Intelligence (Al-Istikhbarat al-Askariyya). This organization dates back to the time of the monarchy and is manned largely by army officers. It focuses on foreign military threats, but also is responsible for internal security within the Iraqi military. It has ties to some radical movements, and has conducted intelligence operations overseas. During the Gulf War, military intelligence was headed by Major General Sabir Abd al-Aziz Hussein al-Duri -- a Sunni Arab from Dur, the

hometown of Izzat Ibrahim, the Deputy Chairman of the Revolutionary Command Council. Duri was an old-time Ba'athist with ties to the army and senior party leaders, but was replaced after the Gulf War by Major General Wafiq Jassim Sammara'i. Sammara'i was later arrested and replaced by either Major General Khalid Salih al-Juburi or Major General Abd al-Khadir Salman Khamis (a Tikriti related to Saddam). It is not clear who is now head of military intelligence, although it may be Major General Fanar Zibin Hassan al-Tikriti. Some experts feel that the true power in military intelligence may be Colonel Abd Hassan al-Majid, who happens to be Ali Hassan al-Majid's younger brother.

- o General Security or State Internal Security (Al-Amn al-Amm). This organization focuses largely on internal security, but sometimes conducts foreign operations. It was headed by Major General Abd al-Rahman al-Duri before the Gulf War, but Saddam appointed his half brother, Siba'wi Ibrahim, as the head after the Gulf War.
- o Ba'ath Party Security (Amn al Hizb). This security office develops intelligence on party members, and has security cells throughout the Ba'ath Party.

Saddam created a new Tribal Chief's Bureau (Maktab al-Shuyukh) after the Gulf War, which pays tribal leaders to control their tribes, spy on possible tribal dissidents, and provide arms to loyal tribesmen to suppress any dissidents. It is headed by Major Saddam Kamil, a cousin and son-in-law of Saddam Hussein and Hussein Kamil's younger brother. He also strengthened and reorganized the Military Bureau of the Baath Party. The Military Bureau is headed by Saddam, and his deputy is his cousin and brother-in-law, Kamil Rashid Yassin. It acts as a commissar system to indoctrinate the armed forces, and check on their political loyalty.

The problem in interpreting the impact of the Gulf War on Iraqi politics, is that this impact is probably most important within Saddam Hussein's "extended family" in the Baath, the key clans, armed forces, and internal security apparatus where any details only become apparent through arrests and executions. There are few signs Saddam and the Ba'ath elite faced serious external or popular threats in spite of Iraq's military defeat in the Gulf War, and the steadily deteriorating Iraqi economy. Opposition groups like the Kurds, Shi'ites, and Iraqi National Congress have no meaningful military power, and Saddam seems to be able to rule by using his extended family.

At the same time, Saddam Hussein's constant purges of the military and security services have not prevented problems within his key instruments of repression, and he faced at least some opposition within key clans like the Juburi and Ubayd. He is steadily more isolated and alienated from other clans, the military, and many leading elements of Sunni

society. He faces the threat that his growing reliance on force, and a steadily smaller elite, could provoke a coup or assassination by other leaders within the Baath elite, security forces, or the armed forces. Unfortunately, this kind of shift in power may well replace Saddam Hussein with another violent and authoritarian leader.

Iraq's Crisis with the Kurds

Saddam's efforts to consolidate power has been also marred by ethnic and sectarian conflicts that have had a significant impact on the power structure in Iraq, and may lead to future conflicts within and outside Iraq. The most significant of these conflicts has been the struggle between the central government in Baghdad and Iraq's Kurds. The Kurds make up about 15-20% of the population -- located largely in the northeast -- and Kurdish separatism has had a bloody history. Kurdish uprisings long predate Iraq's creation in 1920, and the Iraqi central government have been extraordinarily ruthless in putting down Kurdish resistance since the late 1960s. The central government shelled and bombed civilians in Kurdish villages from 1970 to 1975. During the Iran-Iraq War, and after the cease-fire in 1988-1989, it used napalm, poison gas, and forced relocations in ways that amounted to genocide.

The Kurdish issue, however, is not black and white. Many Iraqi Kurds are assimilated into Iraq's economy and political structure and do not support Kurdish separatism. Kurdish rebel groups have pursued a political and economic agenda that have sometimes been extremist, and which many Iraqis see as threatening to divide the nation or cost it much of its oil reserves and revenues. What some Kurds see as Kurdish patriotism, many Iraqis see as treason. Iraqi Kurdish factions have often taken money and support from Iran. Some fought on Iran's side in the Iran-Iraq War, after taking money from Baghdad to fight against Iran for Iraq. The fighting has been ruthless and bloody on both sides, and torture, attacks on civilians, and the execution of prisoners have been a two way street -- although nothing Iraq's Kurdish rebels have done can excuse the near genocidal treatment of rebels village and civilian during Iraq's Operation Anfal in 1988.

This past is not an optimistic prelude to the present or the future. The aftermath of the Gulf War has created a U.N. protected Kurdish enclave with its own government. At the same time, there is no political settlement between the Kurds and the central government in Baghdad, and the Iraqi army is deployed in an attack ready position on the border of the Kurdish security zone. The Kurdish uprising in Iraq has helped to trigger new fighting between Turkey and its Kurds, and within Iran, and threatens to isolate Iraq's Kurds. In many ways, it is a new war waiting to happen.

A chronology of the events that created this situation is shown in **Table XI-1**. This chronology has been shaped by three main factors: A heritage of violent efforts by Iraq's Kurds to win real autonomy or independence, a continuing pattern of ruthless central government efforts to put down any Kurdish attempts at winning independence, and the fact the U.N. and U.S. did not provide active military support for the Shi'ite or Kurdish uprisings that took place right after the Gulf War. It is worth reviewing in detail both for what it says about the character of the regime in Baghdad and because it shows why it is questionable whether the divisions between the Kurdish enclave and Iraqi government can be peacefully resolved.

In brief, it shows that the Kurdish uprisings that took place after the cease-fire gave the Kurds control over much of northeastern Iraq, where most of Iraq's Kurds live. The Kurds won this control because of the paralysis of the Iraqi army and disorganization within the security services, and not because of their military strength. In fact, the various pro-government tribal militias that the Kurdish rebel groups refer to as Juhush, or Saddam's "donkeys," often persuaded the Iraqi army forces in Kurdistan to leave virtually without a fight. As a result the Kurds were able to seize control after a few skirmishes with the security forces and Ba'ath Party cadres in the area.

This Kurdish success, however, left a power vacuum, and Saddam sent the army back into the area when he realized the U.N. would allow Iraqi troops and helicopters to operate against the various uprisings. The U.N. did try to protect the Kurds by forcing Iraq to observe the terms of the cease-fire and to stop using its combat aircraft against the Kurds. U.S. F-15s shot down one Iraqi air force Su-22 on March 20, and then another Su-22 on March 22. By limiting itself to attacks on Iraqi fixed wing fighters,

However, Iraqi army forces were still able to attack the Shi'ites and Kurds with little resistance. Iraqi forces retook Karbala in the south and Kirkuk in the north by March 28. They drove some 70,000 Shi'ites across the border into Iran, killed and imprisoned many others, and trapped still others in the extensive marsh areas in the south.¹⁹

Iraq surrounded cities like Irbil and Kirkuk in the north with army units, and sent brigades to control all key routes and bridges. It used artillery, multiple rocket launchers, and armed helicopters against any pockets of resistance. The Kurdish guerrilla forces had only a negligible capability to resist. The long history of Iraqi attacks on Kurdish civilians, and Iraq's use of chemical weapons against Kurdish civilians, led many Kurds to flee as the Iraqi troops advanced, and one million to 1.5 million Kurdish refugees had moved near to, or across the Turkish and Iranian borders.²⁰

This flood of refugees and the risk a new Kurdish enclave would be created in Turkey, led the U.S. and U.N. to intervene to protect the Kurds and prevent the

establishment of refugee camps and enclaves along the border areas. On April 5, the U.N. passed Resolution 688, condemning and demanding an end to Iraqi repression of the Kurds. On April 7, the U.S. had begun air drops of food. On April 8, Secretary of State Baker promised the Kurds food, shelter, and medicine, and President Bush established a airlift called Operation Provide Comfort.

Repeated Iraqi attacks on the Kurds then led the U.S. to declare that Iraqi would not be permitted to fly aircraft north of the 36th parallel on April 10, 1991. The U.N. also put heavy pressure on the Iraqi government to halt its attacks, and allow U.S. and allied troops to move into northern Iraq to help set up refugee camps in the border area. As a result, Iraq signed an agreement on April 18, 1991, that effectively created a U.N. controlled and demilitarized security zone for the Kurds, a much larger Kurdish controlled enclave, and a no-fly zone north of the 36th parallel. The agreement allowed the U.N. to station 500 security guards to protect relief operations, and was to remain in force until December 31, 1991, with the possibility of renewal.

Iraq, however, immediately began to test the U.N.'s resolve. Some 200 Iraqi policemen attacked Kurds in the town of Zakhu on April 21. Iraqi anti-aircraft artillery fired on U.S. reconnaissance jet patrolling northern Iraq on May 7. Iraqi troops fired on British troops in Dahuk on May 13, and fired on a U.S. army helicopter on May 14. They clashed with Kurdish demonstrators on June 5, and stole 7 tons of relief supplies for the Kurds on June 6.

When it became apparent that these tactics did little more than provoke the U.N., Saddam entered into prolonged negotiations with the Kurds that allowed him to delay any real settlement until U.N. forces had left northern Iraq, and until the long standing tensions between Turkey and the Kurds had largely shut off any support to the Kurds from the north. The U.N. forces in Iraq reached a peak in early May of about 15,000 men, including French, Dutch, Italian, British, and U.S. elements, but there was no political support for the kind of long-term occupation that would have fully secured Kurdish autonomy. U.N. forces left Dahuk on June 15, and the number of troops in Iraq dropped to around 8,000. The U.N. force was cut to 5,100 on June 23. The U.N. withdrew all forces from Iraq on July 15, 1991, although it initially left a small brigade in southern Turkey.

Since mid-1991, the Ba'ath regime has enforced a near economic boycott on the Kurds, manipulated Iraq's currency, and used military pressure to push the Kurds into a political settlement that would allow the Baghdad government to restore control over the north and keep control of Kirkuk and all of Iraq's oil revenues.²¹ It has also provided money and arms to rebellious Kurdish groups in Turkey in an effort to persuade Turkey to ask U.N. forces to leave its soil. These Iraqi efforts helped lead to the removal of all U.N. ground

troops when the U.N. agreement with Turkey that allowed it to station troops on Turkish soil expired on September 30, 1991. There still, however, is a small military mission which patrols the Kurdish security zone, the U.S. keeps some military personnel in Turkey, and Turkey still provides basing for British, French, and U.S. aircraft to provide security for the Kurds.

Iraq's actions have also led the Kurds to suspend autonomy talks with the Iraqi government, and to hold their own elections were held in mid-May, 1992. Although these elections produced a deadlock between the two main Iraqi Kurdish factions -- Talabani's Patriotic Union of Kurdistan and Barzani's Kurdish Democratic Party -- both parties then to agreed to set up a joint "government" with its capital at Irbil. They agreed to create a 105 man assembly, which met for the first time on July 4, 1992. The assembly had 50 delegates each for the Barzani and Talabani factions, and 5 seats for Kurdish Christians. This agreement has allowed the Kurdish enclave to act as an autonomous area, although the Iraqi government has called the new Kurdish leadership "illegal" and labeled its fifteen ministers as "bandits."

In the months that have followed, the Kurdish government has survived, and the Kurds have gradually built up an economy based partly on agriculture and smuggling between Turkey and Iraq. The Kurds have begun to recover from fighting with the Iraqi government that destroyed nearly 2,000 of the 4,000 Kurdish towns and villages in the region since 1970. They maintain a tenuous relationship with Turkey by agreeing to keep Turkish Kurds on their territory from launching military operations against Turkey, and to provide data on those Turkish Kurds who use their territory as a sanctuary. The Iraqi Kurds have fought at least one clash with Turkish Kurds in the PKK.

The Iraqi Kurds have also slowly built up their forces. In early 1994, the Kurdish militia claimed to have an army of about 10,000 men, and claimed to be forming a force of about 35,000 irregulars, with a total of 16 brigades. A force of approximately 8,000 Peshmerga guerrillas has been given training as military and security forces at a center north of Sulaymaniyah, and Kurdish forces possess a few armored vehicles and artillery weapons. This gives the Kurds some defensive capability, although they lack any meaningful strength of heavy weapons, and even significant numbers of anti-tank and light anti-aircraft weapons.

The economic and military plight of the Iraqi Kurds, however, is still grim. Many foreign relief workers were forced to leave southern Iraq in August, 1992, and Iraq continues to harass relief workers in the north.²² The central government enforces an embargo over shipments going to Kurdish territory from the south, and Iraqi forces continue to sporadically shell Kurdish areas. Iraqi ground forces are deployed in positions around

Irbil, Chamchamal, Kifri, and Sulaymaniyah where they could quickly invade unoccupied Kurdish territory.

Nearly four million Kurds in northern Iraq live without any real security from Iraqi military forces other than the U.N.. Iraqi aircraft have usually stayed south of the 36th parallel since the U.N. declared this a "no-fly" zone, but nearly 100,000 Iraqi troops are deployed on the 180 mile border of the Kurdish occupied area and minor clashes and artillery exchanges are common. The Kurds have little support from Iran and uneasy relations with Turkey. They have supported Turkey in fighting its own Kurds -- as their only way of retaining Turkish tolerance -- but Turkey continues to see the Kurdish enclave in Iraq as a potential threat.

It is also important to understand that the tension between Iraqi Arabs and the Iraqi Kurds may go beyond a struggle between Iraq's Kurds and Saddam Hussein. Some of the key groups in the Kurdish enclave -- like the groups that made up the pro-government Kurdish militia -- have had relatively good relations with the Iraqi army. The Iraqi people have not been educated or propagandized to see Iraqi Kurds as enemies or traitors. The Kurdish uprising after the war is also understandable to many Iraqi Sunnis within the military, and is not seen as the kind of threat to Sunni security posed by Shi'ite fundamentalism.

At the same time, Iraqis in the security services and some elements of the armed forces have been systematically taught to deal with the Kurds who support Barzani and Talabani as traitors and criminals for more than a quarter of a century. The recent events described in Table XI-1 have almost certainly reinforced that feeling. They have created a cycle of violence and counter violence that will be difficult to end peacefully, even if the Kurds and central government should try to negotiate a serious autonomy agreement. This may be true even if Saddam Hussein should fall. Any authoritarian regime that replaced him would have to draw on many of the same men who have used extreme violence against the Kurds in the past, and it is difficult to see how an authoritarian regime could co-exist peacefully with a separate Kurdish enclave.

Table XI-1Iraq's Crisis With Its Kurds: A Chronology²³

- 03/16/88 Baghdad bombards Halabja with mustard gas and nerve gas in an attempt to disband an Iranian force and Kurdish rebels that had captured this city twenty four hours earlier. More than 5,000 people, mainly civilians, lose their lives after being blinded, burned or asphyxiated by the deadly gas.²⁴
- 03/02/91 U.N. Security Council approves Resolution 686, which sets out the allies' conditions for a cease-fire.
- 03/03/91 U.N. Coalition and Iraq agrees to informal cease-fire. Iraqis accept virtually all allied terms for the cease-fire, which include a ban on Iraq's use of fixed wing military aircraft inside Iraq. President Bush interprets the resolution as preventing Iraq from using helicopter gunships to quash the Kurdish and Shi'ite rebellions against Saddam that broke out within days of the end of the war. Iraqi helicopter flights were not specifically barred under the informal cease-fire agreement.
- Iraq accepts terms of U.N. Security Council Resolution 686, establishing a cease-fire.
- 03/06/91 Iraqi President Saddam Hussein's cousin Ali Hassan al-Majid, who was widely blamed for the suppression of the Kurds in 1988, appointed Interior Minister. The appointment came during the Shi'ite and Kurdish post-war uprisings. Ali was expected to act more forcefully to suppress the rebellions than his predecessor, Samir Abd al-Wahab al-Shaykhali.
- 03/20/91 U.S. forces shoot down Iraqi fighters near the northern Kurdish city of Kirkuk, enforcing the March 3 agreement between the U.N. Coalition and Iraq that Iraq would not use fixed wing aircraft in combat against rebels inside Iraq.
- 04/05/91 Spokesman for Iraqi dissidents claims that the Iraqi army used chemical weapons against civilians in suppressing the Shi'ite and Kurdish post-war rebellions. No independent confirmation of the charge.
- U.N. Security Council adopts Resolution 688 in response to reports of the suppression by Iraq of the Kurdish and Shi'ite rebellions. Calls for an end to the repression and demands Iraq allow humanitarian access to its population.
- 04/10/91 Bush Administration warns Iraq not to fly aircraft or undertake military operations in areas where allied relief operations, primarily for the Kurds in the north, were taking place. The Administration defines the off-limits area primarily as anywhere north of the 36th parallel, where the allies were trying to create a safe haven for the Kurds and encourage their repatriation.
- 04/12/91 Iraqi forces launch attacks on Kurdish forces around Irbil, north of the 36th parallel in violation of U.S. warnings. Other Iraqi attacks reportedly occurred in Kurdish areas south of the parallel, including Sulaymaniyah. Bush Administration spokesmen does not confirm the reports, adding that there had been no attempts by Iraq to impede the refugee relief operations for the Kurds in northern Iraq.
- 04/16/91 President Bush decides to send U.S. troops into northern Iraq to build refugee camps and guarantee protection for the Kurds, in conjunction with several European allies.

- 04/18/91 Iraq and the United Nations sign Memorandum of Understanding providing for a U.N. humanitarian presence in Iraq and the stationing of 500 U.N. security guards in northern Iraq to protect the relief operations. Agreement to remain in force until December 31, 1991, with the possibility for renewal.
- 04/21/91 About 200 armed Iraqi policemen enter the Kurdish town of Zakhu as Iraqi soldiers withdraw. The military withdrawal is the result of an agreement between the allies and the Iraqis as the allies were establishing a safe haven for the Kurds. A senior U.S. military officer calls the arrival of the Iraqi police contrary to the spirit of the agreement. Iraq describes establishment of a security zone in northern Iraq as an infringement on its sovereignty.
- 04/22/91 Iraqi troops, which withdrew from Zakhu under the agreement with the U.S. military, return to the outskirts of Zakhu, deterring many Kurds from returning to their homes. Iraqis in and around Zakhu reported as friendly and not seeking confrontation with the allies, but some Iraqi troops overlooking Zakhu fire harassing machine-gun and mortar rounds.
- 04/24/91 In response to U.S. warnings, Iraq agrees to move the troops several kilometers away from Zakhu.
- Iraqi Kurdish leaders announce they have agreed in principle with the Iraqi government on a formula to allow them autonomy in northern Iraq. (However, in later months, Iraq hardened its positions in the talks, and no agreement has been signed.)
- 04/25/91 Following U.S. pressure, Iraq begins moving its armed policemen out of Zakhu as well.
- 05/07/91 U.S. officials say Iraqi anti-aircraft artillery opened fire on two U.S. reconnaissance jets over northern Iraq. Fifth such incident since the relief operation for the Kurds began.
- 05/08/91 U.S. and Iraqi military officials meet to discuss the incident and, on May 9, Iraq assures the United States that such actions will not be repeated.
- 05/13/91 British marines exchange fire with Iraqi soldiers guarding Saddam Hussein's summer palace near Dahuk. The allies had allowed the Iraqi forces to retain control of the palace when the security zone for Kurdish refugees was expanded to the outskirts of Dahuk on May 2. The Iraqis, as requested, withdraw from the new areas being occupied by the allies. Dahuk is a Kurdish town in northern Iraq just outside the security zone set up by the U.N. Coalition to facilitate the return of Kurdish refugees to their homes.
- 05/14/91 Iraqi troops open fire as a U.S. army helicopter flies past them just outside the allied security zone in northern Iraq. Helicopter is not hit.
- 05/22/91 Iraq agrees to withdraw from Dahuk itself and allow a small contingent of noncombatant military and civilian relief experts into the town to facilitate Kurdish repatriation.
- 05/24/91 Iraq, after initial opposition, signs agreement with the United Nations permitting the presence of U.N. security guards as a replacement for the allied troops in northern Iraq, when the allies withdraw.
- 06/05/91 Clashes between Iraqi troops and Kurdish demonstrators in several towns outside the allied security zone. U.S. State Department says the Kurds may have provoked the violence in an effort to persuade U.S. troops not to withdraw from northern Iraq.

- 06/06/91 The Bush Administration charges that massive shipments of flour (over 7 million pounds) intended for Kurdish refugees were diverted into the Iraqi Government's food rationing system.²⁵
- 07/19-20/91 Clash occurs in Sulaymaniyah, which result in Iraq's loss of control of that city to the Kurds. The Iraqis do not attempt to forcibly recapture Sulaymaniyah after it comes under Kurdish control.
- 07/21/91 Iraq's Revolutionary Command Council, headed and dominated by Saddam, expands a March 1991 amnesty for army deserters and granted a pardon for regime opponents. The amnesty does not apply to military officers.
- 07/1991 The last Western ground troops withdraw, leaving the protection of 3.5 million Iraqi Kurds to a Turkey-based allied air umbrella.²⁶
- 09/03/91 Revolutionary Command Council issues law allowing opposition political parties but banning any party but the ruling Ba'ath from organizing in the military or security services. The law also bans parties that advocate the overthrow of the state, possess weapons, or engage in acts of violence. In addition, the formation of parties based on ethnicity or sectarianism is prohibited, preventing the Kurds and Shi'ites from forming their own parties. The law is first approved by the National Assembly on July 4, and amended to include several of the above conditions on August 24.
- 09/10/91 Office of Sadruddin Agha Khan, the U.N. representative for humanitarian affairs in the Persian Gulf, says it has reports of serious clashes between Iraqi and Kurdish forces in northern Iraq. Iraq acknowledged the clashes but says its actions fell within the normal duties of its security forces. The attacks on the Kurds reportedly included air strikes north of the 36th parallel, which were precluded.
- 09/12/91 *Washington Post* reports that in August an Iraqi jet violated the injunction against flights from the southern port of Umm Qasr, which is in the demilitarized zone between Iraq and Kuwait.
- 09/14/91 Saddam Hussein ousts Prime Minister, Sa'dun Hammadi, appointed at the height of the Shi'ite and Kurdish rebellions in March. Hammadi, a Western-educated Shi'ite Muslim, was an advocate of a more pluralistic, liberal Ba'athist regime and he supported full compliance with U.N. and allied cease-fire terms.
- 09/30/91 Assistant Secretary of State for Near Eastern Affairs Edward Djerejian meets with Kurdish leader Jalal Talabani in Washington. He reportedly tells Talabani that the United States opposes the fragmentation of Iraq but supports participation for all ethnic groups in Iraq in a pluralistic system of government.²⁷
- 10/07/91 Kurdish guerrillas shoot and kill about 60 unarmed Iraqi soldiers they had captured in clashes outside Sulaymaniyah. Kurdish citizens in Sulaymaniyah tell journalists that the Iraqi army had launched a surprise, unprovoked attack on the city, which resulted in the capture of the Iraqi soldiers. Kurdish leader Massoud Barzani, whose forces had captured the Iraqis, orders an investigation of the killing of the Iraqi military personnel. Rival Kurdish leader Jalal Talabani condemns the murder of the Iraqis but says it may have been perpetrated by Iraqi agents.
- 10/08/91 Kurdish guerrillas and the Iraqi Government sign a cease-fire after a flare-up of fighting around the cities of Kifri and Sulaymaniyah. Fighting was says to be continuing despite the truce.

- 10/26/91 Kurdish leader Massoud Barzani, leader of the Kurdish Democratic Party (KDP) challenges his rivals, primarily Patriotic Union of Kurdistan (PUK) leader Jalal Talabani, to an election for supreme leadership of the Kurdish movement. Challenge is provoked by an increasing divergence between the two main Kurdish leaders -- Talabani advocated abandoning autonomy talks with Baghdad and returning to all out guerrilla warfare, while Barzani wants to continue to engage Saddam Hussein diplomatically. Barzani generally appeals to more conservative, tribally-based Kurds whereas Talabani draws his strength from urban, better educated, left-leaning Kurds.
- 11/02/91 Iraq is reported to be preventing international relief organizations from distributing humanitarian aid directly to the Iraqi people. The Iraqi Government is said to be insisting that the food be distributed through Iraq's own distribution and rationing system. As a result, food belonging to international relief organizations is said to be warehoused for several weeks.²⁸
- 11/10/91 Iraqi troops attack Kurdish guerrilla positions near the city of Irbil. Iraq masses about 18,000 troops on the major roads into Irbil for a possible offensive.
- 11/12/91 Iraq agrees to lift a one-month old economic blockade (fuel and food rations) of Kurdish held territories in northern Iraq if Kurdish guerrilla forces withdrew from the cities they had captured, including Sulaymaniyah and Irbil. The agreement allows Iraqi police and central Government employees to resume some of their authority in those cities. (The Kurds later charged that after Kurdish forces complied with that request, Iraq did not lift the blockade and resumed encroaching militarily on the Kurdish cities.)
- 11/25/91 After several weeks of stonewalling, Iraq agrees to a United Nations request to extend for six months the memorandum of understanding which provides for the United Nations to conduct humanitarian relief operations inside Iraq. In negotiations on the extension, Iraq continues to refuse to participate in the U.N. oil sale plan established in U.N. Security Council Resolutions 706 and 712.
- 11/27/91 Senate Foreign Relations Committee releases report on a visit by a staff member to Iraqi Kurdistan in September, that the Kurds in northern Iraq continue to face major food and shelter shortages as winter approaches. Report notes significant skirting of the international sanctions on the part of Iraq, such as the export of vehicles and machinery to Iran, and notes that divisions exist among the Kurds regarding negotiations with Baghdad for a Kurdish autonomy.²⁹
- 12/23/91 Iraq's Interior Ministry says it is giving Iraqi citizens a final ten days to turn in unlicensed weapons and ammunition without penalty. The firearm amnesty suggests the regime is nervous about popular opposition.
- 01/03/92 U.S. State Department issues a document entitled "Humanitarian Issues in Iraq," accusing Iraq of blocking international humanitarian aid to the Iraqi people and condemning its refusal to participate in the U.N. oil sale plan. The report claims that Iraq refused to concur with a U.N. proposal to open humanitarian relief centers in the largely Kurdish city of Kirkuk and the Shi'ite city of Nasiriyah in southern Iraq, a misinterpretation of the memorandum of understanding Iraq signed with the U.N. in April 1991.
- 01/08/92 Iraqi troops lay barbed wire and sowing mines around -- and occasionally shelling -- Kurdish towns in northern Iraq, causing 200,000 Kurds to flee to refugee camps on the border with Iran. However, Kurdish leader Massoud Barzani says an autonomy agreement with the Iraqi Government is still possible and that the main obstacle is Iraq's refusal to cede to the Kurds control of Kirkuk and Khanaqin.

- 01/15/92 Iraqi Kurds announce they will suspend autonomy talks with the Iraqi Government and hold elections, by April 3, 1992, for an undisputed Kurdish leader. The elections pit the two main Kurdish leaders, Massoud Barzani and Jalal Talabani, against each other. Barzani favors continued negotiations with Saddam to hammer out a Kurdish autonomy agreement, while Talabani has recently favored renewed military offensives against the Government and the declaration of a provisional Kurdish government in Iraqi Kurdistan.
- 01/19/92 Subcommittee on Immigration and Refugee Affairs of the Senate Judiciary Committee releases report that the security zone in northern Iraq is not providing safety for the approximately 2 million Kurds living outside the zone. The report says about 300,000 Kurds have left their homes since October 1991, fleeing the pressure placed on Kurdistan by the Iraqi military. Report notes considerable smuggling in goods and fuel between Iraq and Turkey, Iran, and Jordan.³⁰
- 02/13/92 Turkish Prime Minister Demirel imposes restrictions on the importation of Iraqi gasoline by Turkish truckers. The restrictions result in fewer deliveries of supplies to the Kurds, since the Turkish truckers had been delivering goods to the Kurds on their way to receive the oil cargo in Iraq. Turkish merchants had complained about the illicit importation since the low prices for the Iraqi gasoline were depressing the domestic Turkish market.
- 02/22/92 *Washington Post* reports that Kurdish officials and human rights groups are accumulating evidence of Iraqi atrocities against the Kurds in the late 1980s. Kurdish estimates, drawing on captured Iraqi secret police documents, say as many as 180,000 Kurds killed in the campaign.
- 02/24/92 Iraq denounces report by the U.N. Human Rights Commission critical of Iraq's human rights record. Iraq says it cooperated fully with the United Nations during its survey of Iraq's human rights behavior.
- 03/01/92 Britain and France press the U.N. Security Council to send a special envoy to Iraq to report on the political situation of Iraqi Kurds and Shi'ites. The aim of the proposal is to end the Iraqi economic blockade of the Kurdish areas, reduce Baghdad's military pressure on the Shi'ites in the south, and encourage opposition to Saddam among these groups. The proposal was says to be based on U.N. Security Council Resolution 688 of April 5, 1991.
- Turkey reports that it conducted an air raid against opposition Turkish Kurds operating in northern Iraq. Two days later, Iraq formally protests the cross border raid on its territory.
- 03/07/92 Several members of the House Foreign Affairs Committee, including Chairman Dante Fascell, write a letter to President Bush urging him to consider the use of force to compel Iraq to comply with the cease-fire resolutions. They also urged that humanitarian aid for the Kurds be continued.³¹
- Bomb explodes outside the headquarters of the Iraqi Kurdistan Front, an umbrella organization for Kurdish rebel groups, just after Kurdish guerrillas ended a meeting there. The rebels blame the Iraqi Government for the bombing, which killed four people. Headquarters are located in the Kurdish controlled town of Sulaymaniyah.
- 03/09/92 On the first anniversary of the popular insurrection in Kurdistan, Jalal Talabani, secretary general of the Patriotic Union of Kurdistan (PUK) delivers a speech in Kurdish to the masses of Kurdistan.³²
- 03/12/92 Kurdish leader says Iraqi forces are escalating operations against Kurdish rebels in northern Iraq and that Iraqi troops were massing outside of Sulaymaniyah for a major offensive. The Kurdish leader says the Iraqi military moves were intended to prevent the planned April 3

elections for a unified Kurdish leadership. In a related speech, Saddam told the Kurds he would not tolerate the elections unless the Kurds distanced themselves from the Western countries protecting them. Kurds postponed the elections until April 24 because they need more time to set up an election mechanism.

- 03/13/92 Iraq expands military operations against Kurdish rebel positions in the town of Kifri, southeast of Sulaymaniyah.
- 03/21/92 A report is carried by the Voice of the Iraqi People in Arabic that the Iraqi Government is mobilizing armor and artillery in northern Iraq and adds that Kurdish sources are 99% certain that an offensive will be ignited within a few days. The radio station adds that Kurds expect two Kurdish-controlled bridges to be the targets of the offensive. A Kurdish source is cited as stating that Iraqi forces in the Aski Kalak have increased by 2,000 soldiers in the last few days.³³
- 03/31/92 *New York Times* reports Iraq shelling Kurdish civilians along the front line between Iraq and Kurdish controlled territories. Shelling forces about 40,000 Kurds to flee their homes.³⁴
- 04/05/92 Iraqi aircraft fly for the first time since the Gulf War, attempting to intercept Iranian aircraft raiding the bases in Iraq of Iran's opposition People's Mujahideen, according to the U.S. Department of Defense. Iraqi flights are technically not prohibited under the cease-fire agreement reached with the U.N. Coalition on March 3, 1991, since the U.N. Coalition had unilaterally relaxed the ban on Iraqi flights (south of the Kurdish areas in the north) when it discontinued operations in Iraq in 1991.
- 04/14/92 United States, Britain, and France warn Iraq to stop tracking allied reconnaissance aircraft and moving anti-aircraft missiles into the northern no-fly zone. Allied countries says Iraq had repeatedly illuminated their aircraft with tracking radar in recent weeks. Iraq has also moved SA-2 and SA-3 surface-to-air missiles into positions near Mosul, in northern Iraq, and is massing forces close to Kurdish controlled areas. Bush Administration says Iraq also conducted a series of combat aircraft training flights recently, though such activity is not prohibited if it is not conducted in the no-fly zones. Iraq fires on an International Committee of the Red Cross jeep in northern Iraq. There are no reports of casualties but the United Nations fears it was part of an Iraqi attempt to intimidate relief workers in northern Iraq.
- 04/22/92 U.N. says Iraq imposes new restrictions on the movement of U.N. vehicles providing humanitarian relief. Iraq requires that use of the U.N. vehicles have Iraqi Foreign Ministry approval at least 48 hours in advance.
- 05/19/92 Iraq's Kurds hold elections for a new assembly and an executive authority in northern Iraq. Each of the two main Kurdish parties, the Kurdish Democratic Party (KDP) and Patriotic Union of Kurdistan (PUK) ended up with 50 seats, with five additional seats going to smaller parties. No candidate received a clear majority in election for the presidency, and runoff elections for that post were deferred. Iraq had called the elections null and void.
- 05/19/92 About 1 million Kurds wait in line for up to eight hours to vote in the first free elections held in the state of Iraq. Thousands of armed guerrillas leave their positions opposite the Iraqi army in order to join the voters. Four candidates for leader of Iraqi Kurdistan, and seven lists for members of a 105-seat National Assembly, are put forward by the eight political parties and the few tribal leaders of the Iraqi Kurdistan Front. (IKF) The elections were peaceful.³⁵
- 05/23/92 President Saddam Hussein is preparing to assault the independent Kurdish enclave in northern Iraq in order to retake the territory.³⁶

- 06/22/92 Iraq's major opposition groups, with the exception of the Shi'ite Islamic groups, meet in Vienna and form a united front, the Iraqi National Congress (INC).
- 06/30/92 Memorandum of understanding between Iraq and the United Nations governing the presence of U.N. relief workers and guards expires. Iraq refuses to renew the agreement, causing many relief workers to discontinue their operations in Iraq for fear of their security.
- 07/06/92 Wife of French President Francois Mitterand escapes injury in a car bomb attack near the town of Hawana, in the Kurdish region of northern Iraq. Four people are killed in the attack, which was widely blamed on agents of the regime.
- 07/08/92 Two U.N. guards wounded in a grenade attack in Irbil, in northern Iraq. Agents of the Iraqi regime blamed.
- 07/16/92 A U.N. guard from Fiji is murdered while asleep, a grenade was thrown at the World Food Program office in Sulaymaniyah, and two U.N. guards are slightly hurt by a grenade thrown from a speeding car. Another, has his car blown up by a 22 pound bomb.³⁷
- 07/17/92 U.N. guard assassinated in Dahuk, in northern Iraq. Agents of the Iraqi regime blamed.
- 07/20/92 Bomb explosion destroys a U.N. vehicle near Sulaymaniyah. Two U.N. soldiers injured. Iraqi agents are blamed for attacks.
- 08/22/92 Iraq again refuses to renew the memorandum of understanding governing the U.N. humanitarian presence in Iraq. The memorandum was eventually renewed on October 22, 1992, but provided for the presence of only 300 U.N. guards as opposed to 500 in the original memorandum of understanding.
- 08/27/92 Three U.N. guards in northern Iraq discover a bomb attached to their car but defuse it before it could explode. U.N. officials protest the incident to the Iraqi Government but Iraq denies any connection to it.³⁸
- 09/10/92 Two U.S. F-16 fighters patrolling the northern no-fly zone intercept an Iraqi Mirage F-1. The Iraqi aircraft, which displays no hostile intent, quickly turns and leaves the no-fly zone.
- 09/16/92 The Kurds' two most important political parties agree to combine their guerrilla forces into a sole unit under the command of the Kurdish government. This is a major step toward further centralizing influence in Kurdish-controlled northern Iraq.³⁹
- 10/01/92 At major meeting in Salahuddin in northern Iraq, Shi'ite groups join the INC and a three man leadership council and 26 member executive council is chosen.
- 10/01/92 In an attempt to cool its difficulties with the international community, a high level Iraqi Official signals that Baghdad may be ready to permit more U.N. humanitarian operations inside Iraq.⁴⁰
- 10/02-06/92 Iraqi Kurds supported by Turkish fighter planes carry out a major military offensive to drive Kurdish separatists from their guerrilla bases in northern Iraq.⁴¹
- 10/04/92 Iraqi Kurdish leaders declare a federalist state.
- 10/12/92 Turkish cross-border operations begin.⁴²

- 10/19/92 A team of aid experts led by the United States warns that there could be a humanitarian emergency on a tremendous scale in the Kurdish controlled areas of northern Iraq if aid supplies do not reach the area before the start of winter.⁴³
- 10/20/92 Iraq says it will refuse to allow the stationing of human rights monitors throughout Iraq, as proposed by a special rapporteur of the U.N. Human Rights Commission, Max Van der Stoel.
- 10/22/92 Iraqi officials swear in a memorandum of understanding to cooperate with the U.N. winter aid program that will transport most of its aid, including fuel, north from the Iraqi capital.⁴⁴
- 10/22/92 Turkish troops move across the Iraqi border on three fronts to eradicate the Kurdish separatist movement that has forced south-east Turkey to the brink of civil war.⁴⁵
- 10/26/92 Rebel Turkish Kurds were given until this day by the Patriotic Union of Kurdistan leader, Jalal Talabani, to withdraw from Iraqi Kurdistan or receive renewed attack.⁴⁶
- 10/30/92 Turkish troops move against Turkish Kurdish rebels sought refugee in Northern Iraq.⁴⁷
- 10/31/92 At Tatvan in Turkey, at least five Turkish soldiers are killed and nine injured when rebel Turkish Kurds invade an outpost on the border with Iran.⁴⁸
- 10/31/92 Iraqi Opposition groups elect a Kurdish guerrilla Chief, a moderate Shi'ite Muslim cleric and a retired Iraqi general to lead the combat against Saddam Hussein.⁴⁹
- 11/02/92 Bomb explodes in a market near the headquarters of the U.N. guard contingent in Irbil. One person is killed and 16 injured.
- 11/30/92 U.N. and Kurdish officials say six U.N. food trucks damaged by bomb blasts soon after arriving in the Iraqi Kurdish city of Irbil. The Iraqi National Congress (INC), which includes the Kurds, blames Iraqi agents for the explosions.
- 12/17/92 Iraq moves military forces to the northern part of its country within great close proximity to the Kurdish enclave there.⁵⁰
- 12/19/92 Following a series of bombings and mining against U.N. humanitarian relief trucks in northern Iraq, U.N. relief deliveries are suspended.
- 01/11/93 Director of Central Intelligence Robert Gates says Iraq is continuing to shift anti-aircraft missiles in the no-fly zones of both southern and northern Iraq in a manner threatening to allied forces.
- 01/17/93 Iraq activates targeting radar in the northern no-fly zone. U.N. Coalition conducts an air strike against a SA-6 ground radar station in northern Iraq and shoots down an Iraqi MiG-23 that crossed into the no-fly zone in the north. Later, in response to Iraq's refusal to clear UNSCOM flights into Iraq, the United States launches 45 cruise missiles at the Zaafarniya manufacturing complex outside Baghdad, which had been used to make components for Iraq's nuclear weapons program.
- 01/18/93 U.N. Coalition strikes air defenses in the northern no-fly zone and shot at, and probably downed, an Iraqi warplane that tries to resist U.N. Coalition strikes.

- 01/19/93 Iraqi aircraft again challenge the no-fly zone in the north and direct anti-aircraft fire on U.N. Coalition aircraft. The Coalition then fire cluster bombs and air-to-surface missiles at Iraqi anti-aircraft guns in the northern no-fly zone.
- 01/21/93 U.S. aircraft fire missiles and drop cluster bombs on an Iraqi ground radar in the northern no-fly zone when the radar beam is directed at the U.N. Coalition aircraft as they were escorting a French reconnaissance plane.
- 01/22/93 U.S. F-4G fires two missiles at an air defense battery in the northern no-fly zone after the battery's radar actively tracked U.S. aircraft patrolling the zone. Iraq denies it had tracked the aircraft and claims there are no air defense batteries at that location.
- 02/02/93 Time bomb planted on a U.N. relief truck returning from northern Iraq explodes at a border crossing into Turkey.
- 02/25/93 U.N. officials says an unidentified man ran from a taxi and attached a bomb to an empty U.N. truck moving through the Iraqi controlled checkpoint at Fayda, in northern Iraq.
- 03/02/93 U.N. human rights rapporteur Max Van der Stoel reports to the U.N. Human Rights Commission that Iraq is guilty of human rights violations on a massive scale, including economic deprivation, torture, and mass executions of ethnic minorities. He renews appeal he made previous year for the Human Rights Commission to send human rights monitors to Iraq, a move supported by the U.N. General Assembly but opposed by Iraq.
- 03/17/93 U.S. military officers remind their Iraqi counterparts of the March 3 agreement, but do not threaten any action against Iraqi helicopters, which Iraq was employing against Kurdish and Shi'ite rebels. The terms of the cease-fire did not call for military efforts to prevent Iraq from using force, including helicopters, to combat the Kurdish and Shi'ite uprisings that began shortly after the end of the war, but several Members of Congress, Administration officials, and many outside experts argued that the United States should forcibly prohibit Iraq's helicopter use as well.
- 03/19/93 Clinton Administration releases a U.S. army report on Iraqi war crimes associated with the Persian Gulf crisis. On April 27, 1993, after meeting with visiting INC representatives, Secretary of State Christopher says the United States would propose that the U.N. Security Council create a commission to investigate alleged Iraqi war crimes and crimes against humanity.
- 03/29/93 The U.N. Security Council, after reviewing Iraq's compliance record and finding several areas of non or incomplete compliance, decides to maintain economic sanctions against Iraq.
- 04/18/93 According to U.S. military statement, two U.S. aircraft targeted by Iraqi anti-aircraft radar while patrolling the northern no-fly zone. Iraqi batteries are located just south of the zone. One of the planes fires a missile in response to the threat. Iraq denies threatening the U.S. aircraft.⁵¹
- 04/26/93 U.S. navy EA-6B patrolling the northern no-fly zone does not respond to an Iraqi surface-to-air missile that was fired on it but fell short.
- 04/30/93 The State Department releases "Patterns of Global Terrorism: 1992" which says Iraq is providing a safe haven and support to the radical Turkish opposition Kurdistan Workers Party (PKK).⁵²

- 05/01/93 Iraqi President Saddam Hussein orders the cancellation of the Iraqi 25-dinar notes in an attempt to withhold from the Kurds their main source of commercial exchange. This act has brought anxiety to the three million Kurds in northern Iraq.⁵³
- 05/05/93 Iraq abruptly closes its borders and announces it is taking the prewar 25 dinar bank note out of circulation. This wipes out the value of the 25 dinar note holdings of many Kurds in Iraq.
- 05/22/93 The United Nations warns that relief for the Kurds in northern Iraq, as well as for the needy people hurting from the trade embargo in other parts of the country, will be terminated unless Western countries contribute more finances and supplies.⁵⁴
- 05/24/93 Secretary of State Christopher delivers warning to Iraq not to attack the Kurdish controlled territories in the north, following reports of an Iraqi military buildup along the front with the Kurds.
- 05/25/93 U.N. Security Council again decides not to lift economic sanctions against Iraq because Iraq has not complied fully with U.N. cease-fire resolutions.
- 06/27/93 The British Broadcasting Corporation, broadcasts the first extensive report on the mass murder of Iraqi Kurds during 1988-1990.⁵⁵
- 07/08/93 The approximately 100 foreign relief workers who continue to reside in the autonomous Kurdish northern area of Iraq now solely travel with a backup car filled with armed guards and they never leave their homes after dark. The relief workers say that they feel as if they are the object of a "low-intensity" campaign by Baghdad to force out the only Western presence in northern Iraq.⁵⁶
- 11/23/93 Max van der Stoep, the U.N. special rapporteur for human rights in Iraq, warns that Iraq is continuing to execute dissidents and occasionally shell Kurdish areas.⁵⁷

Iraq's Crisis with Its Shi'ites

The central government has also had problems with its Shi'ites. The central government faced a major Shi'ite uprising immediately after the war. While it was able to suppress this uprising far more quickly and thoroughly than it was able to deal with its Kurds -- and with far less U.N. interference -- the chronology in **Table XI-2** indicates the problem is scarcely over, and could still lead to new problems.

Iraq's Shi'ites are a majority in a country ruled by a Sunni and clan-oriented minority, and their loyalty to the regime in Baghdad is mixed. The U.S. Central Intelligence Agency (CIA) estimates that 60% to 65% of Iraq's total population is Shi'ite versus 32% to 37% Sunni.⁵⁸ Most Shi'ites probably think of themselves as Iraqis first, and Shi'ites second. Shi'ites made up the majority of Iraq's troops during the Iran-Iraq War and fought loyally with only limited numbers of desertions. At the same time, there are powerful Shi'ite families -- like the Hakim family -- that oppose the Ba'ath regime. Some have ties to Iran -- at least in terms of obtaining Iranian funds, military training and equipment, and the use of facilities on Iranian soil. There are some important differences in clerical politics and ritual between Iranian and Iraqi Shi'ites, but there are also Iraqi Shi'ite clergy who strongly oppose the secular regime in Baghdad and who have close ties to the Iranian clergy.

Shi'ite loyalty to Iraq also does not necessarily mean loyalty to Saddam Hussein and the Ba'ath elite. Shi'ite cities and areas often have received fewer benefits from the central government, and made more sacrifices during wartime. The Baath has acted as a pervasive police state, sometimes flaunting Shi'ite custom in activities like the search of mosques, arrests of clerics, limits on religious celebrations, and escorting foreign visitor into Shi'ite sanctuaries. Educational, military, and political opportunities are somewhat restricted for Shi'ites, although mainly in politically sensitive areas.

It is impossible to estimate how many Shi'ites rose up against the Ba'ath elite in the first days after the end of the Gulf War, how many remained neutral, and how many stayed loyal to the regime. There is no doubt, however, that Shi'ites -- combined with some Iraqi troops -- launched major uprisings in much of southern Iraq during the days after Iraq's defeat. These rebels briefly held many of the major cities in the south, including Karbala, Al Hillah, Al Kut, and Al Amarah. There was bitter fighting in the area around Basra and Az Zubayr, and Iran allowed the Badr Brigade -- a 5,000-7,000 man force of exiled Iraqi Shi'ites under the leadership of Mohammad Bakr al-Hakim -- to enter Iraq and support the Shi'ites.

The Shi'ites remained divided, however, and did not unite against Saddam Hussein's forces. The limited number of regular Iraqi army units that went over to the Shi'ite side

could not sustain themselves or act as an organized combat force, and the Badr Brigade took heavy casualties and had to withdraw. Anti-regime Shi'ites never succeeded in creating a separate enclave. Most of the Shi'ite areas came quickly under central government control, and the remaining Shi'ite rebels were captured, fled to Iran, or fled into the nearly 6,000 square miles of marshes formed at the mouth of the Tigris-Euphrates and east of Amarah, Nasiriyah, and Basra.

As Table XI-2 shows, the U.N. did attempt to provide humanitarian relief for the refugees, but the situation was different from the Kurdish crisis in the north. There was never a separate Shi'ite enclave, and Iraqi troops and security forces, as well as Shi'ites loyal to Saddam, were always mixed with the general Shi'ite population. While the U.N. did set up a humanitarian relief center in the marsh area in July, 1991, the Iraqi government organized protest riots and made effective operation impossible. On July 14, it told the U.N. personnel manning the center to leave, and cut the Shi'ites off from any aid.

This situation grew steadily worse during the fall and winter of 1991, and the spring of 1992. Once the central government recovered full control over the rest of the populated areas in the south, the Iraqi government began a military campaign to root out the Shi'ites in the marshes. In April 1992, 36,000-40,000 Iraqi troops were sent into the area, and Iraqi forces built new roads and fire bases in the swamps. They began to selectively drain the marshes, and fought their way through an area with thousands of small islets, 10 foot reeds, and date palm thickets. The Iraqi forces were hunting a total 10,000-20,000 deserters and Shi'ites in the marshes, but these opposition forces were so poorly organized that only 3,000-6,000 could be classified as guerrillas. The Shi'ites were only equipped with small arms and flat bottom boats, although they had limited Iranian and Iraqi exile support.

Iran and Iraq clashed for other reasons. On April 5, 1992, Iraq and Iran had their first significant military exchange since the Iran-Iraq War. Iraq had been providing money and arms to the Mujahideen e-Khalq, a radical Marxist Iranian opposition movement which had military camps and forces in Iraq. The Mujahideen launched several small raids on Iran, and Iran sent 12 F-4 and F-5 fighters to attack the Ashraf Camp about 60 miles northeast of Baghdad. The aircraft attacked in six waves, dropping cluster bombs, firing rockets, and strafing. One Iranian F-4 was lost to anti-aircraft fire during the attack. Iraq responded by scrambling ten of its fighters for the first time since the Gulf War, in violation of U.N. Security Council Resolutions 686 and 687.

In June, Iraqi Minister of Defense Major General Hassan al-Majid took over direction of the fighting in the marshes, and reports appeared that Iraq had moved additional elements of its 3rd and 4th Corps above Basra and east of Amarah. These reports indicated that by August, 1992, the government had deployed 5-6 divisions against the Shi'ites,

including Republican Guard units, and was using artillery, attack helicopters, and fixed wing fighters. Saddam Hussein's son Qusay, and his half brother Wathban al-Ibrahimi, were also said to play a role in overseeing the security operations in the south.

Other security measures were taken in the south. Curfews were enforced in most areas, Shi'ite religious schools and printing houses were closed, and some Shi'ite assemblies were forbidden. Government arrests were reported to have reduced the clergy in the Shi'ite holy city of Najaf from 8,000 before the Iran-Iraq War to less than 800 by the end of 1991, and driven most of the members of key opposition groups like Al Dawa al Islamiya (Islamic Call) and the Supreme Assembly for the Islamic Revolution in Iraq (SAIRI) out of the country. The government began a major effort to relocate the Marsh Arabs (Ma'dan) out of the marshes and expand its plans to drain the entire marsh area with a 350-mile network of canals.

Iraqi government attacks on the Shi'ites became so intense that on August 11, 1992, Britain, France, and the U.S. issued a formal warning to Iraq to cease violating Security Council Resolution 688, which called for an end to all internal repression in the country.⁵⁹ As the chronology in Table XI-2 indicates, however, these warnings have had little practical effect. Iraqi troops continued their sweeps into the marshes, while the government continued to drain the marshes and relocate the Marsh Arabs (Ma'dan) in a ruthless effort to deprive the remaining Shi'ites of cover. By early 1994, the Shi'ite resistance in the marsh was virtually crushed, and the central government was in firm control of the south.⁶⁰

Like the government's attacks on the Kurds, however, this victory over the Shi'ites has almost certainly left a legacy of further violence. The fighting from 1991 to 1994, has alienated many Shi'ites that were previously loyal to the regime. At the same time, it has helped to worsen relations between Iran and Iraq, and to create more tension and hatred between Sunni and Shi'ite. The central government must now be more oppressive and authoritarian in dealing with the Shi'ites, and the armed forces are more likely to see any Shi'ite resistance as treason, pro-Iranian, anti-Arab, and pro-Western. Authoritarianism and xenophobia are likely to feed upon each other, and grow.

Table XI-2Iraq's Efforts to Suppress its Shi'ite Resistance⁶¹

- 03/02/91 U.N. Security Council approves Resolution 686, which sets out the allies' conditions for a cease-fire.
- 03/03/91 U.N. Coalition and Iraq agrees to informal cease-fire. Iraqis accept virtually all allied terms for the cease-fire, which included a ban on Iraq's use of fixed wing military aircraft inside Iraq. President Bush interprets the resolution as preventing Iraq from using helicopter gunships to quash the Kurdish and Shi'ite rebellions against Saddam that broke out within days of the end of the war. Iraqi helicopter flights were not specifically barred under the informal cease-fire agreement.
- Iraq accepts terms of U.N. Security Council Resolution 686, establishing a cease-fire.
- 03/06/91 Iraqi President Saddam Hussein's cousin Ali Hassan al-Majid, who was widely blamed for the suppression of the Kurds in 1988, is appointed Interior Minister. The appointment came during the Shi'ite and Kurdish post-war uprisings. Ali was expected to act more forcefully to suppress the rebellions than his predecessor, Samir Abd al-Wahab al-Shaykhali.
- 04/05/91 Spokesman for Iraqi dissidents claims that the Iraqi army used chemical weapons against civilians in suppressing the Shi'ite and Kurdish post-war rebellions. No independent confirmation of the charge.
- U.N. Security Council adopts Resolution 688 in response to reports of the suppression by Iraq of the Kurdish and Shi'ite rebellions. It calls for an end to the repression and demands that Iraq allow humanitarian access to its population.
- 04/10/91 American troops report isolated instances of Iraqi forces moving into U.S.-occupied territory in southern Iraq as U.S. forces thinned out in the region. The Iraqis were reportedly positioning themselves to crush further Shi'ite unrest in the south.
- 04/18/91 Iraq and the United Nations sign a Memorandum of Understanding providing for a U.N. humanitarian presence in Iraq and the stationing of 500 U.N. security guards in northern Iraq to protect the relief operations. Agreement to remain in force until December 31, 1991, with the possibility for renewal.
- 07/11/91 Iraq organizes a demonstration to disrupt the opening of a U.N. humanitarian aid center in the marsh areas of southern Iraq, where an estimated 40-100,000 Iraqi Shi'ites had taken refuge after their failed March rebellion. The opening of the center came after a month-long negotiation between the U.N. representatives and Iraq.
- 07/14/91 Iraq tells remaining U.N. personnel manning the relief center in southern Iraq to leave; the center is then closed down.
- 07/21/91 Iraq's Revolutionary Command Council, headed and dominated by Saddam Hussein, expands a March 1991 amnesty for army deserters and granted a pardon for regime opponents. The amnesty does not apply to military officers.
- 08/15/91 U.N. Security Council, passes Resolution 706, and tentatively approves a plan under which Iraq could sell up to \$1.6 billion worth of oil over six months. Under Security Council Resolution 705, passed the same day, it is determined that 30 percent of the proceeds would be taken as war

reparations. Much of this is to go into an escrow account for the United Nations to purchase and distribute food and medicine to the Iraqi people. Iraq denounces the plan and refuses to sell oil under these conditions, claiming this was an infringement on its sovereignty.

- 09/03/91 Revolutionary Command Council issues law allowing opposition political parties but banning any party but the ruling Ba'ath from organizing in the military or security services. The law also banned parties that advocate the overthrow of the state, possess weapons, or engage in acts of violence. In addition, the formation of parties based on ethnicity or sectarianism is prohibited, preventing the Kurds and Shi'ites from forming their own parties. The law is first approved by the National Assembly on July 4, and amended to include several of the above conditions on August 24.
- 09/12/91 *Washington Post* reports that in August an Iraqi jet violated the injunction against flights from the southern port of Umm Qasr, which is in the demilitarized zone between Iraq and Kuwait.
- 09/14/91 Saddam Hussein ousts Prime Minister, Sa'dun Hammadi, appointed at the height of the Shi'ite and Kurdish rebellions in March. Hammadi, a Western-educated Shi'ite Muslim, was an advocate of a more pluralistic, liberal Ba'athist regime and he supported full compliance with U.N. and allied cease-fire terms.
- 09/19/91 U.N. Security Council adopts Resolution 712, formally approving the U.N. oil sale plan set up in Resolution 706. Resolution 712 formally accepts a report by the Secretary-General proposing the means for implementing Resolution 706 and documenting Iraq's humanitarian needs. The report was a requirement laid out in Resolution 706 for the formal approval of the oil sale plan.
- 10/12/91 Saddam addresses delegates to an Iraq-sponsored "conference of Arab popular forces," saying that Iraq could withstand the international sanctions for "20 years." Iraq organized the conference to place pressure on Arab leaders to violate the international sanctions by resuming commerce with Iraq.
- 11/02/91 Iraq is reported to be preventing international relief organizations from distributing humanitarian aid directly to the Iraqi people. The Iraqi Government is said to be insisting that the food be distributed through Iraq's own distribution and rationing system. As a result, food belonging to international relief organizations is said to have been warehoused for several weeks.⁶²
- 11/25/91 After several weeks of reports stonewalling, Iraq agrees to a United Nations request to extend for six months the memorandum of understanding which provides for the United Nations to conduct humanitarian relief operations inside Iraq. In negotiations on the extension, Iraq continues to refuse to participate in the U.N. oil sale plan established in U.N. Security Council Resolutions 706 and 712.
- 12/23/91 Muhammad Baqr al-Hakim, leader of Iraq's Shi'ite opposition, says he had invited leaders of other Iraqi opposition groups to a gathering in Damascus in an effort to form a common front and plan strategies for overthrowing Saddam.
- Iraq's Interior Ministry says it was giving Iraqi citizens a final ten days to turn in unlicensed weapons and ammunition without penalty. The firearm amnesty suggested regime nervousness over popular opposition.
- 01/03/92 U.S. State Department issues a document entitled "Humanitarian Issues in Iraq," accusing Iraq of blocking international humanitarian aid to the Iraqi people and condemning its refusal to participate in the U.N. oil sale plan. Document says there were reports that individuals sent by

the Iraqi Government warning Iraqi citizens individually that they would be arrested if they accepted foreign food assistance. This was a violation, according to the U.S. State Department, of U.N. Security Council Resolution 688. The report claimed that Iraq had refused to concur with a U.N. proposal to open humanitarian relief centers in the largely Kurdish city of Kirkuk and the Shi'ite city of Nasiriyah in southern Iraq, a misinterpretation of the memorandum of understanding Iraq signed with the U.N. in April 1991.

- 02/14/92 *Middle East Economic Digest* reports that Saddam has set up a new security force to protect him and his palace against Shi'ite rebels. The force is said to consist of about 10,000 volunteer troops from Saddam's home town of Tikrit and neighboring al-Dur. The unit is reportedly led by Saddam's younger son, Qusay.
- 02/24/92 Iraq denounces report by the U.N. Human Rights Commission that was highly critical of Iraq's human rights record. Iraq says it cooperated fully with the United Nations during its survey of Iraq's human rights behavior.
- 03/01/92 Britain and France press the U.N. Security Council to send a special envoy to Iraq to report on the political situation of Iraqi Kurds and Shi'ites, the two main groups that rebelled against the Iraqi Government after the Gulf War. The aim of the proposal was to end the Iraqi economic blockade of the Kurdish areas, reduce Baghdad's military pressure on the Shi'ites in the south, and encourage opposition to Saddam among these groups. The proposal was said to be based on U.N. Security Council Resolution 688 of April 5, 1991.
- 03/15/92 *New York Times* reports that Iraqi troops are continuing military operations against Shi'ite rebels active in the marshes of southern Iraq. The report estimates that 10,000 guerrillas and 200,000 civilians are living in the marshes.
- 03/20/92 According to some in the U.S. State Department, over the past few weeks Iraq allowed the United Nations to establish humanitarian aid centers in the largely Shi'ite areas of southern Iraq, including Basra, Nasiriyah, and Hammar. Many observers see the Iraqi move as an effort to appear cooperative with the United Nations as its delegation, headed by Tariq Aziz, was meeting with the U.N. Security Council to discuss Iraq's compliance record.
- 04/22/92 U.N. says Iraq is imposing new restrictions on the movement of U.N. vehicles providing humanitarian relief. Iraq required that the use of the U.N. vehicles have Iraqi Foreign Ministry approval at least 48 hours in advance.
- 06/22/92 Iraq's major opposition groups, with the exception of the Shi'ite Islamic groups, meet in Vienna and form a united front, the Iraqi National Congress (INC).
- 06/30/92 Memorandum of understanding between Iraq and the United Nations governing the presence of U.N. relief workers and guards expires. Iraq refuses to renew the agreement, causing many relief workers to discontinue their operations in Iraq for fear of their security.
- 07/12/92 The Voice of Rebellious Iraq says that motorized units surrounded the holy shrines in al-Najaf and Karbala, and prevented ceremonies marking the anniversary of the death of the Imam Hussein (Ashura) Reports from Iraq indicate that Iraqi authorities adopted stringent measures at the beginning of the month of Muharram (beginning July 2). Machine guns were set up on top of mosques. The Ba'athist regime also prevents mourners from assembling in husseiniyas and mosques around the country including Kadhemain, near Baghdad, where the 7th and 9th infallible imams of the prophet's household lie in rest.⁶³

- 08/19/92 The Bush administration, increasing its confrontation with Saddam Hussein, wins British and French agreement today for a plan to shoot down Iraqi military planes if they move into a wide zone throughout the southern part of the country filled with rebelling Shi'ite Muslims. The U.S. led movement to interdict Iraqi aircraft from flying in southern Iraq is an important shift in Western strategy for taking influence from Saddam Hussein⁶⁴
- 08/19/92 After a long cabinet meeting in London, Prime Minister John Major of Britain states that the allies will develop control over as much as a third of the country. "They will be attacked if they fly in the area that is proscribed."⁶⁵
- 08/19/92 U.S. officials says Iraq has refurbished one large air base (Talil in southern Iraq), built a new one, activated other dormant airfields, and revived its air defense network. The reconstruction of Iraq's air infrastructure is undertaken to support a revival of military flights in southern Iraq.⁶⁶
- 08/22/92 Iraq again refuses to renew the memorandum of understanding governing the U.N. humanitarian presence in Iraq. The memorandum was eventually renewed on October 22, 1992, but provided for the presence of only 300 U.N. guards as opposed to 500 in the original memorandum of understanding.
- 08/26/92 United States, Britain, and France declare a "no-fly zone" in southern Iraq to protect the Shi'ite community there, barring Iraqi fixed wing and helicopter flights south of the 32nd parallel. Iraq called the establishment of the zone a violation of international law.
- 08/27/92 The United States, Britain and France barred Iraqi planes from flying south of the 32nd Parallel.⁶⁷
- 09/06/92 Iraq offers amnesty to army dissenters in the mostly Shi'ite south. Baghdad television says that the ruling Revolutionary Command Council issued a decree offering pardons to dissenters who surrender to authorities in the provinces of Basra, Missan and Dhiqar.⁶⁸
- 09/08/92 U.S. Department of Defense charges that Iraqi troops were burning Shi'ite villages in southern Iraq in an effort to flush out Shi'ite dissidents hiding in the marshes.
- 09/27/92 Opposition leaders lay aside their differences and issue a unified appeal to Iraq's army, the ruling Ba'ath party and all citizens to revolt against Saddam Hussein.⁶⁹
- 10/01/92 At a major meeting in Salahuddin in northern Iraq, the Shi'ite groups join the INC and a three man leadership council and 26 member executive council is chosen.
- 10/20/92 Iraq says it will refuse to allow the stationing of human rights monitors throughout Iraq, as proposed by a special rapporteur of the U.N. Human Rights Commission, Max Van der Stoel.
- 11/20/92 The main opposition group in the South declares that the government in Baghdad has increased repression of Shi'ite Muslim civilians, and that the U.S.-led ban on Iraqi flights in the region is not preventing it.⁷⁰
- 12/07/92 Saddam Hussein declares the opening of the "Saddam River" project, a 350 mile irrigation project flowing from Baghdad to Basra. U.N. human rights officials criticize the project as an attempt to drain the marshes in southern Iraq which Iraq's organized Shi'ite opposition uses as a hiding place and base of operations, and to make the vast wetlands accessible to Iraqi armor battling Shi'ite rebels.⁷¹

- 12/27/92 The United States shoots down an Iraqi military aircraft that violated the "no-fly zone" in southern Iraq. Subsequently, Iraq redeploys 8 SA-3 and 12 SA-2 anti-aircraft missile launchers in the no-fly zone in a manner threatening to U.N. Coalition aircraft patrolling the zone.
- 01/11/93 Director of Central Intelligence Robert Gates says Iraq is continuing to shift anti-aircraft missiles in the no-fly zones of both southern and northern Iraq in a manner threatening to allied forces.
- 01/13/93 U.S.-led U.N. Coalition forces conduct air strikes against eight Iraqi anti-aircraft missile sites and related control facilities in the no-fly zone of southern Iraq. The strike, which involved about 110 U.N. Coalition aircraft, follows U.N. Security Council statements on January 8 and 11 that Iraq was in material breach of U.N. Security Council Resolution 687, the principal cease-fire resolution. U.S. announces that a U.S. armored battalion -- about 1,100 soldiers -- would go to Kuwait to participate in military exercises to underscore the U.S. commitment to Gulf security.
- 01/18/93 U.N. Coalition launches another raid on the Iraqi air defense installations in the south that it had missed or insufficiently damaged in the January 13 air strike. The U.N. Coalition also strikes air defenses in the northern no-fly zone and shoots at, and probably downs, an Iraqi warplane that tried to resist U.N. Coalition strikes in the north.
- 01/23/93 U.S. A-6 Intruder aircraft fires a laser-guided bomb at an Iraqi anti-aircraft position in the southern no-fly zone when the pilot thought he saw anti-aircraft fire directed at his and other U.S. aircraft patrolling the zone. The Defense Department subsequently says the U.S. aircraft were not being tracked by Iraqi radar and the Department was trying to establish whether or not Iraq had fired on the U.S. planes.⁷²
- 01/25/93 Defense Secretary Les Aspin states that there is some evidence that the Iraqi military is moving surface-to-air missiles into southern Iraq. Movement of those missiles is important because of Iraq deployed the missiles in a threatening pattern in the southern "no-fly zone." U.S. attacks on surface-to-air missile batteries in the last week of the Bush presidency destroyed some of the missiles and forced Iraq to move others.⁷³
- 02/27/93 *London Observer* reports that Iraq had launched a campaign of repression against its Shi'ite population in the south, poisoning and draining its water supplies. On March 1, the United States says it is investigating the report.
- 02/28/93 Iraq says that it will welcome visits by foreign reporters to its southern marshes, where a British newspaper said Baghdad launched a campaign of repression against the Shi'ites.⁷⁴
- 03/01/93 U.N. investigator says that it appears as if Iraq has executed hundreds of people from its southern marshes in "death camps."⁷⁵
- 03/02/93 U.N. human rights rapporteur Max Van der Stoep reports to the U.N. Human Rights Commission that Iraq is guilty of human rights violations on a massive scale, including economic deprivation, torture, and mass executions of ethnic minorities. He renews appeal he made previous year for the Human Rights Commission to send human rights monitors to Iraq, a move supported by the U.N. General Assembly but opposed by Iraq.
- 03/17/93 U.S. military officers remind their Iraqi counterparts of the March 3 agreement, but do not threaten any action against Iraqi helicopters, which Iraq was employing against Kurdish and Shi'ite rebels. The terms of the cease-fire do not call for military efforts to prevent Iraq from

using force, including helicopters, to combat the Kurdish and Shi'ite uprisings that began shortly after the end of the war, but several Members of Congress, Administration officials, and many outside experts argue that the United States should forcibly prohibit Iraq's helicopter use as well.

- 03/19/93 The Clinton Administration releases a U.S. army report on Iraqi war crimes associated with the Persian Gulf crisis. On April 27, 1993, after meeting with visiting INC representatives, Secretary of State Christopher says the United States would propose that the U.N. Security Council create a commission to investigate alleged Iraqi war crimes and crimes against humanity.
- 03/19/93 The tension in the capital is also based on increasing reports of unrest in the southern part of the country. Southern Iraq is strictly off limits to Ba'ath party officials and government employees after dark. In fact, no one wants to travel to the south after sundown except foreign aid workers and curious journalists.
- 03/19/93 Reconstruction in the south of civilian targets of the allied bombing has not been given the same attention as those in the capital. Unlike Baghdad, where the rebuilding of bombed bridges in the south are still under reconstruction and a primary effort has been given to rebuilding government structures. "Southerners say that the intensive effort by the government to rebuild damaged parts of the holy shrines was a token to the south by the government," said a well-informed resident of al-Basra.⁷⁶
- 03/29/93 The U.N. Security Council, after reviewing Iraq's compliance record and finding several areas of non or incomplete compliance, decides to maintain economic sanctions against Iraq.
- 04/09/93 U.S. aircraft drops cluster bombs on Iraqi air defense installations that fired on those aircraft (three F-16's and one F-4G) during a routine monitoring mission.⁷⁷
- 05/21/93 U.S. Department of Defense announces that U.S. aircraft patrolling the southern no-fly zone encountered anti-aircraft gunfire three times in the past week but did not return fire.⁷⁸
- 05/25/93 U.N. Security Council again decides not to lift economic sanctions against Iraq because Iraq has not complied fully with U.N. cease-fire resolutions.
- 06/01/93 Iran reports that Iraqi troops have surrounded the marsh areas, and the U.N. inspectors in the area back up that claim. The U.N. inspectors state that they find Iraqi Shi'ites living in the marshes under appalling conditions with little food or fresh water. Iraqi troops reportedly withdraw when U.N. humanitarian representative Sadruddin Agha Khan come to set up the U.N. relief center, but return a few days later, after Sadruddin had departed.)
- 06/03/93 U.S. military aircraft detect new efforts by Iraqi anti-aircraft units to track their flights over southern Iraq.
- 06/29/93 U.S. F4-G aircraft patrolling the southern no-fly zone fires a missile at an Iraqi anti-aircraft artillery battery after Iraqi radar targeted the aircraft.
- 07/16/93 Tehran-based Iraqi Shi'ite political figure Mohammed Baqir Hakim in a letter to U.N. Secretary General Boutros Boutros-Ghali reports the recent refugee exodus and asks for U.N. aid for Iraqi Shi'ites in the South.⁷⁹
- 10/1/93 A BBC documentary estimates that the actions of the Iraqi government have reduced the Marsh Arab or Ma'dan population from 700,000 in 1980 (the last census) to less than 200,000.⁸⁰

- 11/19/93 U.N. teams enter the marshes of southern Iran to investigate reports that Iraqi forces have used poisoned gas. Iraq is reported to be building a massive earthen barrier along the border with Iran.⁸¹
- 11/23/93 Max van der Stoep, the U.N. special rapporteur for human rights in Iraq, warns that the survival of the Marsh Arabs (Ma'dan) is threatened in spite of the U.N. no-fly zone, and that Iraq is continuing to intensify its assaults and use of artillery. He indicates that he did not find signs of the use of chemical weapons, but has sent soil samples for analysis, a process that may take some months.⁸²

The Struggle to Eliminate Iraq's Weapons of Mass Destruction

These struggles over the fate of the Kurds and Shi'ites have been accompanied by another set of duels between Saddam Hussein and the U.N. Coalition over the terms and enforcement of the cease-fire in the Gulf War. On paper, Iraq agreed to all of the terms the U.N. Security Council required in its resolutions of March 2, 1991, and April 3, 1991. In practice, however, Iraq has engaged in constant test of will with the U.N., and in a process of "challenge and response" where Iraq has challenged the U.N. up to, or beyond, the point where the U.S. and other U.N. Coalition nations respond with force.

The first of the two key resolutions shaping the cease-fire is U.N. Security Council Resolution 686, which sets out the U.N.'s conditions for a temporary cease-fire, and which was passed on March 2, 1991. The Ba'ath government agreed to an informal cease-fire based on Resolution 686 on March 3, 1991. It agreed to abide by the terms of the twelve U.N. Security Council Resolutions passed before the Gulf War, to renounce its annexation of Kuwait, to pay reparations, to release all prisoners, to restore all stolen property, and to help remove the mines it had left in Kuwait. On March 5, 1991, Iraq publicly announced that it had voided its annexation of Kuwait, and agreed to return all of the assets it had seized in Kuwait and all remaining prisoners of war.

On April 3, 1991, the U.N. Security Council passed Resolution 687, which set forth the formal terms for a permanent cease-fire. This resolution required Iraq to renounce and condemn terrorism, to allow the U.N. to demarcate the Iraqi-Kuwait border and to establish an observer force and demilitarized zone along the border, to repatriate all prisoners, to restore all seized and stolen property, to established a fund based on its oil revenues to pay reparations for the damage to Kuwait, to accept continued arms and economic embargo (except on food, medicine, and essential civilian needs, and to accept the destruction of its weapons of mass destruction. Iraq accepted Resolution 687 on April 6, 1991 -- although it call the Resolution "unjust "-- and the Resolution was then accepted by the Iraqi National Assembly. The U.N. Security Council declared a formal cease-fire was in effect on April 11, 1991.

The latter portion of U.N. Security Council Resolution 687 requires Iraq to accept the destruction, removal, or rendering harmless of all biological, chemical, and nuclear weapons research, development, and support facilities; of all biological, chemical, and nuclear weapons; all stocks of agents; and of all ballistic missiles with a range greater than 150 kilometers and related production and repair facilities. It links compliance to oil and other Iraqi exports by stating that once the U.N. Security Council has agreed that Iraq has

completed these actions, the U.N. prohibitions against the export of commodities and products originating in Iraq shall have no further force or effect.

As the chronology in **Table XI-3** shows, Iraq has been particularly aggressive in resisting these U.N. effort to eliminate Iraq's weapons of mass destruction. Iraqi forces were detected salvaging equipment for missiles and weapons of mass destruction, and cleaning up suspect sites, as early as April 5, 1991. The Iraqi government lied to the U.N. in its first declaration of its holdings of weapons of mass destruction on April 18, 1991. It claimed it only had 52 Scud missiles and modified Scud missiles, 10,000 chemical warheads, 1,500 chemical bombs and shells, and 1,000 tons of mustard and nerve gas after the war -- although the U.N. later found it had far more missiles and at least 46,000 surviving chemical weapons. Iraq lied about its nuclear weapons effort in its April 29, 1991 declaration to the International Atomic Energy Agency (IAEA).

It was actions of this kind that led to U.N. Security Council Resolution 707, which passed on August 15, 1991. This Resolution requires Iraq to provide a full, final, and complete disclosure of all aspects of its biological, chemical, and nuclear weapons and ballistic missiles, and to allow U.N. inspectors unconditional and unrestricted access to all areas, facilities, equipment, records, and means which they may wish to inspect. It also requires Iraq to immediately cease any attempt to conceal, or any movement or destruction of any material or equipment relating to these programs, and to halt all nuclear activities of any kind -- except for isotopes used for agricultural, industrial, or medical purposes. On October 11, 1991, the U.N. Security Council also passed Resolution 715, which requires Iraq to unconditionally meet all of its obligations as required in the U.N. plans for ongoing monitoring of Iraq's compliance with Resolutions 687 and 707.

As Table XI-3 shows, these resolutions were met with constant challenges by the Iraqi government until November, 1993. Until that time, the Iraqi government sent repeated signals that indicated it intended to regain its capability to deliver weapons of mass destruction. It established a pattern of challenge and response in which it attempted to block U.N. Special Commission and IAEA inspection efforts, backing down only after it had provoked a crisis or the U.N. Coalition had retaliated by using force.

On November 26, 1993, Iraq seemed to shift its position and accept the terms of U.N. Security Council Resolutions 687, 707 and 715. Iraq's Foreign Minister, Mohammed Said Sahaf sent a letter to the president of the U.N. Security Council, Jose Luis Jesus, indicating that Iraq would accept the Security Council requirement that Iraq could only resume its oil exports if it agreed to long term U.N. inspection to prevent Iraq from resuming its production of weapons of mass destruction.

A number of experts believe Iraq only sent this letter after prolonged debate between Saddam Hussein's senior advisors, and after Saddam Hussein had personally presided over a discussion between his advisors. They also believe that a key factor in Saddam Hussein's decision was the advice of the armed forces that Iraq's economic situation had deteriorated to the point where it desperately needed hard currency and a relaxation of the U.N. embargo to obtain added spare parts and dual-use items for the military, and to maintain suitable living standards within the military and Ba'ath elite.

What seems most important is that Iraq only made its offer of November 26, 1993, after more than two years of events that indicated it would not honor any such agreement, and would do its best to cheat. Iraq's letter also came only days after Iraq had again challenged its border with Kuwait, had made new claims to Kuwait, had been condemned by the U.N. for new human rights violations, and had made new attacks on the Shi'ites in its marshes.⁸³

Continuing Confrontation With the West

The combined pattern of events in Tables XI-1, XI-2, and XI-3 is equally consistent in warning that a new authoritarian regime in Iraq may pursue a path of continuing confrontation with its Kurds, Iran, its southern Gulf neighbors, and the West. This confrontation is almost certain to be more severe, and more dangerous if Saddam Hussein remains in power, but it may well continue if any successor regime is dominated by other Ba'ath leaders, a Sunni clan or elite, or the armed forces.

There are Iraqi moderates, democrats, and pragmatists, but they seem to have relatively little strength. It is also dangerous to personalize Iraqi politics, and see the future in terms of Saddam Hussein. Seen from within Iraq, there are almost certainly many Iraqi nationalists who see the Iran-Iraq War, the Gulf War, the terms of the U.N. cease-fire, outside support of Kurdish and Shi'ite separatism, and military and economic sanctions as part of a consistent pattern of hostile acts. The fact that hostility and aggression inevitably lead to hostility and response may affect the behavior of many Iraqis, but it will not influence the behavior of many others.

It is not clear that the West and the U.N. have always acted wisely in dealing with this situation. There is a good case for strength and firmness in dealing with Iraq wherever it involves military issues, protection of the Kurds, and efforts to eliminate Iraq's weapons of mass destruction, but the economic embargo has done a great deal more to hurt poor Iraqis, and those who are not supporters of the ruling elite, than it has done to oust Saddam Hussein or limit Iraq's military capabilities.

The U.N. sanctions on military imports and dual-use technology have had great value in putting pressure on Iraq's military capabilities. Before the war, Iraq's military machine had depended on \$3-\$5 billion worth of annual arms imports, plus massive imports of equipment for weapons of mass destruction, and the services of thousands of foreign technicians. The U.N. has cut off most military-related imports, including spare parts, and the sanctions have ensured that Iraq was unable to keep its foreign technicians and military advisors. As a result, Iraqi military readiness has declined steadily since August, 1990.

The impact of the economic embargo also should not be exaggerated. There is no question that Iraqi officials have attempted to manipulate world opinion by making grossly exaggerated claims that the U.N. sanctions are causing widespread hardship and loss of life. For example, government spokesmen claimed the sanctions had caused 68,093 Iraqi deaths on November 26, 1991, yet claimed that Iraq had rebuilt 75% of its power grid, 85% of its oil refining capability, and 99 of 123 damaged bridges on January 11, 1992.

At the same time, the poor and the middle class have suffered a great deal. The government's devaluation of the currency in the spring of 1993 bankrupted some Iraqis, hurt many, and limited the flow of smuggled goods into the country. Unemployment and inflation have been growing problems ever since mid-1990. Imports of medical supplies, which totaled \$500 million per year before the war, dropped to less than \$130 million by 1994. Iraq had a backlog of \$4.5 billion in unfunded food imports by early 1994, and the government subsidized food ration had dropped to about 50%-60% of its previous level. There had been at least some increase in infant mortality, and the economy had reached the point of serious inflation. Most factories worked at 10% to 50% of capacity. Supplies of pure water were well below their pre-war level,⁸⁴

In contrast, the government has survived the embargo by drawing on hidden reserves of currency, smuggling, using outside credits, and confiscating the private resources of Iraqi citizens. It has used these funds for showpiece projects, to maintain decent living standards for the Ba'ath and military forces, and to smuggle arms. It has also manipulated the Iraqi economy, devalued the dinar from \$3.33 to a few pennies, and smuggled gold out through Jordan, while blaming all hardships on the West and outside powers. Even the smuggling of Iraqi petrochemical products into Turkey, Jordan, and Iran has largely benefited the central government. While many Iraqis may blame the government for this situation, -- and may remember the showpiece executions of merchants or TV coverage of Saddam Hussein being given a gold carriage -- many probably believe government propaganda or are increasingly bitter about the actions of outside nations.

There are disturbing paradigms between the social, economic, and political effects of the peace the allies forced on Germany after World War I, and the kind of peace the U.N.

has enforced in terms of sanctions, potential war crimes trials, reparations, and loan repayments on Iraq. There is a clear need to limit arms transfers to Iraq, to deny it weapons of mass destruction, and to place limits on Saddam Hussein's ability to exploit Iraq's oil wealth to buy arms. It is another thing, however, to attack the Iraqi people in the process. It is far from clear that the more extreme efforts to overthrow Saddam Hussein, or to contain Iraq's military build-up, will be anything other than counter-productive.

The problems the U.N. and Iraq have had on agreeing on the resumption of Iraqi oil production are unlikely to end even if a compromise is reached. The regime is virtually certain to portray any agreement as imposed by Iraq's enemies and the West, and is likely to do its best to retain and expand its capability to deliver weapons of mass destruction. It will portray any use of its oil revenues for debt, reparations, and U.N. expenses as imperialism. At the same time, revenues are likely to be limited. Iraq may be able to raise production capacity from less than 2 million barrels per day to 2.5 million barrels with only limited outside resupply.⁸⁵ It is not clear, however, what quota it will be given or how this will affect world oil prices. Iraq has also accumulated an immense backlog of payments. It probably owes at least \$141 billion in reparations, debt repayment, and reconstruction costs over the period from 1991-2000, and its total obligations are almost impossible to estimate. As is the case with Iran, oil politics are more likely to be the politics of confrontation or conflict, than the politics of accommodation.

Finally, it is far from clear that the pattern of challenge and response the U.N. has chosen in dealing with Iraq, that its reflected in the long series of incidents and clashes in Table XI-3, serves any long-term objective. The creation of "no-fly zones" is not a lasting answer to protecting Iraq's Kurds, and has already failed to protect Iraq's Shi'ites. Since 1992, Iraq has had some 7-8 divisions, and 75,000 troops, from its IV Corps, III Corps and Republican Guards deployed in the south. These forces have been spread out through the Shi'ite areas from Karbala and Al Kut in the north to An Nasiriyah and Az Zubayr in the south. In the north, Iraq has had some 16-18 divisions and 150,000-175,000 troops from its 1 Corps and V Corps and Republican Guards spread out along the southern edge of the Kurdish controlled zone from Dahuk through Al Kuwayr, Irbil, and Kifri to Khanaqin. Iraq forces have regularly shelled Kurdish positions near the border of the Turkish security zone, and often harassed the U.N. relief and inspection effort.

The establishment the no-fly zone did not prevent several clashes between U.S. and Iraqi forces when the Iraqis attempted to move surface-to-air missiles into positions that threatened their ability to patrol the no-fly zone. It did little to protect the Shi'ites, since Iraqi forces could continue to operate on the ground. Iraq systematically drained the

marshes the Shi'ite rebels used for cover, pushed roads into the marsh areas, and built-up fire bases and operational commands in the marsh area.

The creation of the no-fly zone in the south has also exposed the eroding unity of the U.N. Coalition. Egypt, Syria, and most other Arab members of the U.N. Coalition did not support the new U.N. action because of their fear that it might cause the break-up of Iraq. Kuwait openly supported the U.N., but the other Gulf states were silent. Saudi Arabia provided military cooperation, but kept a low political profile. Bahrain provided support to the U.S., but refused to let Britain base Tornado fighters on the island. Turkey continued to allow the U.S. to enforce the no-fly zone in the north, but did not permit U.S. forces stationed in Turkey to help enforce the new no-fly zone in the south. Turkey was fighting an increasingly destabilizing civil war with its own Kurds, and it was clear that it increasingly feared that the Kurdish enclave in Iraq threatened Turkey's security.

The U.S., British, and French air and cruise missile strikes in 1993 seem to be a classic example of using too little military force to too little purpose too often. Each series of strikes had very limited objectives, used limited amounts of force, had only moderate success, and failed to do any significant damage to Iraq's military capabilities or Saddam's control of Iraq. The largest of these strikes on June 27, 1993 -- which used 23 Tomahawk cruise missiles to attack Iraq's intelligence headquarters in Baghdad -- destroyed a building worth less than one 15th of the cost of the cruise missiles used to destroy it. Three of the missiles missed, hit Iraqi homes, and produced enough collateral damage to arouse a considerable anti-American sentiment in Iraq, but did nothing to interfere with Iraqi intelligence. Baghdad announced that the headquarters had been fully rebuilt on November 16, 1993.⁸⁶

This kind of graduated escalation may lead the Ba'ath elite to back down in specific cases, but it has probably done as much to unify the Iraqi people in support of the government as to intimidate Saddam Hussein. The U.N. and U.S. have used force in ways that are far too small to threaten the regime but large enough to provoke a hostile nationalist reaction. They have had only mixed support from the Arab members of the U.N. Coalition. They have only had a limited effect in weakening Saddam Hussein.

Table XI-3 is a warning about the cost of relying on rhetoric and half measures, and alienating a people rather than influencing it. Saddam Hussein still has tight control over massive military and internal security forces. His control over Iraq's resources allows him to manipulate the economy to protect the Ba'ath and military from the effects of the U.N. embargo at the expense of the Iraqi people. At present, there is no clear alternative to prolonged confrontation and a constant risk of war.⁸⁷

Table XI-3Iraq's Efforts to Preserve Its Weapons of Mass Destruction and Continuing Confrontation With the West⁸⁸

- 11/19/90 Tariq Aziz, Deputy Prime Minister and Foreign Minister, refutes the "false claims" made by the U.S. Secretary of State James Baker regarding Iraq's goal to possess the technology for making nuclear weapons.⁸⁹
- 03/02/91 U.N. Security Council approves Resolution 686, which sets out the allies' conditions for a cease-fire. Resolution calls on Baghdad to accept the Council's twelve previous resolutions against Iraq, demanding that Iraq renounce its annexation of Kuwait, agree to pay reparations, release all prisoners, help remove mines, and return property it stole from Kuwait. The resolution also says Iraq must cease hostile acts against countries and other parties, including missile attacks and flights of combat aircraft.
- 03/03/91 Iraq announces it accepts terms of U.N. Security Council Resolution 686, establishing a cease-fire.
- 03/05/91 Iraq announces that it has voided the annexation of Kuwait and agrees to return seized Kuwaiti assets, including gold and valuable artifacts, as required in U.N. Security Council Resolution 686. Iraq also releases what it says is the last of the allied prisoners of war and says it is complying with the U.N. Coalition's requirement that it provide details of minefields and chemical arms left in Kuwait.
- 04/03/91 The U.N. Security Council adopts Resolution 687, setting out the conditions for a permanent cease-fire in the Gulf War. The resolution calls for the disclosure and dismantling of Iraq's weapons of mass destruction by a U.N. Special Commission (UNSCOM); the establishment of a U.N. observer force and demilitarized zone along the Iraq-Kuwait border; the return to Kuwait of all property taken by Iraq; Iraqi cooperation in repatriation of Kuwaiti prisoners; the establishment of a fund, financed by Iraqi oil revenues, to compensate for the damage inflicted on Kuwait; a continued arms and economic embargo (except food, medicine, and "essential civilian needs") against Iraq; and an Iraqi renunciation and condemnation of terrorism. On April 6, the Iraqi Government accepted the resolution, while calling it "unjust"; the Iraqi National Assembly subsequently voted in favor of the acceptance; a formal cease-fire is declared by the U.N. Security Council on April 11, 1991.
- Reuters* reports U.S. military policemen believe that Iraq is sending agents posing as refugees into Kuwait to kill Saddam's opponents among those fleeing the unrest in Iraq.
- 04/05/91 The United States reportedly detected Iraqi attempts to salvage military hardware parts from damaged buildings, to clean up suspect military sites, and to move some of its surviving missiles from a site near Baghdad.⁹⁰
- 04/18/91 In its required report to the U.N., Iraq maintains that it has only 52 Scud and modified Scud missiles, along with launchers and transport equipment. Later, after seven ballistic missile inspection visits, the U.N. Special Commission has found and destroyed many more than the 52 declared missiles and suspicions remain that as many as 200 others are still hidden. Iraq claims in its report that 10,000 chemical warheads, nearly 1,500 chemical bombs and shells, and more than 1,000 tons of nerve and mustard gas have survived the war. Later, after seven chemical weapons inspection visits, U.N. inspectors found at least 150,000 filled and unfilled chemical munitions. An aide to the chairman of the Special Commission says, however, that the

discrepancy in Iraq's reports of its surviving chemical and ballistic missiles stocks may have been due to differences in counting procedures and havoc caused by allied bombing.⁹¹

Iraq initially reports that it has no nuclear weapons program, but International Atomic Energy Agency (IAEA) inspectors, on their eight nuclear program inspection visits, find three clandestine uranium enrichment programs. The IAEA believes this material is to be used for nuclear weapons, and other nuclear capabilities have been discovered, as discussed below. Iraq also reports that it has no biological weapons program, but the Special Commission, which has completed three biological weapons inspection visits, later reports that Iraq clearly did have a program. No biological weapons or facilities are found.⁹² (The Iraqis later acknowledge that they have a biological weapons research program.)

In a letter to the U.N. Security Council, Iraq formally and unconditionally reaffirms its obligations under the 1925 Geneva Protocol prohibiting the use of gases in warfare and it deposited the instruments of ratification of the 1972 biological weapons convention with the Russian Embassy in Baghdad. These steps are required by U.N. Security Council Resolution 687.

- 04/23/91 Kuwait accuses Iraq of continuing to detain more than 5,400 Kuwaiti civilians and soldiers.⁹³
- 04/29/91 Iraq tells the IAEA that it has relocated some of its nuclear materials during the Gulf War to escape allied bombing. It refuses to disclose their location unless the IAEA guarantees that the materials would not be attacked by the allies.⁹⁴ The Iraqi disclosures contain substantial further information beyond that previously provided, including the existence of several facilities not known to the IAEA.
- 06/28/91 Iraqi troops fire shots into the air in attempt to prevent U.N. inspectors from photographing equipment used to manufacture weapons-grade uranium. The inspectors see a convoy of trucks carrying the uranium enrichment equipment away from a site (Al Fallujah) where it is being concealed. The action follows two previous attempts that week to prevent the U.N. from inspecting a suspected nuclear facility at Abu Ghurayb. The expanded U.N. search comes after an Iraqi defector reportedly revealed to U.S. military forces the location and activities of four previously unknown Iraqi nuclear facilities. The defector indicates that Iraq is much closer to developing a nuclear weapon than previously believed.⁹⁵ Following U.N.-Iraqi talks after the shooting incident, the U.N. says Iraq did not state its willingness to fully comply with requests by the inspectors to visit suspect Iraqi facilities.
- 07/01/91 Iraq again limits inspection team's access to the Al Fallujah site.
- 07/03/91 Inspection team leaves Iraq and reports to the Secretary General that they were unable to gain access to Iraqi equipment suspected of being used to produce nuclear weapons.
- 07/08/91 Under international pressure, Iraq discloses to the U.N. details of an extensive, secret nuclear development program, but continues to deny that the program is for the development of weapons.
- 07/09/91 U.N. inspectors are shown crucial elements of Iraq's clandestine nuclear program during a visit to a previously uninspected nuclear research plant.⁹⁶
- 07/10/91 *Washington Times* reports that U.S. officials says that satellite intelligence has spotted Iraqi forces burying nuclear-related equipment in an effort to hide it from U.N. inspectors. The officials add that the Iraqis are trying to hide three or four other suspected nuclear sites from remote surveillance by setting fires nearby to cover them with smoke.⁹⁷

- 07/12/91 Because of continued skepticism that Iraq has fully disclosed its nuclear program, five permanent members of the U.N. Security Council on July 12 give Iraq until July 25, 1991, to make a full disclosure or face possible military action.
- 07/18/91 IAEA formally condemns Iraq for failing to declare and submit for inspection all of its nuclear research. This comes despite Iraq's disclosure on July 14 of an additional list of its nuclear facilities.
- 07/19/91 After previous denials, Iraq admits to the U.N. that it has built and tested a 350 mm "super gun" capable of delivering weapons of mass destruction, and that it is working on an even larger (1,000 mm) gun.
- 07/25/91 Deadline for full disclosure of Iraqi nuclear capabilities expires. The Bush Administration charges that Iraq has failed to comply.
- 07/31/91 Report to the U.N. by international inspectors says that Iraq's military, after the war, conducted a massive effort to eliminate evidence of Iraq's nuclear capabilities. The report says that Iraqi concealment measures included the razing of buildings and explosion or burial of equipment.⁹⁸
- 08/01/91 Head of the U.N. inspection team, David Kay, tells journalists that the Iraqis are becoming increasingly cooperative.
- 08/05/91 Iraq discloses to the U.N. that its scientists are able to secretly produce some plutonium suitable for an atomic bomb and that it has misled U.N. inspectors about a secret biological weapons program.⁹⁹
- Iraq begins returning Kuwaiti property, taken in the occupation of Kuwait, by starting to hand over about \$700 million in gold bullion. (Gold return is completed on August 18. Later, on September 10, Iraq returned 120,000 books and rare manuscripts. Transfers are conducted under U.N. auspices at the Iraq-Kuwait border.)
- 08/07/91 Iraqi troops make night raids into Kuwait to retrieve weapons, including Silkworm missiles, left behind when they retreated from Kuwait in late February. Raids are conducted at night when 300 U.N. observers monitoring the demilitarized zone between Iraq and Kuwait do not patrol.¹⁰⁰ The Iraqis are dressed as civilians and there is some debate as to whether they are military personnel. About 150 Iraqis engaged in this activity are arrested in Kuwaiti territory.
- 08/08/91 Iraq shows U.N. inspectors 17.6 pounds of irradiated uranium¹⁰¹ Iraq admits it moved it around for four months by truck to hide it from U.N. inspectors in their three previous visits.¹⁰² Los Angeles Times reports that a senior U.S. State Department official says that Iraq is trying to buy materials from international arms dealers to rebuild its nuclear and chemical weapons capability, in contravention of U.N. Security Council Resolution 687.¹⁰³
- 08/14/91 U.N. officials say that Iraq has the capability to produce biological weapons at its Salman Pak facility, but that there is no evidence that biological weapons has been made. Under pressure, Iraq acknowledges that its biological research program included development of weapons for defensive purposes, and potentially for offensive uses.¹⁰⁴
- 08/15/91 U.N. Security Council, in Resolution 706, tentatively approves a plan under which Iraq could sell up to \$1.6 billion worth of oil over six months. Under Security Council Resolution 705, passed the same day, it is determined that 30 percent of the proceeds would be taken as war reparations. Five percent would help fund the U.N. Special Commission (UNSCOM) that is working to eliminate Iraq's weapons of mass destruction, an additional portion would fund other U.N.

expenses for Iraq, including half the costs of the Iraq-Kuwait Boundary Demarcation Commission, and the rest would go into an escrow account for the U.N. to purchase and distribute food and medicine to the Iraqi people. Iraq denounces the plan and refuses to sell oil under these conditions, claiming this is an infringement on its sovereignty.

Security Council Resolution 707 condemns Iraq for failing to fully cooperate with the Special Commission and the IAEA in finding and eliminating Iraq's weapons of mass destruction, demands that Iraq disclose the foreign suppliers of its weapons of mass destruction programs, and stipulates that U.N. inspectors have unimpeded access, using their own transportation, to any facilities they wish to inspect.

08/19/91 Spokesperson of the Kuwaiti Embassy in Washington says the presumed number of remaining detainees is 1,826.

08/21/91 Team of U.N. inspectors completes a visit to Iraqi chemical weapons sites and says that Iraq has cooperated fully and is working out ways to destroy its chemical bombs and warheads. The U.N. team attributes Iraqi helpfulness to its need to resume chlorine production for civilian uses; the U.N. would not allow the resumption of such production until it is satisfied that Iraq is dismantling its chemical weapons capabilities.¹⁰⁵

08/28/91 Kuwait claims that 80 Iraqi troops dressed as civilians infiltrated its northern Bubiyan Island, which Iraq has long tried to acquire or control. The Kuwaiti's says they captured 47 of the Iraqis and sank some vessels that has attacked their coast guard.¹⁰⁶ Iraq denies the incident. A U.N. report on the incident, however, says the Iraqis probably were scavengers for abandoned arms, finding little evidence of a clash and only ammunition on board captured Iraqi boats.¹⁰⁷

09/08/91 Iraq tells the U.N. that its inspectors cannot use their German-supplied helicopters over Iraqi territory, and must use Iraqi helicopters. U.N. inspectors say this would seriously hamper their inspection efforts by limiting their ability to visit suspect facilities at the time and place of their choosing. Iraq's action contravenes U.N. Security Council Resolution 707 of August 15, 1991, authorizing the U.N. to use its own helicopters to inspect Iraq's stocks of weapons of mass destruction and their production facilities.

09/10/91 Small clash occurs when a car carrying several Iraqis crosses the border into Kuwait.

09/10/91 U.N. officials criticize Iraq for welding together Scud missile transporters that the U.N. inspectors thought had been cut in half and rendered inoperable. However, U.N. officials are not certain that the transporters can be used. According to Western diplomats, Iraq also attempts to retain its old border with Kuwait rather than agree to a new one being drawn up by the U.N.. The Iraqis reportedly move their front-line posts into the no-man's land between the two countries.¹⁰⁸

At a meeting of the Arab League council, Kuwaiti and Iraqi representatives clash over Kuwait's allegations that Iraq is still holding Kuwaiti prisoners. Iraq denies the charge and offers to host an Arab League commission which would investigate the issue. Kuwaiti officials say that one Kuwaiti officer is killed, and another wounded, in a clash with Iraqi smugglers in northern Kuwait. The Kuwaitis say that the Iraqi authorities did not appear to be involved in the incident and they do not consider it a violation of the cease-fire resolutions.

09/16/91 Iraq tells the President of the U.N. Security Council that U.N. inspectors can use their own helicopters but only under the condition that Iraqi "specialists" are on board, that the flights are within a limited area, and that the inspectors do not take aerial photographs. In rejecting the Iraqi conditions, the United States threatens to send additional U.S. aircraft back to the region to provide armed escorts for the U.N. inspectors.

Kuwait says its armed forces dislodge seventy Iraqi civilians who occupied a police post in northern Iraq. Kuwait says Iraqi authorities are responsible for the incident.

- 09/19/91 U.N. Security Council adopts Resolution 712, formally approving the U.N. oil sale plan set up in Resolution 706. Resolution 712 formally accepts a report by the Secretary-General proposing the means for implementing Resolution 706 and documenting Iraq's humanitarian needs. The report is a requirement laid out in Resolution 706 for the formal approval of the oil sale plan.
- 09/21/91 U.S. officials say that Iraq destroyed records of weapons of mass destruction and arms procurement network that it claimed had been stolen. Officials add that the Iraqis obscured the serial numbers of equipment to prevent U.N. inspectors from finding out how Iraq's clandestine procurement network operates. Iraq is also said to have deliberately allowed U.N. inspectors to come in contact with leaking chemical and biological weapons canisters and they have sent uninformed officials to brief the inspectors.¹⁰⁹
- 09/23/91 Iraq detains 44 U.N. inspectors for 13 hours after they discover documents detailing Iraq's nuclear weapons program at a facility in central Baghdad. Iraq allows the inspectors to leave the site, but without the documents. Iraq argues that the documents contain information on Iraqi scientists and charge that the information would be turned over to Western and Israeli intelligence. Iraq's Deputy Prime Minister Tariq Aziz accuses the U.N. team leader, David Kay, of being an American spy. Meanwhile, Iraq's Foreign Minister told the U.N. that Iraq would comply with the U.N. inspection regime.
- 09/24/91 When inspectors insist on removing documents they say contain crucial information on Iraq's nuclear program, Iraqi authorities refuse to allow them to leave the parking lot outside the facility until they surrender the documents. However, Iraq agrees unconditionally to allow U.N. inspectors to use their own helicopters in future inspections of suspect facilities throughout Iraq.
- 09/26/91 Iraq signals willingness to compromise in the standoff with the detained U.N. inspectors by offering to permit them to remove the documents they discovered if they catalogued the material they were taking. In response, the Bush Administration halts plans to send helicopters and additional military aircraft to the Gulf to, if necessary, to escort the inspectors. United States and the U.N. agree to the Iraqi compromise and the inspectors are allowed to leave the site, with their documents, on September 27.
- 09/30/91 IAEA officials say Iraq covered up further evidence of its nuclear program while detaining the U.N. inspectors at the Baghdad parking lot. U.N. inspection team found suspect facilities stripped of their contents when they resumed their inspections on September 28, and they suspended their mission shortly thereafter. They also discover a note from Iraqi authorities giving instructions on where to move hidden documents after the inspectors have left. U.N. officials express embarrassment that, during the detention, inspection team leader David Kay, an American, relayed data on Iraq's nuclear program to the U.S. State Department before reporting to superiors at the IAEA and U.N..¹¹⁰
- 10/02/91 U.N. Special Commission (UNSCOM) says it suspects Iraq may be hiding a fourth uranium enrichment plant, which they believe is designed to produce nuclear explosives by the "nozzle technique," a uranium enrichment technique developed by two German companies. U.N. has previously discovered that Iraq is experimenting with chemical separation, gas centrifugation, and electro-magnetic separation techniques to enrich uranium.
- 10/05/91 In a report to the U.N. Security Council, the inspection team that has been detained in Baghdad says it uncovered evidence that Iraq has tested several items needed to produce and deliver a

nuclear bomb, including a surface-to-surface missile delivery vehicle. The team says it believes about 5,000 people were involved in an extensive nuclear weapons effort.¹¹¹ The report adds program is supported by "broad-based international procurement efforts." Inspectors say that they also believe that Iraq still has many facilities connected to the nuclear program which have not been declared, and recommend significant follow-up activity.

- 10/06/91 Senior U.N. official says that Iraq could still be working on a nuclear weapons program, despite its denials. Another official, Douglas Eklund, head of the ballistic missile inspection team, says his inspectors, on their most recent visit, have found previously undisclosed concrete emplacements that were clearly bases for future Scud missile launchers.¹¹²
- 10/07/91 A U.N. report on preliminary findings of the sixth nuclear inspection visit of Iraq says that U.N. inspectors has visited Iraq's Al Atheer facility south of Baghdad. Documents seized by the inspectors in September indicate that Al Atheer is the headquarters for Iraq's effort to build a nuclear explosive device.¹¹³ These documents also establish that Iraq had begun a weaponization program.
- 10/08/91 Iraq is reported to have produced materials and equipment needed to develop a hydrogen bomb and/or a more destructive atomic bomb. Observers says Iraq is still probably at least several years away from a hydrogen bomb.¹¹⁴
- 10/11/91 Security Council adopts Resolution 715, which provides for aggressive inspections and dismantling of Iraq's industrial facilities that could be used for weapons of mass destruction production. Iraq vehemently opposes the resolution, charging that it provides U.N. inspectors with the authority to dismantle all Iraqi industry, and says it will not cooperate in its implementation.
- 10/12/91 Saddam addresses delegates to an Iraq-sponsored "conference of Arab popular forces," saying that Iraq could withstand the international sanctions for "20 years." Iraq organized a conference to place pressure on Arab leaders to violate the international sanctions by resuming commerce with Iraq.
- 10/13/91 U.N. officials say that Iraq removed most of the documents of its nuclear program before U.N. inspectors arrived (Sept. 23, 1991) at the site where they were kept.¹¹⁵
- 10/16/91 U.N. Special Commission (UNSCOM) says that it will continue to fly its helicopters in Iraqi airspace despite Iraq's warnings that they could be shot down if Israel used the U.N. flights as a cover to protect against anti-aircraft fire. In an October 13 letter to former Secretary General Javier Perez de Cuellar, Iraq suggests that Israel's October 4 over flight of Iraqi airspace coincided with U.N. inspection flights to ensure that Israel would not come under fire.
- 10/21/91 Head of the U.N.'s seventh inspection visit says that Iraq has, for the first time, made a written declaration that it has conducted research into the construction of an atomic bomb. Iraq is continuing to insist, however, that the research is intended to enable Iraq to produce a weapon if a political decision is taken to do so.

In hearings on Iraqi compliance before the Europe and Middle East and International Organizations subcommittees of the House Foreign Affairs Committee, U.S. Ambassador to the U.N. Thomas Pickering presents a picture of "half-hearted, sporadic, lame, halting compliance," but notes that, "nevertheless...time after time [Saddam] balks, and then he seems reluctantly to come along, at least to the point where the inspections can continue, the documents can be retrieved, and so on."¹¹⁶

- 10/22/91 A Harvard University study on the humanitarian situation in Iraq is released. Compiled by 87 experts during a two week visit to Iraq in August and September 1991, the study says that Iraq's child mortality rate has tripled as a result of the Persian Gulf War, the post-war rebellions, and international sanctions against Iraq. The report adds that food prices in Iraq have risen by between 1,500 and 2,000 percent and that Iraq's agricultural output has fallen 70 to 75 percent, and industrial output has been cut by half.
- 10/25/91 Iraq's Oil Minister, Usama Abd al-Razzaq al-Hitti says he recommends that Iraq reject the U.N. oil sale plan (U.N. Security Council Resolutions 706 and 712). Hitti says the plan would prevent Iraq from concluding barter and pre-financing arrangements that it has established with many of its oil customers before the Gulf crisis and the cut-off of its oil exports.
- 10/26/91 U.N. inspectors say they have obtained the blueprints for an Iraqi atomic bomb that, if produced, could have been delivered by a missile. U.N. officials also say that Iraq has tested aspects of a nuclear weapon and could have produced a bomb in about a year.¹¹⁷
- 11/11/91 Members of a U.N. inspection team say that they have found large numbers of Iraqi weapons (rifle grenades, artillery shells, and Scud missiles) which contained chemical warheads, which could have been used in the Gulf War. The inspectors also say the weapons were poorly constructed and probably could not have been fired accurately.¹¹⁸
- 11/12/91 Iraq fails to meet a deadline, established in U.N. Security Council Resolution 715, to provide a list of all the plants and equipment in Iraq that could be used for producing weapons of mass destruction. (Four days later, U.N. officials says Iraqi officials were in the process of trying to compile such lists.)
- 11/24/91 Iraq is found to be exporting small quantities of refined oil products, probably diesel fuel and kerosene, to Lebanon and Turkey. The exports were says to be transiting Jordan and Syria.¹¹⁹
- 11/26/91 Iraq's Health Minister, Abd al-Salam al-Sa'id, charges that the international sanctions against Iraq has accounted for the death of 68,093 Iraqis since the sanctions began on August 2, 1990. While not detailing how that figure is calculated, he used it to denounce the continuance of the economic sanctions.
- U.N. issues a report that its inspectors, during their inspection visit during October 11-22, found traces of weapons grade uranium (93% enriched) at four places within Iraq's Tuwaitha facility. The inspectors say it is unlikely, given what is known about Iraq's nuclear capabilities, that Iraq could have enriched uranium to such levels on its own. U.N. officials note that the samples may have been contaminated inadvertently by the U.N. inspectors or the laboratories in the United States and Austria where the samples are being analyzed.
- 11/28/91 Iraq's Foreign Minister Ahmad Hussein al-Samarra'i visits Tunisia to request the repatriation of four Iraqi aircraft parked there since the Gulf crisis began. Iraq asks Tunisia to release its Iraqi assets to fund food and medicine purchases.
- 12/04/91 Kuwait's Ambassador to the U.N. protests that Iraq is failing to honor its commitment to facilitate the work of the U.N. Iraq-Kuwait Boundary Demarcation Commission, which is attempting to define the border between Iraq and Kuwait. He also complains that Iraq has failed to release all prisoners (including Kuwaitis) and has prevented visitations of these prisoners.
- 12/09/91 Kuwaiti paper reports that three Kuwaiti fisherman were abducted by Iraq in international waters in the Persian Gulf. The paper says Kuwaiti authorities have warned fisherman not to sail in

international waters. A U.S. Embassy spokesman says two U.S. businessmen who were surveying parts of the Iraq-Kuwait demilitarized zone were missing, presumably taken by Iraq.

- 12/10/91 Iraq's National Assembly ousts five of its members for suspected disloyalty to the regime. Another, a former Minister of Light Industries and member of the Tikriti clan, resigns.

A summit of the Islamic Conference Organization adopts a resolution criticizing Iraq for the invasion of Kuwait and calling for economic sanctions against Iraq to be maintained. While PLO leader Yasir Arafat and Jordan's King Hussein oppose continued sanctions, only Sudan votes against the anti-Iraq resolution.

- 12/13/91 Iraq strongly criticizes U.N. Secretary General Javier Perez de Cuellar for his December 10, 1991 report blaming Iraq for starting the Iran-Iraq War in 1980. Iran has hailed the finding as a historic "belated but encouraging recognition of the aggressor."

- 12/23/91 Iraq's Minister of Health, Abd al-Salam al-Sa'id, is replaced by the Minister of Labor and Social Affairs. While Baghdad radio does not cite reasons for Sa'id's dismissal, he probably was being made a scapegoat for the poor economic and public health conditions resulting from the international sanctions.

Iraq's Interior Ministry says it is giving Iraqi citizens a final ten days to turn in unlicensed weapons and ammunition without penalty. The firearm amnesty suggests regime nervousness over popular opposition.

- 01/01/92 Saddam's elder son Uday, in an editorial in his newspaper *Babil*, calls for a return to public executions for suspected dissidents, such as those responsible for the car bomb that exploded outside a Baghdad hotel.

- 01/06/92 It is reported that Iraq has smuggled uranium and nuclear scientists to Algeria in an effort to develop an atomic bomb. According to the report, Iraq trucked ten tons of uranium into Jordan, for shipment to Algeria, before the first U.N. teams began their nuclear inspections in Iraq on May 10, 1991. The *London Observer* report adds that Iraq has sent nuclear scientists to Algeria to work on its Chinese made 15 megawatt nuclear reactor.¹²⁰ Following the report, the U.S. State Department confirms that the U.S. has expressed concerns to Algeria about its alleged nuclear connection with Iraq. Algeria denied the connection.

In a speech on Army Day, Saddam Hussein boasts of Iraq's ability to hit Israel with ballistic missiles during the Gulf conflict. Unlike past years, there is no military parade to mark the occasion.

- 01/08/92 Iraq and the U.N. begin talks in Vienna on the proposed U.N. oil sale plan, amid signs of possible U.N. flexibility on some of Iraq's objections. Iraq reportedly wants to export some of the oil through its own Mina al-Bakr terminal rather than through Turkey, which would entail payment of substantial fees to Turkey. Iraq also wants to be able to monitor the use of the proceeds from the oil sale and to be permitted to sign long-term oil contracts to reestablish itself in the international oil market. Iraq's Oil Minister also says Iraq is pushing for the U.N. to increase the allowed oil sale from \$1.6 billion to \$2.4 billion.

- 01/11/92 Iraqi Government officials say that Iraq has rebuilt 75 percent of its power grid, 85 percent of its oil refining capacity, 99 of the 123 bridges damaged or destroyed in the war, and 187 "military industries" buildings.

- 01/13/92 Iraq admits to U.N. inspectors that they have bought large quantities of German components to build gas centrifuge devices for uranium enrichment. The admission came a day after U.N. inspectors, possessing information from Bonn about the German-supplied machinery, raided a suspected Iraqi nuclear facility without finding the purchased equipment. Iraq says it has destroyed the machinery after the cease-fire in the Gulf War, but the U.N. says it remained skeptical that all the acquired equipment has been destroyed.
- 01/15/92 In testimony before the Senate Governmental Affairs Committee, Director of Central Intelligence Robert Gates says that Iraq could rebuild its ability to make nuclear, chemical, and biological weapons and ballistic missile systems within a few years. He says that Iraq's scientists and engineers could reconstitute dormant programs rapidly.¹²¹
- 01/17/92 IAEA says that preliminary on-site investigations indicate that Iraq has, as it says, destroyed the uranium enrichment equipment supplied by German companies.
- In a speech marking the anniversary of the beginning of the 1991 Gulf War, Saddam says Iraq intends to rebuild an "influential" military capability, while acknowledging that Iraq has lost the Gulf War. Earlier in January, Defense Minister Ali Hassan al-Majid told the Ba'ath Party paper Al Thawra that Iraq would build a strong but smaller army.
- 01/23/92 In letter to the U.N. Security Council, Iraq's Foreign Minister provides what Iraq says is documentation of its cooperation with the cease-fire resolutions. In some cases, such as the return of Kuwaiti property, Iraq blames its incomplete compliance on the U.N. staff shortages and inefficiencies. Iraq blames its failure to repatriate all Kuwaiti nationals to Kuwait's failure, thus far, to grant approval for the remaining Kuwaiti nationals to be repatriated.
- 01/25/92 Secretary General reports to the U.N. Security Council on Iraq's compliance record to date. Report says that Iraq has refused to provide the U.N. Special Commission (UNSCOM) with a detailed report on its defense industries, as required in U.N. Security Council Resolutions 707 and 715. Iraqi officials are said to have told Commission members, at a January 12 meeting in Iraq, that Iraq would not make any further declarations on its defense industries. Report says Iraq has tried to conceal equipment used for making chemical weapons and that Iraq still refused to furnish the Commission with its plans for producing biological weapons. U.N. officials add that the Iraqi army has extended its military lines around the Kurdish areas in northeastern Iraq to enforce its economic blockade of the Kurds. The report also says that Iraq has not, as required by U.N. Security Council Resolution 706, informed the Secretary General of its holdings of gold and foreign currency reserves.
- 01/28/92 Iraqi police officers refuse to intervene when demonstrators harass three U.N. inspectors at a hotel in Baghdad. Demonstrators confined the rest of the chemical and biological inspection team for about 25 minutes inside a bus.
- 01/31/92 Kuwait's Permanent Representative to the U.N. charges that Iraq has established several border posts inside Kuwaiti territory. According to the U.N., Iraq has generally respected the Iraq-Kuwait border and observed the demilitarized zone, but it is refusing to withdraw several police posts closer to the demilitarized zone than the U.N. has demanded.

According to the *Middle East Economic Digest*, a U.S. consultant estimated that Iraqi imports since the end of the Gulf War have been about one quarter of the prewar total, financed partly through Iraqi assets unfrozen by the United Kingdom, reports new credits from Jordan, oil smuggled across the Turkish and Iranian borders, and \$5 million in aid from Libya.

02/04/92 Kuwait's Interior Minister says Kuwait has arrested an unidentified number of Iraqi infiltrators allegedly engaged in smuggling or planning acts of sabotage inside Kuwait. He reiterated that Kuwait would set up a defensive line along its border with Iraq, once the U.N. has demarcated the border.

Iraq cancels a second planned round of talks in Vienna with U.N. officials on the U.N. oil sale plan. The cancellation diminishes expectations, raised in the first round of talks in January, that an agreement on the oil sale plan will be reached.

02/05/92 U.N. Security Council decides to maintain economic sanctions against Iraq and says there is "serious evidence" of Iraqi noncompliance on disclosing and dismantling its weapons of mass destruction and on the repatriation of Kuwaitis and other third country nationals detained in Iraq. The U.N. also denounces Iraq's refusal to participate in the U.N. oil sale plan.¹²²

02/08/92 Iraq accuses the U.N. of violating the rules of diplomatic immunity by entering the Baghdad headquarters of the Arab Scientific Research Council without permission. On a Cable News Network interview, Secretary of State Baker says the Iraqis have briefly tried to deny U.N. inspectors access to the site but ultimately granted them admission.

02/11/92 U.S. officials are reported to believe that Iraq is reorganizing and consolidating their military apparatus in a "highly provocative" manner. In addition, officials say Iraq has taken some of its MiG-23 aircraft out of protective revetments and flown some on short missions, a direct violation of the March 3, 1991 cease-fire agreement with the allies in which all fixed wing flights in Iraq were banned.

02/12/92 During the tenth U.N. inspection of Iraq's nuclear facilities, the inspectors search, unsuccessfully, for a previously unknown nuclear reactor capable of producing plutonium. U.N. suspects that Iraq has such a plant on the basis of new intelligence, primarily from France.

02/13/92 Iraq offers to send its Minister of State for Foreign Affairs to meet with the U.N. Security Council to discuss Iraq's shortcomings in complying with all U.N. resolutions. Meanwhile, the United States pledges support for U.N. efforts to destroy Iraq's military industries, particularly those used in the production of ballistic missiles. United States says it would support a resolution of condemnation if Iraq did not cooperate in the dismantling of those facilities but it reportedly is not clear if the United States is considering military action to compel Iraqi cooperation.¹²³

02/19/92 *London Financial Times* reports that the U.N. Iraq-Kuwait Boundary Demarcation Commission (tasked under U.N. Security Council Resolution 687 with finally demarcating the Iraq-Kuwait border) may draw the border slightly north of where it has been previously, denying Iraqi claims and possibly giving Kuwait control over some of Iraq's port at Umm Qasr.¹²⁴ Such a demarcation would also give Kuwait extra oil wells in the Iraqi portion of the Rumaylah oil fields.

Security Council orders Special Commission head Rolf Ekeus to Baghdad to obtain assurances from the Iraqi Government that it will cooperate with U.N. efforts to catalogue and destroy its weapons of mass destruction. The U.N. warns of "serious consequences" if Iraq does not comply. In addition, a report presented to the U.N. Human Rights Commission in Geneva says thousands of Iraqis are in danger of execution, torture, and unfair detention and that these abuses were likely to continue as long as the security forces continued to hold ultimate power over the lives of most Iraqis. The report, submitted by former Dutch Foreign Minister Max van der Stoel, calls the human rights situation in Iraq the worst in any country since World War II.

- 02/24/92 Kuwait's Deputy Chief of Staff says Iraq has begun to return captured Kuwaiti military equipment but it has not agreed to return captured Hawk anti-aircraft missile systems. The United States has also reportedly detected recent Iraqi tests of the system.¹²⁵
- 02/25/92 A Kuwaiti paper reports that Iraq has begun hastily rebuilding the port of Umm Qasr to strengthen its claim to the town before the UN's Iraq-Kuwait Boundary Demarcation Commission rendered a final decision on the demarcation of the Iraq-Kuwait border.
- 02/26/92 Kuwait's Association to Defend War Victims, a private human rights group, lists 1,053 Kuwaitis as still unaccounted for, with many believed still held by Iraq. The Kuwaiti Government-run National Committee for Missing and POW Affairs says that "about 1,000" Kuwaitis are still missing and many might eventually be found among those killed during the occupation but buried before they were identified.
- 02/27/92 Head of the U.N. Special Commission (UNSCOM), Rolf Ekeus, says Iraq has not agreed unconditionally to comply with U.N. plans to dismantle its weapons of mass destruction unless the U.N. relaxed the international embargo against Iraq. In response, the United States says it will push for a new U.N. Security Council resolution to pressure Iraq to comply with all relevant cease-fire resolutions if Iraq does not become more cooperative.
- 02/28/92 Iraq again refuses to meet a deadline for allowing U.N. inspectors to begin destroying its ballistic missile manufacturing equipment. The first deadline was February 26, but Iraq was granted several postponements by the U.N.. Instead, Iraq writes to the U.N. Security Council proposing negotiations on this subject when a high level Iraqi delegation (Iraq's Deputy Prime Minister Tariq Aziz and Minister of State for Foreign Affairs Muhammad Sahhaf) met with U.N. officials in early March, 1992. Iraq argues that it does not want the equipment destroyed since it could be converted to civilian uses and that international economic sanctions should be eased in exchange for Iraqi compliance. Because Iraq would not cooperate, the U.N. team sent to dismantle the manufacturing facilities left Baghdad the following day. In response, the Security Council meets, describes Iraq's behavior as unacceptable, and demands that Iraq comply with the equipment destruction plan and that its delegation arrive for discussions on the matter no later than March 9. It again warns Iraq of "serious consequences if it does not comply.
- 03/01/92 A German newspaper reports that Iraq has recruited two Russian nuclear scientists to work at a military complex near Baghdad. The two scientists, who were on their way to Iraq, tell the paper that about 50 experts from the former Soviet Union were already working in Iraq.
- 03/03/92 *Philadelphia Inquirer* reports that Bush Administration is considering a military strike against Iraq as a means of forcing Iraq to comply with the U.N. efforts to dismantle its ballistic missile manufacturing facilities. According to the report, U.S. officials believe the United States would have the support of the U.N. Security Council for such a strike.
- 03/05/92 United States is reported to be attempting to locate, through intelligence means, Iraqi Scud missiles that it believes are hidden in underground storage sites.¹²⁶
- 03/06/92 *Middle East Economic Digest* reports that the U.S. is trying to track Iraq's hidden assets abroad, estimated at 10-30 billion dollars.
- 03/11/92 U.N. Security Council tells the visiting Iraqi delegation headed by Prime Minister Tariq Aziz, that, in the Council's view, Iraq is not in full compliance with its obligations under U.N. cease-fire resolutions. Aziz responds by arguing that Iraq is in compliance with all relevant resolutions, and that reporting on its compliance record by the Special Commission and IAEA is promoting internal dissension against Saddam Hussein. He proposes the formation of an expert

panel consisting of representatives from Iraq, the U.N., and the Security Council members to decide on which facilities in Iraq should be dismantled. The Council opposes such a plan on the grounds that U.N. Security Council Resolution 687 delegates those decisions to the Special Commission.

03/12/92 In the second day of meetings between the Iraqi delegation and the U.N. Security Council, delegation head Tariq Aziz says Iraq wants to cooperate with the Council by complying with the cease-fire resolutions and that it wants to discuss any problems in compliance with the U.N.. Aziz says Iraq is ready to make a full declaration of its weapons of mass destruction facilities, but that Iraq first wants to discuss the disclosures with the Special Commission and the IAEA to ensure that the disclosure did not violate Iraqi sovereignty. He says Iraq is ready for a dialogue with the Special Commission on long-term monitoring of its military industries but that Iraq wants to preserve everything that can be converted to civilian use. Aziz adds that Iraq is willing to reopen talks with the U.N. on the oil sale plan and that Iraq would give the International Committee of the Red Cross access to Iraqi prisons to look for missing Kuwaitis. Council members are skeptical that Iraq has softened its positions, however, and there is speculation that the United States and other nations might consider military action if Iraq still does not comply. For example, the United States is said to want immediate destruction of Iraq's Al Atheer facility, at which Iraq is said to be developing nuclear explosive devices.

03/13/92 U.S. aircraft carrier *America*, along with several supporting ships, sails into the Persian Gulf. The Pentagon calls the maneuver "routine" but many observers read the deployment as preparation for or threat of an attack against Iraq if it continued to defy the U.N.. Later, some U.S. officials say the battle group is a "clear signal" to Iraq that it must comply with U.N. demands.

03/14/92 Reacting to what they believed is Iraqi intransigence in the talks between Tariq Aziz and the U.N., some U.S. officials say that the United States might have to use military action to destroy Iraq's capability to produce weapons of mass destruction. These officials add that the United States would only undertake a military strike against Iraq with the approval of the U.N..

In an interview prior to his return to Iraq, Tariq Aziz declines to provide assurances that Iraq would allow U.N. teams to dismantle its weapons production facilities but that U.N. activities would be judged on a "case by case basis."

03/16/92 Appearing before the governing council of the U.N. Compensation Committee, an Iraqi Central Bank official says Iraq will not compensate allied prisoners it has captured and allegedly mistreated during the Gulf War. Such compensation is demanded of Iraq in U.N. Security Council Resolution 687.

03/17/92 In testimony before the Europe and Middle East Subcommittee of the House Foreign Affairs Committee, Assistant Secretary of State for Near Eastern Affairs Edward Djerejian says that Tariq Aziz failed to satisfy the U.N. Security Council in their meetings. He added that Iraq is still "far short of complete and unconditional compliance" with all U.N. cease-fire resolutions. Djerejian says that it is the Administration's assessment that Jordan has made a "full and unambiguous commitment" to enforcing the sanctions regime against Iraq.

--- *New York Times* reports that during the discussions with Iraq's Deputy Prime Minister Tariq Aziz, the U.N. gave Iraq until March 26, 1992 to formulate a detailed plan for dismantling its facilities for producing weapons of mass destruction. Aziz is said to have accepted the ultimatum, which carried an implied threat of force, and a 35 member team of U.N. ballistic missile experts is in Baghdad awaiting receipt of the Iraqi plan. During his discussions with the U.N., Aziz is also said to have given the U.N. a list of Iraqi military industries for the Special Commission to monitor.

- 03/20/92 U.N. officials say Iraq has promised, in writing, to provide the U.N. a complete picture of all its arms programs. The U.N. officials say the message reflects a new attitude on the part of Baghdad toward complying with U.N. cease-fire requirements. In its letter, Iraq says it has destroyed 89 ballistic missiles on its own; those missiles were supposed to have been destroyed under U.N. supervision. Iraq gives the U.N. new data on previously undisclosed chemical warheads for its Scud and modified-Scud missiles. Iraq also agrees to destroy facilities and equipment the Special Commission believes necessary. U.S. officials welcomed Iraq's letter, but react cautiously.
- 03/22/92 IAEA, after meetings with Iraqi officials on Iraq's nuclear program, says that Iraq is refusing to fully disclose the extent of that program. They say the Iraqi delegation's attitude contrasts sharply with Iraq's apparent new willingness to cooperate in destruction of its ballistic missiles and chemical weapons. The Iraqi delegation is said to be pressing especially hard to avoid destruction of its Al Atheer facility outside Baghdad. During the Gulf War, Al Atheer was identified as the location where Iraq is attempting to develop a nuclear explosive device. The Iraqis maintained that Al Atheer, a complex consisting of about 100 buildings, is developed as a civilian nuclear science research center and should not be destroyed.
- U.N. inspectors say they are shown about two dozen previously undeclared Scud missiles that Iraq has destroyed on its own. The team does not say how many destroyed missiles they have seen. Iraq also agrees to destroy Scud missiles manufacturing equipment and provides information on chemical warheads it is suspected of concealing.
- 03/25/92 U.N. team in Iraq reports that it has begun dismantling ballistic missile manufacturing equipment. IAEA orders Iraq to destroy the technical core of the Al Atheer facility.
- 03/31/92 Kuwait tells the Arab League that Iraq is still holding 850 Kuwaitis (723 citizens and 127 non-Kuwaitis) in Iraq.
- 04/05/92 Iraqi aircraft fly for the first time since the Gulf War, attempting to intercept Iranian aircraft that were raiding the bases in Iraq of Iran's opposition People's Mujahideen, according to the U.S. Department of Defense. The Iraqi flights are technically not prohibited under the cease-fire agreement reached with the U.N. Coalition on March 3, 1991.
- 04/13/92 Iraq says it will not attack U-2 surveillance flights over Iraq that monitor Iraqi compliance with cease-fire resolutions. Iraq had sent a letter to the U.N., made public April 10, to halt the flights, claiming that Iraq might interfere with them if it has to defend against another Iranian incursion such as happened on April 5.
- 04/14/92 The United States, Britain, and France warn Iraq to stop tracking allied reconnaissance aircraft and moving anti-aircraft missiles into the northern no-fly zone.
- 04/22/92 U.N. says Iraq has imposed new restrictions of the movement of U.N. vehicles providing humanitarian relief. Iraq requires that the use of the U.N. vehicles have Iraqi Foreign Ministry approval at least 48 hours in advance.
- 06/01/92 Iraq formally tells the U.N. it rejected a new demarcation of the border recommended by the U.N. boundary commission. Iraq warns that imposing that border would keep regional tensions high. The U.N. demarcation is based on a border designated in the 1963 "Agreed Minutes" between the two countries.
- 06/08/92 *Washington Times* reports that U.S. intelligence has noted several areas of possible or potential Iraqi violations of the cease-fire resolutions. These include reports of large scale production of

missile fuel --- an oxidizing agent similar to that used in Scud missiles; and the secret reprocessing of nuclear fuel at a research center near Tuwaitha.¹²⁷

- 06/19/92 IAEA says Iraq, in a letter, refuses to name the foreign suppliers of its nuclear program on "moral grounds" and on the "principle of respect for ethics, rules and norms of international trade dealing among various parties."¹²⁸
- 06/30/92 A memorandum of understanding between Iraq and the U.N. governing the presence of U.N. relief workers and guards expires. Iraq refuses to renew the agreement, causing many relief workers to discontinue their operations in Iraq for fear of their security.
- 07/05/92 Iraq denies U.N. Special Commission (UNSCOM) team access to the Agricultural Ministry, where information on Iraq's weapons of mass destruction are believed to be stored. This provokes a three week standoff, in which the United States threatens military action, and moves additional forces into the region to participate in accelerated joint exercises. The United States sends a battery of Patriot anti-missile systems to Kuwait and one to Bahrain. Iraq allows the Ministry to be inspected on July 28 after reaching a compromise with U.N. Special Commission (UNSCOM) head Rolf Ekeus that the inspection team that enter the Ministry would not include Americans or members of the U.N. Coalition that fought Iraq in Desert Storm.
- 07/27/92 *New York Times*, quoting from a report in the Petroleum Intelligence Weekly newsletter, says that Iraq has rebuilt a significant portion of its oil producing, exporting, and refining capacity.¹²⁹
- 08/19/92 U.S. officials say Iraq has refurbished one large air base (Talil in southern Iraq), built a new one, activated other dormant airfields, and revived its air defense network. The reconstruction of Iraq's air infrastructure is reportedly undertaken to support a revival of military flights in southern Iraq.¹³⁰
- 08/22/92 Iraq again refused to renew the memorandum of understanding governing the U.N. humanitarian presence in Iraq. The memorandum is eventually renewed on October 22, 1992, but provides for the presence of only 300 U.N. guards as opposed to 500 in the original memorandum of understanding.
- 08/24/92 *Washington Times* reports that U.S. intelligence detects signs of growing instability in Iraq. For example, Iraqi police and internal security officers have come under increasing attack, including bombings and sniper fire, and were being armed with assault rifles rather than pistols.¹³¹
- 08/26/92 U.N. Security Council passes Resolution 773, welcoming decisions made by the Boundary Commission and urging Iraq and Kuwait to cooperate with its work.
- 08/30/92 A Kuwaiti policeman is wounded in an exchange of gunfire with Iraqi soldiers at the Iraq-Kuwait border. The Kuwaiti officer is trying to prevent a truck with Iraqi license plates from crossing the border. He dies a few days later.
- 09/08/92 Iraq accepts a U.N. proposal for a nationwide water sampling program to assure that Baghdad does not secretly reconstruct a nuclear arms program.¹³²
- 09/10/92 The Defense Department states that two American F-16 fighters monitoring the no-fly zone in northern Iraq intercept an Iraqi F-1 Mirage fighter. The F-1 jet slowly turns south and quickly leaves the allied-imposed no-fly zone.¹³³

- 09/20/92 Iraq executes 25 Iraqis for unspecified black market currency transactions. This follows the arrest of approximately 600 and the execution in July 1992 of 42 Iraqi merchants on charges of profiteering.
- 10/02/92 Security Council passes Resolution 778, providing for the seizure of some frozen Iraqi assets and their transfer into an escrow account to be used for the same purposes as in the \$1.6 billion oil sale plan.
- 10/06/92 Saddam Hussein calls U.N. inspectors "stray dogs" who are trying to "strip Iraq of industrial capability" it needs for reconstruction. At an extraordinary meeting of the Ba'ath Party held that day, Saddam adds two hard-liners to the party's Regional Command, the highest body below the ruling Revolutionary Command Council.
- 10/08/92 Iraqi police arrest an American demolition expert, Clinton Adam Hall, on the Kuwaiti side of the demilitarized zone. An Iraqi statement upon his release two days later suggested Iraq believed his capture is an error.
- A letter from Iraq's Foreign Minister requests that U.N. Special Commission (UNSCOM) delay a scheduled October 17 inspection visit until after the November U.S. presidential election. The U.N. refuses the request.
- 10/12/92 A U.S. soldier serving with the U.N. is stabbed and wounded near the port of Umm Qasr at the southern tip of Iraq
- 11/06/92 *Wall Street Journal* reports that, according to Western officials and other sources in Jordan, Iraq is moving undeclared Scud missiles around Iraq, using camouflaged trucks to conceal them from U.N. Special Commission (UNSCOM). The report adds that Iraq has buried an unknown number of missile boosters as well.¹³⁴
- 11/16/92 U.N. officials say that Iraq may still possess undeclared supplies of ballistic missiles and that a new inspection team is heading to Baghdad to inspect several undeclared sites that they believe may contain biological agents.¹³⁵
- 11/17/92 U.N. weapons inspector team leader Dimitri Perricos says Iraq has admitted for the first time that its engineers were heavily involved in designing centrifuges for the enrichment of uranium.
- 11/23/92 Bush Administration officials say Iraq has resumed training international terrorists at a secret base near Baghdad. The officials says the training, which would constitute a violation of Resolution 687, is spotted by U.S. intelligence satellites, and includes practice with small arms and explosives, and other paramilitary activities.¹³⁶
- 11/23/92 Iraq frees imprisoned British businessman in return for the release of \$125 million in Iraqi assets held by British banks. The deal is brokered by the UN's humanitarian representative in the Gulf, Prince Sadruddin Aga Khan, and the funds are to be used for humanitarian imports of food and medicine.¹³⁷ Shortly before, about twelve European commercial banks release tens of millions of dollars in Iraqi assets over U.S. objections.¹³⁸ After the deal is concluded, Sadruddin urges other countries to release more of Iraq's frozen assets.
- 11/29/92 Iraq returns to the Kuwaiti air force six truckloads of equipment taken during the occupation. However, the Kuwaiti official in charge of receiving the equipment says it is in poor condition.
- 12/02/92 Iraq refuses to allow a U.N. helicopter surveillance flight to enter Iraqi airspace.

- 12/07/92 Two assailants, believed to be Iraqi intelligence agents, shoot and kill an Iraqi nuclear scientist in Jordan as he is defecting from Iraq.
- 12/10/92 U.N. Special Commission (UNSCOM) notifies the Security Council that Iraq is refusing to allow UNSCOM to fly its helicopters over Baghdad proper. U.N. Special Commission (UNSCOM) rejects the Iraqi position but does not challenge the restriction by flying over Baghdad.
- 12/14/92 A combined chemical-biological U.N. Special Commission (UNSCOM) team completes a nine day inspection visit without obtaining from Iraq a list of foreign suppliers for its weapons of mass destruction programs, as required by U.N. Security Council Resolution 707. A U.N. memorandum quotes the team leader as saying Iraqi Lt. Gen. Amir Rashid al-Ubaydi, head of Iraq's Military Industrialization Commission, told him he would "break the back" of any Iraqi that provides anything more than technical responses to U.N. inspector questions.
- 12/15/92 U.S. Central Intelligence Agency (CIA) Director Robert Gates charges in two speeches in California that Iraq "still had formidable programs in all four areas of weapons of mass destruction (nuclear, chemical and biological weapons, and ballistic missiles)" despite the fact that the Gulf War and U.N. inspections significantly harmed Iraq's special weapons program. Gates states that Iraq "will continue to follow this policy despite the expense and despite the state of U.N. sanctions and inspections."
- 12/26/93 President Bush announces the no-fly zone in the south of Iraq.¹³⁹
- 12/27/92 U.S. shoot down an Iraqi military aircraft that violated the "no-fly zone" in southern Iraq. Subsequently, Iraq redeploys 8 SA-3 and 12 SA-2 surface-to-air missile launchers in the no-fly zone in a manner threatening to U.N. Coalition aircraft patrolling the zone.
- 12/28/92 Iran threatens to retaliate after a U.S. fighter jet downed a warplane on Sunday the 27th - the first in the U.N. "no-fly zone over southern Iraq"¹⁴⁰
- 12/29/92 A U.S. official states that for the third day in a row, Iraqi warplanes 'violated' the interdiction to fly over southern Iraq, moving into the no-fly zone and then stepping back when U.S. fighters acted to intercept them.¹⁴¹
- 12/30/92 Iraq states it will not be compelled into submission by a U.S. aircraft carrier dispatched to the Gulf to 'reinforce' a no-fly zone over the south of the country.¹⁴²
- 01/04/93 Administration officials state that Iraq moved surface-to-air-missiles into the enclave in the southern part of the country that is monitored by American and allied warplanes.¹⁴³
- 01/06/93 United States, Britain, France, and Russia gave Iraq 48 hours to move its surface-to-air missile batteries to their original locations or face possible military action.
- 01/07/93 Saddam Hussein maintains his surface-to-air missiles in the no-fly zone of southern Iraq. Iraq changes it position, however, when a U.N. deadline approaches.¹⁴⁴
- Iraq tells U.N. Special Commission it will no longer permit UNSCOM inspectors to use their own aircraft to fly into or land in Iraq. It says the inspectors could use chartered Iraqi aircraft for their transportation. Iraqi position is a violation of U.N. Security Council Resolution 707, which states that UNSCOM inspectors could use their own methods of transportation in the course of their inspections.

- 01/09/93 The U.S. announces that Baghdad has backed down and moved its anti-aircraft missiles in southern Iraq.¹⁴⁵
- 01/10/93 On January 10, Iraq bars the flight into Iraq of 70 U.N. inspectors returning to Iraq after the Christmas/New Year holidays. In addition, about 500 Iraqis, some armed, cross into the demilitarized zone between Iraq and Kuwait. They seize weapons, including four Silkworm missiles, under guard by the U.N. Iraq-Kuwait Observer Mission (UNIKOM).
- A U.N. Boundary Commission has finished demarcating the Iraq-Kuwait land border on November 23, 1992 and the new border is to go into effect on January 15, 1993.
- 01/11/93 Director of Central Intelligence Robert Gates says Iraq is continuing to shift anti-aircraft missiles in the no-fly zones of both southern and northern Iraq in a manner threatening to allied forces.
- About 150 Iraqis cross the border into Iraq and start taking apart warehouses in defiance to U.N. orders.¹⁴⁶
- 01/13/93 U.S.-led U.N. forces conduct air strikes against eight Iraqi anti-aircraft missile sites and related control facilities in the no-fly zone of southern Iraq. The strike, which involves about 110 U.N. Coalition aircraft, follows U.N. Security Council statements on January 8 and 11 that Iraq is in material breach of U.N. Security Council Resolution 687, the principal cease-fire resolution.
- 01/14/93 It is reported that Iraq, in August 1992, tested a special radar that can be used with missile launches and that construction of new aircraft bunkers is detected by U.S. intelligence.¹⁴⁷
- According to U.S. officials, Iraq has gradually restored its weapons capabilities through stepped-up aircraft training, buying arms on the international black market, and is rebuilding anti-aircraft defenses.¹⁴⁸
- 01/16/93 In a further challenge to the United States, Iraq states that it will assure the safety of U.N. aircraft solely if the planes kept out of the no-fly zone imposed on southern Iraq. The U.N., however, rejects the stipulations.¹⁴⁹
- 01/17/93 Iraq activates its targeting radar in the northern no-fly zone. The U.N. Coalition conducts an air strike against a SA-6 ground radar station in northern Iraq and shoots down an Iraqi MiG-23 that has crossed into the no-fly zone in the north. Later, in response to Iraq's refusal to clear U.N. Special Commission (UNSCOM) flights into Iraq, the United States launches 45 cruise missiles at the Zaafarniya manufacturing complex, a dormant, general-purpose, machine tool factory outside Baghdad, which had been used to make components for Iraq's nuclear weapons program. U.S. and diplomatic officials say, however, that there is no proof to support the assertions by White House spokesman Marlin Fitzwater that the site is still part of Iraq's "weapons of mass destruction program," and had equipment for nuclear weapons development at the time of the strike.¹⁵⁰
- 01/18/93 The U.N. Coalition launches another raid on the Iraqi air defense installations in the south that it has missed or insufficiently damaged in the January 13 air strike. Iraq finishes removing six police posts from the Kuwait side of the newly inaugurated border with Kuwait.
- 01/19/93 Iraqi aircraft again challenge the no-fly zone in the north and directs anti-aircraft fire on U.N. Coalition aircraft. The U.N. Coalition fires cluster bombs and air-to-surface missiles at Iraqi anti-aircraft guns in the northern no-fly zone. On the eve of the inauguration of President Clinton, Iraq's ruling Revolutionary Command Council offers a "cease-fire" in its confrontations with the U.N. and the U.N. Coalition. It offers to allow U.N. aircraft to fly into Baghdad without

conditions. U.N. Secretary General Boutros Boutros-Ghali recommends that 3,645 armed U.N. troops and military support be sent to guard the Iraq-Kuwait border.

- 01/20/93 Iraqi President Saddam Hussein declares a unilateral cease-fire to give President Clinton an opportunity to examine U.S. policy toward Iraq ¹⁵¹
- 01/21/93 U.S. aircraft fires a missile and drops cluster bombs on an Iraqi ground radar when the radar beam is directed at the U.N. Coalition aircraft as they are escorting a French reconnaissance plane.
- After a week of deadlock with Baghdad, and a week of United States attacks on Iraq, a team of U.N. weapons inspectors arrives in the Baghdad. ¹⁵²
- 01/22/93 A U.S. F-4G fires two missiles at an air defense battery in the northern no-fly zone after the battery's radar actively tracked U.S. aircraft patrolling the zone.
- 01/23/93 A U.S. A-6 Intruder aircraft fires a laser-guided bomb at an Iraqi anti-aircraft position in the southern no-fly zone when the pilot thinks he saw anti-aircraft fire directed at his and other U.S. aircraft patrolling the zone. The Defense Department subsequently says that U.S. aircraft were not being tracked by Iraqi radar and the Department is trying to establish whether or not Iraq had fired on the U.S. planes. ¹⁵³
- 01/25/93 U.N. Security Council again determines that Iraq's compliance with the cease-fire resolutions is insufficient to justify lifting international sanctions against it. Iraq claims it has released 90 percent of all information about its nuclear program, but continues to refuse to provide information about its foreign suppliers.
- 01/27/93 UNSCOM officials disclose that Iraq has placed virtually all of its top rocket scientists and engineers to work at the large research facility, Ibn al-Haytham, outside Baghdad. U.N. Special Commission (UNSCOM) suspects that Iraq is preparing to eventually renew research and development of prohibited ballistic missiles at the facility, which consists of about 20 buildings.
- 01/28/93 Iraq admits to visiting U.N. Special Commission inspectors that it has made a deliberate and false statement to a previous UNSCOM team concerning its arsenal of missile launchers.
- 01/29/93 Lt. Gen. Martin Brandtner and Rear Admiral Mike Cramer testify before the Senate Armed Services Committee that Iraq still has 400,000 troops, 3,000 tanks, 3,000 armored personnel carriers, 1,800 artillery pieces, 300 short-range surface-to-air missiles, 350 long-range surface-to-air missiles, and 370 fighter/bomber aircraft. ¹⁵⁴
- 01/30/93 U.N. nuclear weapons inspectors complete a week long mission in an exercise that was seen as a test of Baghdad's intentions toward obeying the terms of the cease-fire that terminated the Gulf War. ¹⁵⁵
- 02/01/93 A rock shatters the rear window of a U.N. Special Commission doctor's car in Baghdad. The U.S. State Department says it was possibly thrown by one of the Iraqi members of the UNSCOM team.
- A senior Iraqi official states that all of Iraq's surveillance radars has been ordered shut down following a series of attacks on radar-guided missile sites by U.S. aircraft patrolling no-fly zones in the south and north of the country. ¹⁵⁶

- The commander of U.S. naval forces in the Gulf states that Iraq is continuing to disobey U.N. cease-fire accords despite its proclamations of goodwill toward the Clinton Administration.¹⁵⁷
- 02/02/93 The U.S. Department of Defense states that Iraqis have "changed their behavior" and halted their harassment of American planes policing the no-fly zone over northern and southern Iraq.¹⁵⁸
- 02/03/93 French F-1 Mirage reconnaissance aircraft are fired on.¹⁵⁹
- 02/04/93 Iraqi General tells U.N. Special Commission (UNSCOM) it cannot conduct a baseline survey of the Ibn al Haytham missile research and development center. The center is suspected of being used to research and develop prohibited ballistic missiles. (Missiles of less than 150 kilometer range are not prohibited by the U.N. resolutions.)
- 02/05/93 U.N. Security Council passes Resolution 806, calling for a phased deployment of additional U.N. troops (up to a 3,600 troop maximum) in the demilitarized zone between Iraq and Kuwait. The U.N. is having trouble raising troops for that contingent because of the many peace-keeping operations it is involved in worldwide.
- 02/07/93 General Amir Hammudi al-Sadi, one of the driving forces behind Iraq's effort to develop weapons of mass destruction, says that Iraq still needs a strong army to defend itself and that "every country is entitled to produce what it can for its legitimate defense and Iraq is no exception."
- 02/09/93 Kuwait gives Iraq, via the International Committee of the Red Cross, files on 617 detainees it says Iraq is still holding. Iraq does not respond to the files and continues to assert that many Kuwaitis remain in Iraq of their own accord and Kuwait is unwilling to allow them back.
- 02/12/93 A 13-member team of weapons inspectors arrives to examine Iraq's remaining ballistic missile capacity. The group visits four sites related to Security Council Resolution 687, which states that the ban on oil sales will be lifted when the Council decides that Iraq has destroyed its most lethal weapons and concedes to long-term inspection.¹⁶⁰
- 02/21/93 *New York Times* reports that Iraq has trained anti-aircraft guns on two U.N. Special Commission (UNSCOM) helicopters participating in a search for Iraqi ballistic missiles.
- 02/22/93 U.N. Special Commission ballistic missile team conducts a "surprise inspection" of Iraqi facilities in an attempt to discover ballistic missiles believed to still be hidden by Iraq. About 200 such missiles are said to be unaccounted for. However, some UNSCOM officials believe the 200 missiles are accounted for in firing reports of short-range missiles early in the Iran-Iraq war.
- Iraqi anti-aircraft artillery tracks a U.N. Special Commission (UNSCOM) helicopter, twice threatening to shoot it down, according to a U.N. report.
- 02/24/93 In a testimony before the Senate, James Woolsey, the new Director of Central Intelligence, states that the Iraqi's "retain missiles, support systems and propellants and are still capable of firing Scud missiles."¹⁶¹
- 02/26/93 Head of Iraq's Military Industrialization Commission, Lt. Gen. Amir Rashid al-Ubaydi, says Iraq is ready to accept long-term monitoring of its weapons of mass destruction capabilities, in accordance with Security Council Resolution 715. U.N. inspectors later say they did not see evidence of the promised cooperation.

- 03/04/93 U.N. nuclear weapons experts examine four Iraqi military sites but locate nothing to uphold accusations that Iraq still has an underground plutonium reactor ¹⁶²
- 03/07/93 The head of a U.N. inspection team states that a long-term program to monitor Iraq's nuclear capability must be launched or "anything may happen." ¹⁶³
- 03/08/93 Iraq asks the Security Council to halt U-2 surveillance flights over Iraq, alleging that intelligence from the flights is being provided to Israel.
- 03/10/93 U.N. weapons inspectors, ending an eight day mission in Iraq, say they found 242 undeclared machine tools that could be used for nuclear weapons or civilian purposes. The team leader, Dimitri Perricos, says none of the tools were being used for banned activities when found but, in the team's opinion, they should have been declared by Iraq. Perricos also says Iraq has promised to send to IAEA headquarters information about the foreign suppliers of its nuclear program.
- 03/16/93 Saddam visits the headquarters of the Military Industrialization Organization (Commission) and calls on it to "mobilize its potentials" and "creatively interact to achieve the big objectives of the victorious march of the Mujahideen." The Organization is responsible for rebuilding Iraq's weapons production infrastructure and Saddam's exhortation to the Organization has been interpreted as evidence of his intention to rebuild Iraq's weapons production capabilities.
- *Philadelphia Inquirer* reports that the U.N. weapons inspectors are convinced Saddam Hussein is hiding powerful weapons for a future mischief and are planning to stay for a lengthy time in order to make the plan of Saddam Hussein backfire. ¹⁶⁴
- 03/17/93 Iraq reopens its al-Nida facility at Zaafarniya, which was bombed by U.S. cruise missiles in January 1993 during a period of confrontation between Iraq and the U.N. Coalition. The factory, according to U.N. inspectors, has been used in Iraq's electromagnetic isotope separation (EMIS) program for enriching uranium before the Gulf War. The inspectors says Iraq no longer has an EMIS capability but it may still be hiding centrifuges used for nuclear enrichment.
- 03/24/93 U.N. Special Commission chief Rolf Ekeus says UNSCOM has "a strong reason to believe [Iraq] is hiding some" chemical weapons and that inspectors have still not accounted for about 200 of Iraq's total Scud missile arsenal of over 800. He says that Iraq has retained its scientific infrastructure and that, if the economic sanctions are lifted, its weapons programs might "grow up like mushrooms after the rain." ¹⁶⁵
- 03/28/93 A Kuwaiti official says that all captured Kuwaiti air force equipment has been returned by Iraq, although in mostly poor condition. However, 75 U.S.-made Improved Hawk air defense missiles, tanks, and other military equipment has not been returned, and the U.S. State Department says Iraq is using some of the captured equipment.
- 03/29/93 U.N. Security Council, after reviewing Iraq's compliance record and finding several areas of non or incomplete compliance, decided to maintain economic sanctions against Iraq.
- 04/09/93 U.S. aircraft drop cluster bombs on Iraqi air defense installations that fire on those aircraft (three F-16's and one F-4G) in the northern no-fly zone during a routine monitoring mission. ¹⁶⁶
- 04/12/93 According to U.S. officials, a car bomb intended for former President Bush during his upcoming visit to Kuwait is driven across the Iraqi border into Kuwait. Two days later, as the Bush visit is beginning, Kuwait arrests 16 suspects led by two Iraqi nationals and seize the car bomb.

- 04/18/93 Two U.S. aircraft are targets by Iraqi anti-aircraft radar while patrolling the northern no-fly zone. The Iraqi batteries are located just south of the zone. One of the planes fires a missile in response to the threat. Iraq denies threatening the U.S. aircraft.¹⁶⁷
- 04/26/93 U.S. navy EA-6B patrolling the northern no-fly zone does not respond to an Iraqi surface-to-air missile that is fired on it but falls short.
- 04/30/93 State Department releases its "Patterns of Global Terrorism: 1992" in which Iraq is cited for conducting 39 terrorist attacks in 1992, in direct violation of Resolution 687.¹⁶⁸
- 05/04/93 The hard-line Palestinian organization, the Democratic Front for the Liberation of Palestine (DFLP) opens office in Baghdad after being closed for about 10 years.¹⁶⁹
- 05/04/93 A judge steps up the inquiry into Britain's sales of arms-making equipment to Iraq in the years before the Gulf War, commencing public hearings to determine whether officials knowingly violated their own interdiction on military exports to Saddam Hussein.¹⁷⁰
- 05/05/93 Iraq abruptly closes its borders and announces that it is taking the prewar 25 dinar bank note out of circulation. The move wipes out the value of the 25 dinar note holdings of many Kurds in Iraq and currency speculators in Jordan.
- 05/06/93 State Department says Iraq has not responded to U.S. protests about an American citizen who is charged and sentenced by Iraq for illegal entry and espionage. He is arrested about one week previously.
- 05/07/93 Clinton Administration says it has strong evidence that Iraq is behind an attempt to assassinate former President Bush during his April 14-16, 1993 visit to Kuwait. Some in Congress, and reportedly some in the Administration, press for retaliation, such as an air strike.
- 05/20/93 U.N. Secretary General accepts final report of the U.N. Boundary Commission on the demarcation of the Iraq-Kuwait border. Six days later, the Speaker of Iraq's National Assembly says the newly designated border, which gave additional territory to Kuwait, would keep tensions in the region high. Iraq refuses to accept the new demarcation and, in press editorials and other statements, continues to assert a territorial claim to Kuwait as its 19th province.
- 05/25/93 U.N. Security Council again decides not to lift economic sanctions against Iraq because Iraq has not complied fully with U.N. cease-fire resolutions.
- 05/27/93 U.N. Security Council adopts Resolution 833, reaffirming the final demarcation of the Iraq-Kuwait border, demanding both states respect that border, and guaranteeing the inviolability of the border.
- 05/28/93 Britain and a German are arrested by Iraq after straying into Iraqi territory from Kuwait. This raises the number of expatriates arrested for illegal entry in 1993 to six. (During the previous year, Iraq arrested two Britons, three Swedes, an American, a Filipino, and a Pakistani on charges of illegal entry.)
- 06/18/93 U.N. Security Council says Iraq is in "material breach" of its cease-fire commitments by refusing, since June 4, to allow U.N. Special Commission to install surveillance cameras at two missile testing sites and for rejecting a UNSCOM request to move chemical production equipment to a destruction site at Muthanna. Iraq argues that the cameras impinge on its sovereignty and that the chemical equipment is to be used to manufacture pesticides.

- 06/21/93 U.N. Special Commission's fifth report on Iraqi compliance is transmitted to the U.N. Security Council. It says there has been continuing problems in the implementation of UNSCOM's status, privileges and immunities in Iraq and that Iraq has been uncooperative in field operations with UNSCOM. It says Iraq's full, final, and complete disclosures of its prohibited weapons programs, due under Resolution 707, contains major shortcomings. The report says Iraq continues to refuse to divulge its foreign suppliers of advanced technology. The report adds that Iraq has still not accepted implementation of long-term monitoring of its weapons facilities under Resolution 715, and considered UNSCOM "interim monitoring" of a missile facility as part of Resolution 687, not 715.
- 06/23/93 In its largest military mobilization since the Gulf War, Iraq moves troops closer to the Iranian border and puts its air defenses on high alert.¹⁷¹
- 06/24/93 Iraq moves more troops close to the Iranian border.¹⁷²
- 06/25/93 President Clinton warns Iraq that its constant refusal to enable U.N. inspectors to watch over missile test sites could have very serious results.¹⁷³
- 06/26/93 The U.S. launches 23 cruise missiles at the headquarters in Baghdad of the Iraqi Intelligence Service (IIS), which reportedly planned the plot to assassinate former President Bush in Kuwait. Three miss their targets, and hit nearby Iraqi homes. The United States says it is acting under Article 51 of the U.N. Charter, which asserts the right of self defense, and informs the Security Council of its actions as required by that article.
- 06/27/93 U.S. presents evidence to the Security Council of Iraqi involvement in the plot to assassinate former President Bush in Kuwait. The bomb device involved in the plot matched that used by Iraq in previous clandestine operations. The evidence is gathered by an independent U.S. investigation by the Central Intelligence Agency, Federal Bureau of Investigation, and the Secret Service.
- 06/27/93 The European allies respond with approval to the United States cruise missile attack against Iraq. Most Arab states, including allies of U.S., condemn the strike.¹⁷⁴
- 06/29/93 A Staff report released by the Subcommittee on International Security, International Organizations and Human Rights of the House Foreign Affairs Committee says Iraq has rebuilt 80 percent of its prewar conventional military manufacturing capability and resumed production of a wide range of conventional weaponry. The report also says firms in Europe have sold Iraq some of the equipment needed for the reconstruction and that U.N. inspections "have found only a portion of the dual-use manufacturing equipment known to have been purchased by Iraq in the mid and late 1980s."¹⁷⁵
- 07/06/93 Iraq's foreign minister appeals for more negotiations to work out the details of U.N. _ monitoring of its weapons system.¹⁷⁶
- The U.N. rejects an Iraqi request to present evidence that it is honoring the terms of the accord that terminated the Gulf War, the Iraqi delegate to the U.N..¹⁷⁷
- The U.N. Special Commission (UNSCOM) on Iraq withdraws its inspectors from Baghdad because they were kept from installing remote-control cameras from inspecting activity in the missile sites.¹⁷⁸

- 07/08/93 U.N. Special Commission (UNSCOM) dispatches a team to Iraq to keep two rocket testing sites from being used while a dispute over monitoring is resolved.¹⁷⁹ According to chairman Rolf Ekeus, the weapons team has left Bahrain for Baghdad. At this point it is still too early to tell if the Iraqi government will allow it to travel to the rocket test sites and temporarily disable them. Officials warn that refusal to permit the team access could cause another confrontation with Baghdad.¹⁸⁰
- 07/09/93 In an attempt to break the deadlock with Iraq over permanent monitoring of the country's missile testing sites, the U.N. sends a team of inspectors to Baghdad with instructions to discard all examination of rockets temporarily.¹⁸¹
- 07/17/93 U.N. officials indicate that Iraq is cooperating with their efforts to discover the extent of Iraq's nuclear program, and has "deluged" the U.N. inspection team with information about its nuclear enrichment program over the past few days.¹⁸² However, the Clinton Administration strongly questions the adequacy of Iraq's disclosures.¹⁸³ Iraq also gives the U.N. a formal pledge that it has no more clandestine nuclear plants and that it has revealed all its nuclear secrets.
- 07/19/93 After lengthy negotiations with a top U.N. official, Iraq accepts long-term monitoring of its weapons program.¹⁸⁴
- 07/23/93 Rolf Ekeus, chairman of the U.N. Special Commission (UNSCOM) to abolish Iraq's weapons of mass destruction, convenes with the Security Council to gain acceptance of the plan that could terminate a stalemate over weapons inspection with Baghdad.¹⁸⁵
- 07/24/93 U.S. warplane shoots missile at an anti-aircraft battery in southern Iraq that was preparing to fire at the plane.¹⁸⁶
- 07/29/93 Hours after U.S. warplanes shoot missiles at Iraqi anti-aircraft batteries, an official in the Clinton Administration states that the pilots were mistaken in believing that Iraqis were getting ready to open fire. Officials in the military insist that the two navy EA-6B jets were 'justified' in attacking radar installations in different occurrences at two anti-aircraft sites in the southern no-fly zone. One incident took place just north of Talil air base and the other southeast of Talil. However, an Administration official knowledgeable of the classified intelligence reports of the occurrences states that the navy pilots were new to the region and misinterpreted Iraqi surveillance radar for a much more menacing radar that tracks a target just prior to firing a missile.¹⁸⁷
- 08/12/93 U.N. inspectors are taken to see the 350 mm test super gun at Jabal Hamrayn as well as parts for the larger gun in their packing crates at the Iskandariya military production facility.
- 09/19/93 In a new confrontation with President Saddam Hussein, the U.N. sends helicopters equipped to detect atomic radiation in an attempt to wipe out any secret nuclear weapons sites in Iraq.¹⁸⁸
- 09/27/93 In a step that could lead to the eventual lifting of the world trade embargo against Iraq, the U.N. begins its largest inspection of Iraqi weapons sites.¹⁸⁹
- 10/1/93 Kuwait spokesman announces that Kuwait is building a security fence along the new Iraqi-Kuwait border. The fence is part of a security belt extending 170 kilometers around the border, with a 3 meter ditch and a 3 meter high sand berm with barbed wire on top. Observation platforms manned by border guards are located at 1.2 mile intervals.
- 11/16/93 Iraq announces that it has rebuilt the intelligence headquarters the U.S. attacked with cruise missiles on June 27, 1993.¹⁹⁰

- 11/17-
20/93 Hundreds of Iraqis cross the Iraqi-Kuwait border to protest the U.N. demarcation of the border, and the construction of a security fence along the new border. Iraqi government newspaper, *Al Jumhuriyah*, calls for the liberation of Kuwait in the future, and condemns Kuwait for flagrant violations of Iraq.¹⁹¹
- 11/21/93 U.N. Iraq-Kuwait Observer Mission announces that it will deploy 100 Bangladesh policemen along the border to stop further Iraqi incursions.¹⁹²
- 11/23/93 Max van der Stoel, the U.N. special rapporteur for human rights in Iraq, warns that Iraq continues to attack the Shi'ites and Kurds, threatens the survival of the Marsh Arabs (Ma'dan), and executes dissidents. He indicates that a U.N. team did not find signs of the use of chemical weapons during a visit to the marsh area on November 21, but has sent soil samples for analysis -- a process that may take some months.¹⁹³
- 11/26/93 Iraq agrees to U.N. terms for long-term monitoring of its weapons of mass destruction activities and facilities -- in return for U.N. lifting oil embargo as called for in U.N. Security Council Resolutions 688 and 715. The Iraqi agreement takes the form of a letter by Iraqi Foreign Minister Mohammed Said Sahaf to the president of the U.N. Security Council. This agreement does not yet meet all U.N. terms, because no mention is made of human rights, or border with Kuwait. Rolf Ekeus says it could take six months to test a system for long-term monitoring to make sure it is fully operational.¹⁹⁴
- 12/3/93 Ekeus warns in an interview that monitoring will involve 100 "critical sites" and more than 1,000 establishments capable of producing components for weapons of mass destruction.¹⁹⁵
- 12/4/93 Armed U.N. troops from Bangladesh deploy along the 105 mile Kuwaiti-Iraqi border, and are authorized to fire on infiltrators. They replace 300 unarmed observers. The initial deployment is 150 men, with 550 more to follow.¹⁹⁶

Iraqi Military Expenditures

Iraq remains a major regional military power in spite of the Gulf War. It does so largely because of the immense scale of Iraqi defense expenditures and arms transfers before the conflict. Even by a conservative estimate, Iraq imported well over one hundred billion dollars worth of conventional arms between 1972 and 1990, and probably spent over \$20 billion dollars worth of arms and equipment to assemble, manufacture and deliver weapons of mass destruction. It spent billions on fighting the Kurds during the early to mid-1970s.

Like Iran, Iraq has only been able to finance these immense military expenditures because it is a major oil power. Iran had produced about 22 billion barrels of oil by the time the Gulf War began.¹⁹⁷ It was producing at a daily rate of over two million barrels and had produced at daily rates of three million barrels a day in the past. Iraq has claimed a total reserves of 100 billion barrels, and proved reserves of 85 billion barrels, plus proved gas reserves of 95,000 billion cubic feet. This gave it roughly 13% of the world's total oil reserves.¹⁹⁸ Iraq also had a share of the Saudi-Iraqi neutral zone, which had another 5 billion barrels of proven reserves, and 1,000 billion cubic feet of gas.¹⁹⁹

Iraq's oil revenues have varied sharply according to world oil prices and the impact of Iraq's wars. They have given Iraq annual revenues of \$6.8 billion to \$26.0 billion during much of the last decade, although Iraq lost much of its export capability during the early part of the Iran-Iraq War and has not been able to export since it invaded Kuwait in August, 1990.²⁰⁰

Unlike many Gulf states, Iraq has a relatively well developed manufacturing sector, that accounted for over 10% of the GDP even during 1987 -- the worst year of the Iran-Iraq War. About 12% of its land is arable, of which 4% is irrigated. Another 9% is suitable for grazing, and 3% is forest. Iraq has about 42.8 cubic kilometers of internal renewable water resources, which is high for a Middle Eastern country. This amounts to about 4,575 cubic meters of water per person, more than twice the total for a citizen of the U.S.²⁰¹ While Iraq is a major food importer, this is largely because of government mismanagement. The Tigris and Euphrates rivers make a major increase in production relatively easy to achieve, and the agricultural sector already employs 30% of the labor force, although it accounts for only 11% of the GNP.²⁰²

Iraq's tragedy is that it has been blessed with immense oil wealth and other natural assets, and one of the best educated populations in the Middle East, and cursed with one of the worst governments. Military expenditures and wartime losses have drained Iraq's economy for nearly two decades, and Iraq's oil wealth is relative. Measured in constant 1988 dollars, Iraq's GNP peaked during 1979 and 1980, with totals of \$118 billion and \$120

billion respectively. The impact of the Iran-Iraq War rapidly cut Iraq's GDP to \$70.4 billion in 1981. A combination of wartime damage, the loss of oil export routes through the Gulf and Syria, and lower oil prices then cut the GNP to levels of \$70 billion or less throughout the rest of the 1980s. Iraq's GNP was only \$65.8 billion in 1988, the year the Iran-Iraq War ended. This is about half of Iraq's GNP in 1980.

In spite of its growing economic problems, Iraq kept its military expenditures at around 30% of its GNP from 1980 to 1984, the first four years of the Iran-Iraq War. After 1984, when the Iran-Iraq War grew more threatening, military spending rose to 52% of the GNP in 1985, and stayed close to 50% for the rest of the 1980s. Iraq could only sustain these expenditures through a combination of massive foreign borrowing and aid from southern Gulf states like Kuwait and Saudi Arabia. Iraq's debt to its Arab neighbors rose to \$37 billion.²⁰³

To put Iraq's military expenditures in perspective, ACDA estimates that Iraq spent \$10,010 million on military forces in 1978, \$11,350 million in 1979, \$19,810 million in 1980, \$24,610 million in 1981, \$25,070 million in 1982, \$25,260 million in 1983, \$25,940 million in 1984, and \$18,970 million in 1985.²⁰⁴ The U.S. has not issued estimates of Iraqi military spending for the period after 1985. The IISS estimates that Iraq spent \$13,990 million in 1987, \$12,870 million in 1988, and \$8.61 billion in 1990 -- although there is no way to relate this figure to what Iraq had to spend on the Gulf War, when it had to devote much of its economy to preparing for the conflict.²⁰⁵

By 1989, the year between the Iran-Iraq War and Iraq's invasion of Kuwait, Iraq's economy was experiencing a serious economic crisis. Experts disagree over the economic statistics involved, but not over the seriousness of the crisis. According to the U.S. Central Intelligence Agency (CIA), Iraq's GNP was then \$35 billion and its per capita income was only \$1,940. This level of per capita income is not unusual by Third World standards, but it was low relative to Iraq's economy in 1979, and to the wealth of a far less developed Saudi Arabia -- which had a GNP of \$79 billion and a per capita income of \$4,800. Iraq also owed \$13 billion in annual debt payments to the West, nearly half of its oil revenues in 1989.²⁰⁶

While Iraq unquestionably could have funded its economic recovery at the cost of further cut backs on its military expenditures --and done so without risking an attack from Iran or any other neighbor -- it chose to try to buy both guns and butter. It was this choice that steadily increased the impact of its debt burden and created the economic crisis and helped lead Iraq to invade Kuwait.²⁰⁷

Iraq planned an annual military budget of \$12.9 billion in 1990, and was spending an average of \$721 per citizen on military forces before it invaded Kuwait. Although Iraq had cut its rate of new arms orders, it still took delivery on \$1,435 million worth of arms, and

ordered \$1,125 million more during the first six months of 1990. This level of expenditure raised Iraq's international debt to the West to \$40 billion or more. Some experts feel Iraq's total debt was well in excess of \$80 billion by early 1990, if the total is expanded to include all of Iraq's debts to Arab states.²⁰⁸

Iraqi Arms Imports

Iraq's arms imports have placed a continuing burden on Iraq's economy. During the latter half of the Iran-Iraq War -- which covers the period from 1984-1988 -- Iraq took delivery on \$29.7 billion worth of new arms, including \$15.4 billion worth of arms from the former Soviet Union, \$0.75 billion from Poland, \$0.65 billion from Bulgaria, \$0.675 billion from Czechoslovakia, and \$2.8 billion from the People's Republic of China. Iraq obtained \$3.1 billion from France, \$0.37 billion from Italy, \$0.03 billion from the U.K., \$0.675 billion from Germany, and \$5.2 billion from other countries.²⁰⁹

Iraq could not sustain this level of orders once the Iran-Iraq War ended. During 1989 and 1992 -- which covers the period from the end of the Iran-Iraq War in August, 1988 to the beginning of the embargo on arms shipments to Iraq in August, 1990 -- Iraq ordered only \$1.7 billion worth of arms. Some \$200 million were ordered from the former Soviet Union, none from the People's Republic of China, \$500 million from major West European states, \$100 million from other European states, and \$900 million from other countries.

This low rate of new orders was a product of (a) Iraq's growing economic crisis, (b) the arms embargo on Iraq after August, 1990, and (c) the fact Iraq was still receiving the backlog from the immense amount of orders Iraq already had placed during the Iran-Iraq War.²¹⁰ Where Iraq had consistently ranked among the top 10 arms importers during the Iran-Iraq War, it dropped off the list after the war. Iran, however, remained on the list with a total of \$6.7 billion in new orders during 1989-1992.

The size of the backlog of previous Iraqi arms orders is indicated by the fact that Iraq took delivery on \$5.0 billion worth of arms during 1989-1992, including \$1.5 billion worth of arms from the former Soviet Union, \$400 million from the People's Republic of China, \$2.1 billion from major West European states, \$600 million from other European states, and \$ 400 million from other countries. In spite of the reductions in Iraq's orders and Iraq's massive victory in the Iran-Iraq War, these transfers exceeded those received by Iran. Iran took delivery on \$4.5 billion worth of arms, and had a much smaller backlog of prior orders.²¹¹

Ironically, the Gulf War has since cost Iraq both its guns and much of its butter. Iraq's GDP probably would have risen to \$40.8 billion in 1990, if it had not invaded Kuwait.

Instead, it dropped to around \$25 billion. Any estimate of Iraq's GDP after 1990 is speculative, but it seems to have been about \$24 billion in 1991, \$20 billion in 1992, and substantially less than \$20 billion in 1993. Estimates of Iraq's total foreign debt in 1993, including interest, range from \$80 billion to \$109 billion.²¹²

Since the cease-fire in the Gulf War, Iraq has also received only small deliveries of smuggled spare parts and limited numbers of munitions. Iraq has had to make major domestic expenditures to reconstitute its disorganized units, carry out a major rebuilding of many facilities, and pay its military personnel high wages to maintain their loyalty. There are also some indications that Iraq may be running out of covert currency and gold supplies. Iraq began to smuggle gold out of Iraq in the spring of 1993, rather than use hard currency, and cut back on food imports to a point which the regime probably found to be politically unsafe.²¹³ It has obtained some revenue by smuggling out petrochemical products, but scarcely enough to meet its most critical military and civilian needs. It also faces the prospect that any future oil exports will be audited by the U.N., and it may find it difficult to use the revenues for military imports.

Iraqi Efforts to Smuggle Arms and Parts and Rebuild Its Iraqi Military Industries Since the Gulf War

Iraq has attempted to compensate for its loss of access to arms imports by making use of the extensive purchasing and intelligence network it established overseas during the Iran-Iraq War. This network includes a mix of firms in Chile, Europe, U.S., China, Japan, Hong Kong, and other Asian countries. Iraq has refused to provide the U.N. with its full list of suppliers, and many of its fronts and contacts are still operating. At least through the beginning of 1994, Iraq did not have any major successes in these efforts, but did obtain at least two shipments of tank parts and one artillery shipment.

Iraq has also made a crash effort since the cease-fire to restore and improve its domestic military production capabilities, often seeking to disguise the true purpose of these plants by changing their names. Iraqi officials have built on an investment in the Iraqi Ministry of Industry and Defense Industry that totaled \$14.2 billion between 1985 and 1989, and that often suffered only limited damage during the war.²¹⁴ They have claimed that 200 factory buildings associate with military production have been repaired and tooled up since the end of the Gulf War, and that more than 50 establishments of the former Ministry of Industry and Military Industrialization are now operating -- many using machine tools and specialized equipment that was originally exported without proper export licenses. Saddam Hussein's cousin, Hussein Kamil al-Majid, who was in charge of Iraq's industrialization effort before the war, is back in charge of this effort.

According to a report by the House Foreign Affairs Subcommittee on International Security, International Organizations, and Human Rights, these facilities now include:²¹⁵

- o T-72 tank assembly plant operating under Polish and Czech licenses at Al-Amen
- o Major armor refitting center at Base West World (Samawa).
- o Manufacture of proximity fuses for 155mm and cluster munitions at April 7 (Narawan Fuse) Factory.
- o Manufacture of 122mm howitzers, Ababil rockets, tank optics and mortar sights at Sa'ad 5 (Sa'ad Engineering Complex).
- o Manufacture of wheeled APCs under East European license, other armor, and artillery pieces at Al Taji).
- o Manufacture and repair of artillery, vehicle parts, and cannon barrels at SEHEE heavy engineering complex (Al Dura).
- o Aircraft assembly and manufacturing plant under construction at Sa'ad 38. (Faw)
- o Manufacture of aerial bombs, artillery pieces, tungsten-carbide machine tool bits at Badr (al Yusufiyah).
- o Production of explosives, TNT, propellants, and some vehicle production capability at Al Hiteen (Al Iskandariyah).
- o Production of cluster bombs, fuel-air explosives at Fao.
- o Production of aerial bombs, TNT, solid rocket propellants at Al Qaqaa.
- o Manufacture of small naval boats at Sawary (Basra)
- o Production and modification of defense electronics at Mansour (Baghdad).
- o Production and modification of defense electronics, radars, frequency-hopping radios at Sa'ad 13 (Salah al Din - Ad Dawr).
- o Digital computer software, assembly of process line controllers for weapons plants, plastic castings at Diglia (Zaafarniyah).
- o Precision machining at Al Rabiya.
- o Manufacture of non-ferrous ammunition cases at Sa'ad 21 (Mosul).
- o Liquid nitrogen production at Al Amil.
- o Production of ethylene oxide for fuel-air explosives at PCI.
- o Production of HMX and RDX explosives at Fallujah chemical plant at Al Muthanna.
- o Manufacture of gas masks at Sa'ad 24 (Mosul).

Despite these efforts, Iraq has had limited success in producing and re-manufacturing advanced equipment like tanks and aircraft, and in carrying out many types of major combat repairs. Its success is only likely to improve in the future if it can obtain access to new and highly specialized foreign machinery and the ability to import new spare parts.

Iraq has, however, been able to manufacture small arms and artillery ammunition. It has made some artillery weapons like the Ababil multiple launch rocket system, and has reconditioned and assembled some Soviet tanks, including T-72s. It has manufactured and adapted military electronics, and made some small craft. These efforts have failed, however, to offset the attrition of Iran's surviving equipment which has been caused by a lack of spares and specialized support equipment.

It seems likely that Iraq's problems in maintaining its inventory of operational combat equipment will accelerate with time in spite of its manufacturing efforts. Cumulative wear and maintenance defaults will produce steadily more serious -- and sometimes unrecoverable -- problems, as spares are consumed and machines and major subassemblies wear out. Iraq may also exhaust its hidden supplies of hard currency, and this would make it even more difficult to obtain even limited supplies of critical spare parts on the world's black arms market.

Iraq, Unconventional Warfare, and Terrorism

There is another aspect of Iraq's political situation which is also likely to affect the military balance in the Gulf. Iraq has long manipulated extremist groups and movements to serve its ambitions and ideological goals. Like other radical Middle Eastern states, Iraq has found such exploitation to be a cheap and effective substitute for overt political and military action. It allows Iraq to partially decouple its actions from public responsibility and to easily shift support from one group to another, or to disavow a given group at will.

Iraqi intelligence has a large special operations component. It operates directly out of Iraqi embassies, and has independent overseas "fronts" like airline and purchasing offices. While Iraqi intelligence is deeply concerned with suppressing opposition to the Ba'ath regime, Iraqi intelligence has been deeply involved in buying arms, obtaining the technology for weapons of mass destruction, providing covert support for ethnic and political movements hostile to the enemies of the Iraqi regime, and in attacks on foreign critics, intelligence agents, and political leaders.

Iraq has not been able to act as freely in supporting revolutionary and extremist groups since the end of the Gulf War as it has in the past. Many Iraqi agents were expelled from foreign countries during the Gulf War. Nevertheless, Iraq has still been active in terrorism. The U.S. State Department estimates that Iraqi intelligence conducted 39 terrorist attacks between the end of the Gulf War and April, 1993. It seems to have trained new hit squads to kill enemies in foreign countries, including an Iraqi scientist that was about to defect in Jordan in December, 1992. There have been dozens of attacks on U.N. relief and

aid workers in Iraq, including many bombings. Eight time bombs were found under U.N. trucks in December, 1992, and explosives damaged 14 U.N. trucks a week later.

Iraq continues to host a number of terrorist organizations despite the fact this is forbidden in U.N. Security Council Resolution 687. These groups include the People's Mujahideen of Iran. As has been discussed later, the People's Mujahideen has repeatedly launched raids and conducted terrorist attacks in Iran. This has led to Iranian air attacks on the People's Mujahideen camps in Iraq in April, 1992, and May, 1993, to Iran holding maneuvers on the Iraqi border, and to Iraq claims that it redeploys forces in the area. Iran has retaliated by sponsoring anti-Iraqi forces in Iran led by the Hakim family.²¹⁶

Iraq has supported extremist Palestinian groups like the Abu Nidal Organization (ANO), the Arab Liberation Front (ALF), Abu Abbas's Palestinian Liberation Front (PLF), and Abu Ibrahim. Iraq has also supported the Turkish Kurdistan Workers Party (PKK) in attacks in Turkey and anti-Iranian Kurdish groups in Iran. It supported groups involved in blowing up a Pan Am airliner in 1982. It may have given some support to the group that bombed the World Trade Center, although the available evidence indicates the group had closer ties to Iran -- if it had more than the most indirect ties to either nation.²¹⁷

None of these groups are particularly strong at the moment, or seem to be attracting significant popular support. They are, however, tools which Iraq can use under at least some conditions. Iraq can also use state terrorism, and has tried to do so. The Iraqi Intelligence Service (IIS) sponsored an assassination attempt on President Bush when he visited Kuwait on April 14-16, 1993.

Iraq intelligence agents -- including Mohammed Jawad and Abd al-Iman -- recruited 11 Iraqis to drive a Toyota Land Cruiser and Chevrolet Suburban across the Kuwait border on April 13. The vehicles contained pistols, hand grenades, timing devices, remote control sensing devices, and a 180 pounds of Semtex plastic explosive. They were also given 12 cases of whiskey to disguise the operation as smuggling. The key device involved in the plot was a car bomb that was intended to be placed along the President's route through Kuwait and kill him and his entourage. One of the key Iraqis in the plot, Wali Ghazali, was also given a "suicide belt" as a back-up if the car bomb failed.

The U.S. originally suspected that Kuwait might be exaggerating the plot -- in part because Iraqi intelligence recruited amateurs and then failed to inform them of changes in President Bush's route. However, later investigations confirmed that Iraqi intelligence was directly involved. While all of the evidence has not been made public, FBI and CIA agents found that a total of 14-17 people had been involved in the plot, including 11 Iraqis and three Kuwaitis, that several had clear ties to the Iraqi Intelligence Service, that some bomb

components were Iraqi, that the bomb design was similar to an Iraqi bomb used in Turkey, and that other evidence linked the plot to the highest levels in the Iraqi government.²¹⁸

The United States retaliated on June 26, 1993 by firing 23 Tomahawk cruise missiles against the center of the IIS headquarters in suburban Baghdad. As Table XI-3 has shown, however, the plot on President Bush's life was only part of the much broader pattern of challenge and response that Iraq had carried out since the cease-fire in the Gulf War. Iraq continued to challenge U.N. aircraft in the no-fly zone by tracking them with radar and occasional anti-aircraft fire, it continued to attack Shi'ite rebels in the south, to bomb U.N. aid missions to the Kurds, to keep much of its troop strength on the border of the Kurdish security zone, and to attack Kurdish leaders and villages in the security zone.

II. Iraqi Land Forces

The post war political situation in Iraq has been shaped as much by Saddam Hussein and the Ba'ath's continued control over Iraq's military power as by any other factor. This power is a function of both the authoritarian nature of the Ba'ath regime, and the fact that Iraq spent so much on military forces before the Gulf War that even its catastrophic losses during the conflict could not destroy the Iraqi military machine.

Iraqi Land Forces Before the Gulf War

When Iraq invaded Kuwait on August 2, 1990, the Iraqi army was the fourth largest army in the world. Its active regular strength had increased from 180,000 men in early 1980, before the start of the Iran-Iraq War, to over 800,000 men in early 1990 -- before Saddam Hussein took his decision to invade Kuwait. Its forces had the potential to mobilize to as many as 2,000,000 men, or roughly 75% of all Iraqi men between 18 and 34. The Iraqi army's tank strength had risen from 2,700 to at least 5,700 weapons between 1980 and 1990, and its total tube artillery strength had risen from 2,300 weapons to 3,700.²¹⁹

By the time Iraq had invaded Kuwait, its army had mobilized as many as 955,000 men (including 480,000 reserves). These forces were organized into seven to eight corps, and more than 60 to 66 division equivalents.²²⁰ While estimates differ as to the exact number of major combat units involved, they seem to have included 7 armored and mechanized divisions, 8 Republican Guard divisions, 40 infantry divisions, 20 special forces and commando brigades. They included 2 surface-to-surface missile brigades with at least 50 FROG-7 launchers, and 800-1,200 Scud and Scud variant missiles. These estimates would have given the Iraqi army a total mobilized strength of about 230 brigade equivalents, with up to 50 armored and mechanized brigade equivalents.

The Republican Guards were Iraq's most effective force. Iraq had recognized the need for elite forces once Iran had invaded Iraqi territory, and had expanded a guard force originally designed to protect the capital and the president. The Republican Guards forces received special equipment and training during the Iran-Iraq War. They played a major role in defending Basra in 1987 and the Iraqi offensives 1988. As a result of their success, they had grown to eight divisions by the end of the Iran-Iraq War, plus a large number of independent infantry and artillery brigades.

By August, 1990, the Republican Guards totaled nearly 20% of the Iraqi army. They reported to the State Special Security Apparatus in peacetime, rather than the Ministry of Defense. They reported to the Presidential Palace in wartime, although they were subordinated to military headquarters for specific military operations. They had special training in offensive and maneuver warfare, chemical warfare, and counter-attacks. They

were equipped with Iraq's best weapons: T-72 main battle tanks, BMP armored fighting vehicles, French GCT self-propelled howitzers, and Austrian GHN-45 towed howitzers, the most modern weapons in the Iraqi army. Republican Guard battalions had nine more tanks than Iraqi regular army battalions, and the Republican Guard's support, armored recovery, and engineering equipment was superior to that of other Iraqi army forces.²²¹

The rest of the Iraqi army totaled more than 50 division equivalents by mid-1990. Its basic operational level was the Corps, which normally consisted of several divisions and large numbers of support units. Divisions normally consisted of three brigades. The bulk of the Iraqi regular army divisions were infantry forces equipped with 1960's vintage Soviet and PRC-made equipment, but there were several high quality armored and mechanized divisions. Iraq's regular army armored divisions had two armored brigades and one mechanized brigade. The mechanized divisions had two mechanized brigades and one armored brigade. Infantry divisions had three infantry brigades and one tank battalion. Iraqi divisions generally had four artillery battalions and sometimes more. Most brigades had four battalions. The armored brigades had three armored and one mechanized battalion. The mechanized brigades had three mechanized and one tank battalion.²²²

Iraq also had a Popular Army, which had been created in 1971 as a Ba'ath Party militia. It was a highly political force designed to counter any threat from the regular forces, and had poor training and equipment before the Iran-Iraq War. Despite several efforts to improve it during the early 1980s, it performed poorly during the Iran-Iraq War -- even when Popular Army units were finally integrated into Iraqi regular army formations during the 1980s. This led Iraq to cut the Popular Army to 250,000 by mid-1990, from a wartime high of 650,000. It no longer was integrated into the Iraqi regular army. The remaining forces consisted largely of Ba'ath Party members and it was organized for rear area and internal security missions.²²³

The Iraqi army was extremely well equipped by Third World standards. It had at least 5,700 tanks and many experts feel the figure was closer to 6,700.²²⁴ In addition to its main battle tanks, Iraq had more than 3,000 heavy tank transporters. It also had at least 3,500 to 4,000 other armored vehicles. The Iraqi army had large numbers of anti-tank weapons, including AT-3 Sagers, AT-4 Spigots, SS-11s, Milans, and HOTs. Iraq had one of the most formidable artillery forces in the world. Its major tube artillery included 3,000 to 5,000 towed and 500 self-propelled weapons. Iraq also had extensive surface-to-surface rocket and missile forces. These included a minimum of 24-30 FROG launchers and up to 100-150 Scud launchers, including fixed sites and modified trucks. The army had 490 helicopters, of which 190 were attack helicopters. The armed types included 56 Bo-105s with AS-11s and HOT, 40 Mi-24s, 30 SA-316s with AS-12s, 13 SA-321s, some armed with Exocets, and 20

SA-342s armed with machine guns and cannon. The other helicopters included 15 heavy transports, 225 medium transports, and 124 light helicopters.

Iraq had a separate air defense command that cooperated with the air force as part of an integrated air defense system. It also, however, had many lighter air defense weapons that were deployed with army units at the corps level or lower. These included some 7,000 anti-aircraft guns, with a number of ZSU-23-4 radar-guided self-propelled weapons, and numerous heavy anti-aircraft guns ranging from 85mm to 130mm. Iraq also had some 15,000 mobile and man-portable SA-7, SA-8, SA-9, SA-13, SA-14, and SA-16 weapons, and roughly 100 Roland fire units on self propelled armored vehicles.²²⁵

The Iraqi Army During The Gulf War

The Gulf War destroyed much of this capability. The U.S. Department of Defense has issued estimates that indicate that by the time the air portion of the Gulf War began, the total deployed strength of the Iraqi army was 1.2 million men, 69-71 division equivalents, 5,800 tanks, 5,100 armored personnel carriers, and 3,850 artillery pieces. This estimate of manpower may well be too high, since Iraq had substantial call-up and desertion problems before the fighting began. The Department's estimate of equipment strength and force structure, however, seems likely to be correct.

The Department estimates that the forces in northern Iraq and Kurdistan included two corps with 17-18 infantry divisions and 6 independent forces commands. The forces in Western Iraq included 2 armored regiments and 1-2 infantry divisions. The forces in central Iraq included 1 corps and 3 infantry divisions, and the forces in Baghdad included 2-4 Republican Guard brigades, and 1 mechanized division in the process of formation.

Estimates differ as to how many of these forces Iraq actually deployed into the Kuwaiti Theater of Operations (KTO) during the months between its August 2, 1990 invasion of Kuwait and the beginning of the Gulf War. One U.S. Department of Defense estimate issued shortly after the war indicates that they included 5 corps with 35-36 divisions, of which 11 were armored and mechanized divisions, 25-26 were infantry divisions, and 1 was a special forces division. Eight more division equivalents were nearby or in the Kuwaiti Theater of Operations as independent elements, bring some estimates of the total forces in the KTO to 43 divisions.

If this estimate is correct, and all of these forces were properly manned and equipped, there would have been a total of 500,000-540,000 troops in the Kuwaiti Theater of Operations -- with about 50% in Kuwait. Iraqi forces would have included 140,000 Republican Guards, 4,200-4,500 tanks, 2,880 armored personnel carriers, 3,100 artillery

pieces, SA-2 and SA-3 launchers, and large number of shorter range missiles and anti-aircraft weapons.²²⁶

After a fuller re-examination of the data the U.S. acquired during the war, the Gulf War Air Power Survey (GWAPS), reported different figures. According to this estimate, there were only 336,000 Iraqis in the theater when the war began, with 3,475 tanks, 3,080 armored personnel carriers, and 2,475 artillery pieces. This estimate, which is shown in **Table XII-1**, is lower in every category except APCs, where U.S. intelligence sharply undercounted the number of APCs normally in Iraqi units throughout the war for reasons that are still not clear. The Gulf War Air Power Survey also estimated that desertions, withdrawal, and combat damage had reduced these forces to 200,000-220,000 Iraqis in the theater when the ground offensive began on February 23, and was left with 2,090 functioning tanks, 2,150 APCs, and 1,320 artillery pieces.²²⁷

Table XII-1

U.S. Estimates of Iraqi Losses Made After A Full Survey of U.S. Intelligence and Combat Data
During 1991-1992 -- Part One

Category of Loss	Total in Kuwaiti Theater of Operations			Estimated Losses			Losses as Percent of Original Total		
	Start of War 1-16-91	Start of Ground War 2-23-91	End of War 1-3-91	During Air War 1-16-91	During Ground War 2-23-91	Total 1-3-91	Start of Ground War 1-16-91	During Ground War 2-23-91	Total 1-3-91
<u>Ground Forces in the Theater</u>									
(Personnel	336,000	200,000-	-	-	-	-	-	-	-
		220,000							
Escaped/ Deserted	84,000	-	114,000-	-	-	-	-	-	-
			136,000						
Wounded	-	-	-	20,000	-	-	-	-	6%
Killed	-	-	-	10,000	-	-	-	-	3%
Front-line Armor	-	-	-	-	-	-	50%	-	-
Republican Guards Armor*	-	-	-	-	-	-	25%	-	-
Main Battle Tanks	3,475	2,090	279	1,385	1,811	3,196	40%	52%	92%
Other Armored Fighting Vehicles	3,080	2,150	1,412	930	738	1,668	30%	24%	54%
Artillery	2,475	1,320	279	1,155	1,041	2,196	47%	42%	89%

* A serious problem emerges in these counts of Republican Guards strength. The losses data seem to ignore two Republican Guards heavy divisions because of the precise geographic division of these units up to the cease-fire although the percentage of losses data include them. This is reflected in the briefing aids for the study which indicate that some units, including Republican Guards units and weapons including 800+ tanks escaped during the air phase of the war.

Table XII-1U.S. Estimates of Iraqi Losses Made After A Full Survey of U.S. Intelligence and
Combat Data During 1991-1992 -- Part Two

	<u>At Start of War</u>	<u>At The End of The War</u>	
		<u>Number Destroyed</u>	<u>Percentage Destroyed</u>
<u>Total Air Forces</u>			
Active Combat Aircraft	750	324	43%
Aircraft Shelters	594	375	63%
Major Surface-to-Air Missiles	?	?	60%?
Major Radars	?	?	50%?
<u>Other Major Military Facilities and Targets</u>			
Leadership Sites	-	- Unknown	
Communications Sites	-	- Substantially reduced	
Electricity	-		88%
Refining Capacity	-	-	93%
POL Storage	-	-	20%
Navy		All sunk or neutralized	
Major facilities for missiles	-	- Firings Suppressed	
Mobile Missiles	-	- None	
Nuclear Facilities	-	- Most survive	
Chemical & Biological Facilities	-	- Most Survive	

Source: Dr. Eliot A. Cohen, "A GWAPS Primer," U.S. Air Force, Washington, 19 April 1993, p. 2, and draft text of full study dated May 5, 1993. Losses include withdrawals and some systems temporarily inoperable. Total losses actually killed or captured are estimates to be 76% of tanks, 55% of APCs, and 90% of artillery. Republican Guards units, however, only lost 50% in these categories.

Reshaping Iraqi Land Forces After The Gulf War

Some experts estimate that Iraq's army emerged from the Gulf War with as little as 25% to 33% of its pre-war division strength fully operational, with about only 20% of its heavy armored and mechanized brigade strength combat effective, and with only 20% to 25% of its total manpower under full government control. Some experts feel it lost about 50% of its total operational tank strength, 40% of its other armored vehicles, 50% of its artillery -- although these figures include some recoverable equipment inside Iraq or equipment that could be repaired.

Iraq also lost much more than manpower and equipment losses. Many of the U.N. Coalition air attacks struck at facilities and area targets, rather than combat units or weapons. By the time the Gulf War was over, the U.N. had flown 41,309 strikes on Iraqi targets. To put this in perspective, a total of 5,153 known Iraqi installations had been identified by the time the war was over, and the U.N. had classified 3,813 as military related targets. The total mix of installations included 270 facilities associated with military leadership and support, 122 airfields; 988 air defense facilities; 53 naval facilities; 154 facilities associated with Scud and other missiles; 86 facilities associated with biological, chemical and nuclear weapons; 692 command, control, and communications facilities; 266 electrical power installations; 224 oil and petrol facilities; and 620 railroads and bridges.

By March 1, 1991, U.N. Coalition forces had flown 2,428 strikes against nuclear, chemical, biological, and fixed missile facilities; 1,697 strikes against leadership and telecommunications facilities; 884 strikes against electrical and oil facilities, 1,541 strikes against railroads and bridges; 5,335 strikes against air defense facilities. Detailed data on the number of strikes against land forces facilities are not available, but most were struck at least once, and that the scale of damage affecting Iraqi land forces went far beyond losses of men and weapons.

What is clear is that immediately after the war, the Iraqi army was in a state of disruption and political upheaval. Some elements had joined the Shi'ite and Kurdish rebels that attempted to seize power in the south and north right after the war, and other commanders and units either wavered in their loyalty or hesitated in obeying Saddam Hussein's orders. Many Iraqi troops also became disaffected.²²⁸

This disruption of Iraq's forces was relatively short-lived. None of the forces that challenged Saddam were strong enough to confront the Republican Guards and regular military units that remained loyal, although the Iraqi regular army command was in a state of shock and Iraq's vast security apparatus was so badly led that it collapsed in many of the Kurdish areas in the north and many Shi'ite areas in the south. This paralysis of the army

command and security forces encouraged the Kurdish and Shi'ite uprisings, but the Republican Guards and many key Iraqi regular army units remained loyal to the regime.

The Iraqi army quickly regained control of key urban areas, and Saddam proceeded to purge the army of any elements he felt were inefficient, uncertain or disloyal. He removed the head of the security service and inefficient security personnel, and reorganized his government and military forces. During the course of 1991 and early 1992, forces loyal to the government suppressed all serious Shi'ite resistance in the south, and drove the remaining forces in the marshes near the Iranian border. The army defeated a Kurdish uprising that threatened to seize control of the north and Mosul during the first weeks after the cease-fire, and left the Kurds isolated in a U.N.-secured enclave.

Iraq restored the high command structure of the army. It purged as many as 1,500 senior officers, and shot others, and it has gone through a long series of major command shake ups since that time. It restructured its pre-war corps structure so that its Vth Corps was deployed in the north around Mosul and the areas near the Turkish border, its 1st Corps covers the Iranian border north of Baghdad, and its other Corps were distributed in different locations in central, eastern, and southern Iraq.²²⁹

The Iraqi army was able to recover much of the equipment that it initially abandoned or which had fallen into hostile hands, and it conducted a massive scavenging hunt in the Iraqi territory the U.N. had occupied, the moment that U.N. forces left. Iraq also sent infiltrators into Kuwait in an effort to regain equipment, spare parts, and munitions. In many cases it was able to repair equipment that had been counted as "killed" during the war because the damage was not sufficient to prevent repair or combing parts from several damaged systems.²³⁰

Iraq did face continuing problems with the morale and loyalty of the Iraqi regular army, and with conscript call-ups and desertions. Nevertheless, it had a vast pool of manpower to draw upon in rebuilding its forces. In 1992, Iraq had a population of about 18.5 million, growing at a rate of 3.7%. The U.S. Central Intelligence Agency (CIA) estimates that this population was about 75-80% Arab, with 15-20% Kurdish, and 5% Turkic, Assyrian, and others. Iraq was deeply divided along religious lines, with a population that was 97% Muslim and 3% Christian and other, but divided between 60-65% Shi'ite and 32-37% Sunni.²³¹ Other sources indicate that the percentage of Shi'ite in the total population may have been closer to 50%.

Iraq's total male manpower pool was about 4,042,000, counting the population from 15-49. The U.S. Central Intelligence Agency (CIA) estimates that 2,272,000 males are fit for military service, and that 228,000 reach military age each year.²³² The IISS estimated in

1991 that there were 1,170,000 males between the ages of 13 and 17, 945,400 between the ages of 18 and 22, and 1,408,700 between the ages of 23-32.²³³

By September, 1992 -- only a little over a year of recovery -- Iraq's military forces were able to draw on this manpower pool to deploy 500,000 to 650,000 men -- including a substantial number of reserves. The Iraqi army had from 300,000-400,000 actives, or about 40% its prewar strength. Many of the Iraqi regular army forces were manned by poorly trained and motivated conscripts, which had been drafted after the Gulf War or who had been defeated in that conflict. These lower quality forces were stiffened, however, by relatively effective Republican Guards forces, a number of moderate to high quality Iraqi regular army units, and reorganized internal security forces.

The army was reported to be organized into five main corps, with a 4th border guard force along the Syrian border, a 5th border guards force along the border with Saudi Arabia, and a third screening force along the western border of Kuwait. The Iraqi army had a total of 24 to 30 divisions. These included an uncertain mix of armored, mechanized, and infantry divisions. According to British and Israeli sources, there were three regular armored divisions, three regular mechanized divisions, and 15-17 regular infantry divisions. The Republican Guards had three armored divisions, one mechanized division, three-four infantry divisions, and a special forces unit

Various estimates of total major combat unit strength gave the Iraqi army a numerical strength of some 25-28 division equivalents, versus a strength of 60-70 division equivalents before the Gulf War. However, such direct numerical comparisons ignore the fact that Iraqi divisions had far less manpower and equipment strength and combat capability than Iraqi divisions before the war. Iraq had also been forced to disband or consolidate some of 15-20 special forces and commando units that existed before the war, and demobilize some reserve units.

The Present Strength of the Iraqi Army

The Iraqi army seems to have become stronger by 1994. According to the IISS, Iraq now had a total of 350,000 men (including 100,000 recalled reserves), and a total of six corps, with 22 regular divisions, seven Republican Guard divisions (4 armored/mechanized and 3 infantry), 1 Presidential Guard/Special Security Force, and 15 independent special forces or commando brigades. German, U.S., and Israeli experts felt that Iraq had up to 400,000 men, five to six corps, and a total of 28-30 divisions with 10 armored and mechanized divisions (four in the Republican Guards and six in the Iraqi regular army), and 18-20 infantry and mountain division equivalents (three in the Republican Guards and 15-17 in the Iraqi regular army), plus a division-sized Special Republican Guards formation.²³⁴

Iraqi forces were organized into four major echelons. The first echelon was composed of at least one heavy division equivalent of what Iraq called the Special Republican Guards or "Presidential Guards" forces. The second echelon included six other divisions, and some independent special forces and support units, in the rest of the Republican Guards. All of the Republican Guards units reported directly to the Presidential Palace, and not to the Chief of Staff or Ministry of Defense. The third echelon of forces was composed of a number of Iraqi regular army units under exceptionally loyal commanders. These units had much of the Iraqi regular army's armor, and have an unusually high level of equipment, total personnel, and combat-experienced personnel. Finally, a fourth echelon included the rest of the Iraqi regular army. The units in this echelon were under loyal commanders, but were often seriously understrength. They lacked the manpower and equipment of the other echelons, and could only be used in largely defensive or rear area roles.

Rough estimates of the desired table of organization and equipment for Iraqi divisions are shown in **Table XII-2**. Few units actually approached this level of strength before the Gulf War, however, and most were well below this level of manpower and equipment in 1994. It is unlikely that even the Republican Guards units were at full strength, and many Iraqi regular army units were badly under-equipped and under-manned. In many cases, titles like "armored" or "mechanized" probably did not reflect the actual structure of given divisions.

Table XII-2

Iraqi Division Organization

<u>Type</u>	<u>Regular Army</u>			<u>Republican Guard</u>		
	<u>Armored</u>	<u>Mech.</u>	<u>Infantry</u>	<u>Armored</u>	<u>Mech.</u>	<u>Infantry</u>
Personnel	12,100	12,200	14,100	13,800	13,800	14,300
Tanks	245	175	78	308	220	44
OAFVs	472	544	6	538	622	6
Artillery	114	114	78	144	138	18
Air Defense Guns	90	90	54	90	90	54
Surface-to-Air Missiles	50	0	50	50	0	

Source: U.S. Department of Defense Public Affairs press briefing handout, September, 1990

The Iraqi army was concentrated around the Kurdish security zone in the north, with as many as 15-16 divisions and 150,000 men. Infantry divisions secured the border of the security zone and armored, mechanized, and Republican Guard divisions provided heavy offensive forces. The army's key formations were a corps headquartered in Mosul and another corps headquartered in Kirkuk. Another Iraqi corps or large scale formation was concentrated in the Baghdad area with many of the Republican Guards heavy divisions and the Special Republican Guards (or "Presidential Guards") formations.²³⁵ Two more corps were deployed in the south, with at least 50,000-75,000 men. These forces seem to have included 5-10 divisions, with a mix of infantry and heavy divisions, and at least some Republican Guard formations in reserve.

In addition, Iraq had 20,000 Frontier Guards. These Frontier Guards were deployed along every border -- except the "border" along the Kurdish security zone, which was covered by regular Iraqi forces. The Frontier Guards are little more than a light infantry and surveillance force armored with light weapons and anti-aircraft guns. Training has generally been poor, but the force does free the army to perform combat missions.

Current Major Equipment Holdings

In 1994, the Iraqi army's major holdings seemed to include about 3,000 tanks, or less than half the 6,700 tanks it had before the war. About half these tanks were T-54s, T-

55s, T-59s and T-69s. Iraq also had about 600-700 M-48s, M-60s, AMX-30s, Centurions, and Chieftains captured from Iran or obtained in small numbers from other countries. Iraq had lost much of its pre-war T-72 strength and only had about 500-600 T-72s left, plus about 200-300 T-62s, versus nearly 1,500 T-72s and T-62s before the war. According to some estimates, only about 2,000-2,300 of Iraq's tanks were operational, but Iraq retained over 1,500 tank transporters and heavy vehicle trailers out of the several thousand it had bought during the Iran-Iraq War.²³⁶

Iraq's surviving strength of other armored vehicles is a subject of debate, but one estimate indicated that it included some 4,000-4,500 other armored vehicles. Iraq had 1,250-1,500 armored reconnaissance and command vehicles (BDRM-2, EE-3, EE-9, AML-60, AML-90, MTLB) versus 2,500 before the war. It had 800-900 armored infantry fighting vehicles (BMP-1, BMP-2, and AMX-10P) versus 2,000 before the war; and 2,000-2,250 armored personnel carriers (BTR-50, BTR-60, BTR-152, OT-62, OT-64, MTLB, YW-531, M-113, M-3, EE-11) versus up to 7,100 before the war. Other estimates indicate Iraq may have had only about 2,800-3,100 other armored vehicles, versus 5,100 before the war. Regardless of the number, many of these vehicles have only limited operational capability. Iraq does, however, retain large numbers of special purpose armored vehicles like command centers that it had bought during the Iran-Iraq War.²³⁷

Iraq's surviving artillery included about 1,500-1,750 towed artillery weapons (105mm, 122mm, 130 mm, and 155mm). It also included around 250-300 self-propelled artillery weapons (2S1 122mm, 2S3 152mm, M-109A1/A2 and GCT AUF-1 155mm); and 4,000-5,000 (60mm, 81mm, 120mm, 160mm) mortars. This compares with 3,000-5,000 towed weapons, and 500 self-propelled tube weapons before the war. As is often the case in such estimates, the data on multiple rocket launchers are too contradictory to make any estimate of wartime losses possible, although it is clear that many such weapons were destroyed or abandoned in the Kuwaiti Theater of Operations. It seems likely, however, that Iraq still retains 150-200 such weapons (240mm, 140mm, Astros I, Astros II, BM-21, 122mm). Iraq probably retains many of its pre-war holdings of the FROG surface-to-surface rocket, and at least several hundred rockets.²³⁸

Iraq had over 350 self-propelled mortars mounted on armored vehicles before the Gulf War. These do not seem to have been heavily committed to the Kuwaiti Theater of Operations, and Iraq has probably retained up to several hundred after the conflict. Iraq also had large numbers of 81mm and 120mm Soviet mortars and these are likely to remain in large numbers.

The Iraqi army lost large numbers of its anti-tank weapons during the fighting, many of which were recovered intact by the U.N. Coalition forces. Nevertheless, Iraq retains

substantial anti-tank warfare capability. Its guided weapons include an unknown number of HOTs, AS-11, and AS-12s mounted on PAH-1 and SA-342 helicopters, and AT-2s mounted on Mi-8 and Mi-24 helicopters. It has Milan and HOT launchers mounted on VC-TH armored vehicles; Soviet AT-1, AT-3, AT-4 crew-portable anti-tank-guided missiles; and Milan man-portable anti-tank guided missiles. It has several thousand 85mm and 100mm anti-tank guns and heavy recoilless rifles.

There are definitional problems in counting Iraq's surviving anti-aircraft guns because some estimates include machine guns and others only heavier weapons. Pre-war estimates put the total number of weapons including machine guns at around 7,000, and the number of heavier weapons at 4,000. Iraq lost substantial numbers of anti-aircraft guns during the Gulf War, but seems to retain 300-500 self propelled weapons, including some AMX-30 SAs, Egyptian-made guns and light missile launchers, and 150-200 radar-guided ZSU-23-4s. Iraq certainly retains at least 4,000-5,000 other anti-aircraft guns, although many may not be operational or may be deployed as anti-infantry weapons.

Post-war estimates do not provide many details of Iraqi army surface-to air holdings, although they clearly include thousands of light and medium surface-to-air missiles. These include SA-7, SA-8, SA-9, SA-13, SA-14, and SA-16 vehicle-mounted, crew swerved, and man-portable weapons, and perhaps 50-100 surviving Roland fire units on self-propelled armored vehicles. According to most estimates, Iraq retains at least 50% to 66% of its pre-war anti-aircraft weapons strength.

Estimates of helicopter strength are equally uncertain. Iraqi army aviation seems to retain about 120 of the 159 armed helicopters that Iraq possessed before the war. These may include 20 PAH-1 (Bo-105) attack helicopters with AS-11, AS-12 and HOT missiles, 30 Mi-24s and Mi-25s with AT-2 missiles, 40 SA-342s with AS-12s and HOTs, Allouettes with AS-11s and AS-12s, and 5 SA-321s with Exocet. No reliable estimate exists of the number of surviving heavy, medium, and light transports and utility helicopters, but it seems likely that Iraq retains 200-300.²³⁹

Current Limits on the Capabilities of the Iraqi Army

This inventory of surviving army equipment is more impressive than Iraq's surviving military capabilities. Although the Iraqi army built up significant war fighting capabilities during the Iran-Iraq War, its forces had many defects even before they suffered major losses during the fighting in 1991. Like many other Middle East armies, Iraq armed with little regard to standardization and ease of supply, training, and maintenance. The army was dependent on continuing imports of a wide mix of equipment supplied by the former Soviet bloc, France and Italy, other European states, and Third World countries. Iraq relied on

resupply as a substitute for maintenance, overhauls, and effective logistics. As a result, much of Iraq's equipment was constantly deadlined -- or had limited operational effectiveness.

The Gulf War has made this reliance on resupply unworkable. Iraq has been cut off from major arms imports and foreign technical support since August, 1990. Its army needed at least \$1 billion a year worth of arms imports before it suffered the losses of the Gulf War, and the problem of obtaining arms imports goes beyond Iraq's present inability to meet peacetime needs. Iraq's army was also organized to deal with combat attrition through resupply of new equipment, rather than by repairing damaged or worn equipment. As a result, Iraq not only has suffered from wartime losses, but from a steady decline in operational equipment strength and equipment sustainability, but from the inability to fully repair much of the combat damaged equipment it salvaged from the war.

Iraq's military industry can offset some of these problems. It can still assemble some T-72 kits from shipments it received before the war, and manufacture some tank parts. It can manufacture limited numbers of artillery and multiple rocket launcher systems, and produce large numbers of small arms and artillery ammunition. It is heavily dependent on imported subassemblies and machines, however, and has probably lost a significant amount of capability because it no longer has access to imports of these items.²⁴⁰

A much larger portion of the Iraqi army's equipment is certain to be deadlined, or lose part of its operational capability over time. While Iraq can improve its ability to manufacture some spare parts, its inability to produce or obtain some critical major parts and complex assemblies will force it to cannibalize its equipment, and reduce its sustainability, unless the embargo ends. These problems will be compounded by (a) the weakness of the Iraqi army logistic and supply system, (b) mass losses of stocks and supplies during the Gulf War that cannot be replaced, (c) the maldeployment of a great deal of equipment and stocks, (d) the inability of the Iraqi army to properly man and organize its post war support and logistic system, and (e) a general lack of interoperability in Iraq's equipment mix. Iraqi ability to conduct sustained intense combat, maneuver, or to support a major redeployment with logistics and supply is greatly reduced

All of these readiness and sustainability problems will degrade Iraq's limited ability to conduct effective combined arms and mobile warfare. So will the human element. The quality of Iraq's manpower has been degraded by the fact that many of Iraq's best armored and mechanized units were shattered in the fighting, including its heavy Republican Guards units. Many officers and technicians were lost in the fighting, and the Iraqi forces have been subject to recurrent purges and upheavals ever since the end of the conflict. There has been little large scale training since early 1990, and many units are filled in with a mix of inexperienced troops and low grade conscripts and reservists. There are continuing

problems with conscript call-ups and desertions in the regular forces. At least one-third to one-half of the Iraqi order of battle consists of hollow forces that will take years to rebuild to the level of capability they had before the fighting.

The Iraqi army, however, remains a very large force. It also does not face formidable opponents in the region. It is still likely to remain qualitatively superior to Iranian and southern Gulf armies for at least the next few years, and is far superior to Iraqi Kurdish and Shi'ite rebel forces. It may have severe limits by Western standards, but it is still the most effective land force in the Gulf region.

The Iraqi Republican Guards and Special Republican Guards

The Republican Guards make a particularly interesting case study in the changes in Iraq's forces since the Gulf War. These forces are the political elite of the Iraqi armed forces. They are under the direct command of the Presidential Palace bypass Iraq's regular chain of command in peacetime. There is a tendency in some commentaries on Iraq to treat the Republican Guards as including all of Iraq's elite forces, although many Iraqi regular army armored and mechanized units were almost as well equipped and trained, and played as important a role in combat during the Iran-Iraq War. Nevertheless, the Republican Guard Forces Command (RGFC or "Al Faris Forces Command") has been a mainstay of Iraqi military capability and of critical importance in securing Saddam Hussein and the Ba'ath's control over Iraq. It has also served as Iraq's strategic reserve in wartime, and was often used during the Iran-Iraq War to lead offensives or reinforce a threatened defensive position.²⁴¹

Before the war, the Republican Guards had a total of roughly 12 division equivalents and 150,000 men. It is important to note that these divisions were not standardized, and that many were infantry units tailored more for peacetime control of Iraq than combat power. The term "division" was also misleading. Even by Iraqi standards, a division slice required about 20,000 men to produce a field deployable division with a combat strength of 10,000 men. This would have required a Republican Guards force of at least 240,000 men, and illustrates the fact that many Guard divisions were little more than reinforced brigades. Further, one armored division could have up to twice the heavy armor of another, and training and readiness standards varied sharply by brigade or regiment.

The Gulf War forced Iraq to consolidate its Republican Guards forces down from a total of 12 divisions to a current total of seven divisions, and to eliminate a number of smaller formations. The current divisions include three armored divisions (Al Nida division, the Hammurabi division, Al Medina division), one mechanized division (Al Abid), and three-

four infantry divisions (the Adnan division, the Nebuchadnezzar division, the Baghdad division, possibly one unidentified) equivalents. Two special forces brigades seem to have survived from the pre-war special forces division, and up to four independent infantry formations -- nominally of brigade strength.²⁴² According to U.S. and Israeli experts, the surviving Republican Guards force had a total of between 60,000 and 80,000 men, and 26-30 brigade equivalents (6-8 armored, 3-4 mechanized, and the rest infantry). This means that even the reduced Republican Guards force consists of units with 65-75% of the manning needed for its combat units and about half the total manpower needed to deploy and sustain a force of seven full divisions.²⁴³

This force has been created by deactivating the five Republican Guard divisions mentioned earlier, and some smaller formations. Many of the Republican Guard divisions were concentrated around Baghdad in early 1994, although at least one to two divisions were located in the north near the Kurdish security zone, one division was located in the south to control Karbala and Al Kut, and another division equivalent was deployed to control Al Amarah and help support operations against the Shi'ite rebels in the marshes.

The precise equipment holdings of the surviving Republican Guards units are almost impossible to estimate, but they seem to be about 66%-75% of what they were before the war. A very rough estimate of the total equipment holdings of the Republican Guards would be around 650-800 tanks (at least 550 T-72s), 800-1,100 other armored vehicles (about half BMP 1/2s and 25% MTLBs), and 350-500 artillery weapons. Given probable operational readiness, this more than seven division force had total equipment holdings roughly equivalent to those of only two U.S. armored divisions. While the Republican Guards were training again, it is unclear that they have been able to train effectively above the brigade level, and they may need several years to fully reorganize and train for full divisional or Corps level combat.

The regime seems to place a high degree of trust in the Republican Guards, although Guard deployments around Baghdad are structured to prevent any one Guard unit from acting against the regime. According to some reports, Iraq also has at least two Special Republican Guard (Al-Haras al-Khass) mechanized infantry brigades, which are the only units normally allowed in Baghdad. These units are manned largely by Sunnis, many from the area around Tikrit, and are equipped with T-62 and T-72 tanks and modern armored infantry fighting vehicles. Experts disagree as to whether these units existed before the Gulf War or were created after it. One source reported that the Special Republican Guards were reported to have been under the command of Lt. General Hussein Kamil al-Majid during the Gulf War, but now may be under the command of Major General Kamal Mustafa al-Majid. Major Saddam Kamil Hassan (who is brother of Lt. General Hussein Kamil al-Majid and is

married to one of Saddam Hussein's daughters) may be, or have been, in the chain of command.²⁴⁴

Saddam also may have a small armored unit as part of his personal bodyguard (Haras al Ra'is al-Khass). This bodyguard has at least several hundred men, and some reports indicate several thousand. It is headed by Brigadier Arshad Yassin, a cousin and brother-in-law of Saddam Hussein who serves as both his personal pilot and "aide de camp". Many of the men in the bodyguard come from Tikrit and from Saddam Hussein's own clan. Estimates of the total deployed strength in Baghdad of these two special security forces go as high as 8,000-15,000 men.²⁴⁵

The Warfighting Capabilities of the Iraqi Army

The Iraqi army is still the strongest army in the Gulf region, but it faces many of the problems in rebuilding and improving its land forces as Iran. Iraq's land forces still retain significant war fighting capabilities. They could still seize Kuwait in a matter of days, or occupy much of Saudi Arabia's Eastern Province, *if* they did not face opposition Western forces. Iraq has the military strength to overrun its Kurds in a matter of weeks if U.N. forces cease to protect them. The army has already effectively defeated all serious Shi'ite resistance. It can probably defeat any major Iranian attack, and should be able to defeat the Iranian army in detail in the border area if it is given warning about a limited attack. Iraq can pose some threat to Syria, although with some logistical difficulties, and can deploy two to three divisions into an Arab-Israeli conflict if it has Syrian or Jordanian support.

The Iraqi army is, however, much weaker than it was before the Gulf War, and it is very different from the army that defeated Iran in 1988. Many combat veterans of the Iran-Iraq War have steadily left military service since the end of the Iran-Iraq War. Iraq has reported a number of large-scale military exercises, but their quality is in question. It seems the army is steadily losing combat experience and manpower quality. The U.N. air offensive did massive damage to the Iraqi army's facilities and stockpiles. Iraq would find it much harder to sustain operations, or support offensive operations significant distances away from the support facilities that have been repaired since the end of the war.

There continue to be problems in terms of desertions, morale, and call-ups, although these seem to be declining with time. Saddam Hussein has taken a number of measures designed to improve the loyalty of the armed forces. He has steadily increased salaries to compensate for inflation, and set up special stores which provide military personnel with better access to food and consumer goods. He has cut the period for conscription from 36 months to 18 for college graduates, and to four months for the holders of advanced degrees. He has revived some of the special privileges like car loans, land grants, housing benefits,

and low interest loans used to motivate officers during the Iran-Iraq War. He also now allows automatic retirement after 25 years of service.²⁴⁶

Human factors will continue to be a problem -- particularly if the civilian economy continues to decline. The most critical mid-term limitation affecting the war fighting capability of the Iraqi army, however, may be the impact of the U.N. arms embargo. Iraq can work around some of its equipment problems, but it will need significant supplies of spare parts to maintain its army. If the U.N. embargo continues to be effective, the Iraqi will gradually lose force strength, and war fighting quality relative to Iran, the southern Gulf states, and its other neighbors. It is almost impossible to predict the rate at which this loss will occur, but the Iraqi forces will lose sustainability and a significant amount of its combat effectiveness long before a lack of outside supply makes its equipment fully inoperable.

Iraq must also modernize its land force equipment and technology if it is to compete with the force improvements being made by its neighbors. Iraq needs a comprehensive tank rebuilding program, and to upgrade much of the rest of its armor. It needs to up-gun its older tanks or use improved tank rounds. Most of its tanks need modern fire control systems, armor, night and thermal vision devices, and guns and ammunition equal to those of the U.S. and Saudi Arabia.

If the Iraqi army is ever to compete directly with Western or Israeli land forces, it must convert from the relatively static defensive force that lost the Gulf War to become a force that can match the kind of highly mobile, firepower intensive, maneuver-oriented, 24 hour day force the U.N. deployed during Desert Storm. This is a far more demanding challenge than simply acquiring spare parts of more modern equipment.

To carry out such a conversion, Iraq must greatly improve the long-range sustainability of its forces in maneuver operations, and its battlefield recovery and repair capabilities. It must make sweeping improvements in its night and poor weather warfare capabilities, and ability to rapidly move artillery, mass and shift fires. It must acquire beyond-visual-range targeting systems. It must restructure its communications, command, and control to support fluid maneuver operations, and greatly improve its helicopter and combined operations training with fixed wing aircraft. It will need targeting and reconnaissance capabilities that are integrated into its division or brigade level operations. It will need improved mobile short-range air defenses and man-portable surface-to-air missiles, tank transporters, secure communications, modern fire control systems, tracked support equipment and self-propelled artillery.

To use these new capabilities, Iraq will have to make fundamental changes in tactics and training, and acquire advanced training and simulation technology. It will be even more important, however, to convert from a political to a professional force. Saddam Hussein and

the Ba'ath still interfere constantly with organizational matters, exercises, training, promotions, and equipment and supply matters down to the battalion (major and lieutenant colonel) level. Senior commanders still face the constant threat of removal for the normal failures of war and for petty political reasons. Domestic political considerations, and ruthless efforts to ensure the loyalty of all officers to the regime, often lead to the promotion of the politically loyal over the professionally competent.

Iraqi politicians may not be the worst enemy of the Iraqi army, but they are certainly high on the list. At the same time, the Iraqi officer corps also needs to be more self-critical. It needs to accept the fact that many of its problems are self-inflicted failures to learn from the lessons of war, rather than the result of pressure from the Presidential Palace or foreign conspiracies.

III. The Iraqi Air Force

The Iraqi air force has suffered as much from the Gulf War, and the embargo that has followed it, as the Iraqi army. Although the land forces lost a higher percentage of major weapons in combat, the air force has suffered damage to many of its key facilities, and has lost the 139 aircraft that fled to Iran. The air force is a higher technology force, and is more vulnerable to an embargo on spare parts and equipment. Its effectiveness is also heavily dependent on the capabilities of its battle management, air control and warning and command, control, and communications systems. These system suffered major damage during the war that Iraq has not been able to repair.

The Build-Up of the Iraqi Air Force Before the Gulf War

The active strength of the Iraqi air force at the time the war began is a subject of considerable debate, and U.S. government sources reported a much larger inventory of combat aircraft during the war than most unofficial sources had reported before the conflict began. Part of the reason for this debate is that it is difficult to make precise estimates of the air force's operational strength because many of its aircraft were in delivery to units, and in storage, and because there are differing ways of counting the aircraft in training and conversion units.

According to a U.S. air force estimate made after the war, Iraq had the sixth largest air force in the world by the summer of 1990. It had about 40,000 active personnel, including 10,000 air defense personnel. Most estimates indicate that Iraq had 700 to 770 fighters, bombers, and armed trainer aircraft. These were supported by 200 other transport and special purpose aircraft, including an Iraqi-built airborne early warning aircraft derived from a Soviet IL-76 transport. These aircraft were dispersed in 44 major operating bases, a total of 122 airfields, and roughly 600 aircraft shelters.²⁴⁷

Iraq's combat aircraft included French Mirage F-1 fighters, the export version of the Soviet MiG-29 Fulcrum interceptor and air superiority fighter, the MiG-27 Flogger strike fighter, the MiG-25 Foxbat interceptor, the MiG-23 Flogger fighter-bomber, the MiG-21 Fishbed fighter, the Sukhoi Su-25 Frogfoot ground attack airplane, the Sukhoi Su-24 Fencer long-range strike aircraft range, Tupolev Tu-16 Badger and Tu-22 Blinder bombers, and the Su-7, Su-20, and Su-22 Fitter family of attack fighters. Iraq also had PRC-made H-6 and J-7 aircraft, and Czech L-39 armed trainers.²⁴⁸

Iraq operated three of the most sophisticated combat aircraft in the world before the Gulf War began. These included the MiG-29, Su-24, and Mirage F-1. Iraq's 65 French made

Mirage F-1s were the elite section of the Iraqi air force. They carried a wide range of the latest French and Soviet guided missiles and munitions, and laser-guided air-to-surface weapons. Their pilots were French trained and had more air-to-air combat training than the pilots flying Soviet-made aircraft.

The Iraqi Mirage F-1s included Mirage F-1EQs which could carry Exocets and other advanced French air-to-ground missiles, and could be refueled in flight. The F-1EQ5s carried a Thompson CSF Atlas laser designator pod which could designate targets for laser-guided bombs at ranges of up to 10 kilometers. The Mirage F-1s could deliver the Aerospatiale AS-30L laser-guided bomb which can glide to ranges of 12-15 kilometers, and had been modified to carry the Soviet AS-14 Kedge air-to-ground missile, which has a maximum range of 12 kilometers and used semi-active laser guidance with an active laser fuse.²⁴⁹

Iraq was also improving its ability to use its new Soviet fighters. It had exercised and trained its MiG-29 units to operate with its "Adnan" airborne warning aircraft. Its model of the Su-24 was the Su-24D. This model has a sophisticated radar warning receiver, an improved electronic warfare suite, an improved terrain avoidance radar, satellite communications, an aerial refueling probe. It can deliver electro-optical, laser, and radar-guided bombs and missiles.²⁵⁰

Unlike many strike-attack aircraft the former Soviet Union delivered to the Third World, the Su-24D could carry the latest Soviet air-to-surface munitions, lift payloads of nearly 25,000 pounds, and operate on missions with a 1,300 kilometer radius when carrying 6,600 pounds of fuel. With a more typical 8,818 pound (4,000 kilogram) combat load, the Su-24 has a mission radius of about 790 kilometers in the LO-LO-LO profiles, and 1,600 kilometers in the LO-HI-LO profile.²⁵¹

Many estimates of Iraq's strength of given types of aircraft before the Gulf War seem to undercount deliveries after 1987. The working estimate shown in Table XIII-1 may be more accurate, although only 750 fixed wing aircraft seem to have been confirmed as operational in any kind of combat status.²⁵²

Table XIII-1Iraq's Air Order of Battle Before the Gulf War

(Includes entire inventory, estimates of operational strength are much lower)

91	F-6s, Xian F-7's and unidentified types of MiG-21
65	MiG-21PFM Fishbed F
30	MiG-21MF Fishbed J
20	MiG-21UTI Mongol
37	MiG-23BN Flogger G
23	MiG-23 Flogger E
22	MiG-25 Foxbat A/E
35	MiG-29 Fulcrum B
10	MiG-29U Fulcrum C
40	Su-25 Frogfoot
150	Su-7/20/22 Fitter A/C/D/J/H
48	Su-24D Fencer E
50	MiG-23BN Flogger F
8	Tu-22 Blinder A
14	Tu-16/B6D Badger
65	Mirage F-1EQ/EQ4-200/EQ5-200/EQ6-200
30	MiG-17 Fresco
34	Hawker Hunters (up for sale for several years)
30	MiG-19/F-6 Farmer
8	MiG-15R and MiG-25 Foxbat B

810	total resources

Iraqi Air Force Helicopter Inventory

60	Hughes-300 / 530 Combat Helicopters in 1983
26	Hughes-530 Combat Helicopters in late 1985
40	Mi-8 Hip Assault Transports
40	Mi-24 Hind Gunships

Source: adapted from Dr. Eliot Cohen, Gulf War Air Power Survey, Washington, U.S. Air Force, 1993, briefing aids and Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, p. II-361; U.S. Department of Defense, Conduct of the Persian Gulf War: Final Report, U.S. Department of Defense, April, 1992, pp. 10-12, and the IISS Military Balance

The Iraqi air force seems to have had two bomber squadrons with 7-12 Tu-22 Blinders 8-14 Tu-16 Badger (including 4 PRC-made B/H-6Ds). It had roughly 22 fighter-ground attack squadrons: One with 16-48 Su-24s, five with 70-90 MiG-23BM/Ns (24 Flogger E and 50 Flogger F), four with 23-34 Mirage F-1EQ-200s with Exocet and 35 Mirage F-1EQ5s and EQ6s), four with 40-60 Su-25A/Bs, four with 70 Su-20/Su-22s, two with 30 Su-7s, and two with 30 J-6s. According to some reports, it also had up to 40 MiG-27 Flogger Js.²⁵³

These Iraqi attack forces had considerable combat experience in basic attack missions against an Iranian opponent with minimal air defense capabilities, but had an uncertain mix of capabilities against more advanced opponents. The bomber units lacked the electronic warfare and low altitude penetration capability necessary to survive against Western air defense. The Su-24 units were just entering service and had lacked the experience and advanced training to be fully effective. The Mirage units were relatively well trained, but had no experience in operating against strong air defenses. They lacked the extremely sophisticated electronic warfare equipment necessary to challenge the U.N. Coalition's advanced defenses, although Iraq did succeed in some of its jamming efforts. The MiG-23s had uncertain readiness and training, and some had relatively poor attack avionics. The Su-25s were A-10-like close air support fighters that could not survive without air superiority. The J-6s were little more than glorified trainers, and the SU-7, Su-20, Su-22 force had very mixed training standards. Only part of the Su-17/20/Su-22 force was really combat effective.

The Iraqi air force had 13-17 interceptor squadrons. Its all-weather fighters included 22 MiG-25A/Es, 35 Mirage F-1EQs, 35 MiG-29s. Its day fighters included 40 J-7s, and 206 MiG-21s.²⁵⁴ This gives Iraq a total of at least 300 air defense aircraft. This count, however is somewhat misleading in that a number of Iraq's attack fighters were dual-capable in air defense roles. U.S. experts counted Iraq's air defense assets as including 159 all-weather air defense fighters (35 MiG-29, 65 Mirage F-1EQ, 37 MiG-23G, 22 MiG-25A/E), and 246 day/visual flight rules (206 MiG-21 and 40 MiG-23E). These aircraft were normally based at main operating air bases at H-3, H-2, Al Asad and Al Taqaddum in the west; Qayyarah West, Tall Afar, Mosul, and Kirkuk in the north; Balad, Rashid, Shayka Mazar, and Al Jahrah in the center-east; and Kut Al Hayy, Talil, Jalibah, and Shaibah in the south.²⁵⁵

Iraq's air defense units often had lower training and readiness than the attack units, but the units with newer aircraft had readiness rates of around 60% to 80%.²⁵⁶ Their pilots had little experience from the Iran-Iraq War because Iran rarely challenged Iraqi air defenses after the first years of the war. Training standards were often low, although they were

relatively high for the Mirage F-1 units. Iraq was attempting to improve its fighter performance by establishing training links to Jordan. This allowed some Iraqi pilots to fly missions near the Israeli border, as well as cooperate in limited reconnaissance missions.²⁵⁷

Many of Iraq's Soviet-made air defense aircraft had limited radar and electronic warfare capabilities by Western standards, although some had good infrared countermeasures. Most were vulnerable to allied jamming and the superior radars and missiles on aircraft like the F-15. Most were also highly dependent on the ability to receive data from ground-controlled intercept stations to locate an attacking aircraft, and had no ways to acquire targets effectively once these stations were put out of action during the first days of the war. Further, while Iraq's training of some of its air units was adequate by Third World standards, its units had nothing approaching the kind of all-weather, night, and computerized air combat training available to NATO forces.

Iraq had one reconnaissance squadron with 5 MiG-21s and 7-8 MiG-25s, two types of Soviet-made remotely piloted vehicles (RPVs), and developmental versions of two Iraqi-built RPVs called the Al Yamamah-A, a multi-mission RPV carrying daylight and infrared cameras. It also had Sarab-3, a modification of the British TTL-3 Banshee target drone.

These reconnaissance assets were largely useless against the U.N. Coalition. They were far too limited in scale to cover the rapidly changing Coalition forces, could not penetrate its defended air space, and were tied to a slow and cumbersome photo processing system that took far too long to process reconnaissance information. Iraqi reconnaissance units also generally had major problems in routing such information to the proper user even during the Iran-Iraq War when the Iraqi command and control system was fully intact. As a result, Iraqi forces were "blind" in comparison with the highly sophisticated mix of airborne and space reconnaissance systems available to the U.N. Coalition.

Iraq had recognized many of these defects during the Iran-Iraq War, and was trying to correct them when the Gulf War began. One example of such efforts was the IL-76 Candid that Iraq modified to act as its Adnan AEW aircraft. The first such aircraft was called the Baghdad-1 and had its rear cargo ramp replaced by a GRC radome with an Iraqi-modified version of the French Thompson CSF Tiger surveillance radar. The radome had a 9 meter (30 foot) diameter dome that rose about 43 meters (13 feet) above the fuselage and the Candid. The rotating mechanism and radar were integrated into the aircraft in Iraq. The radar's signal processing was modified to remove ground clutter. Electronic support measures (ESM) were also installed, along with an improved radio navigation system.

Iraq claimed the Aidan could track targets out to 350 kilometers and had a real time down link using direct data transfer or voice. Coverage was said to exceed 180 degrees. The Aidan was used in the last stages of the Iran-Iraq War, and an improved version called the

Baghdad 2, with direct fighter air control capabilities, was in development before the war began. It is important to note, however, that the Aidan had far less coverage and electronic warfare capabilities than the E-3A airborne warning and air control system (AWACS) flown by the U.N. Coalition, and no real chance of survival against a Western-type air force.²⁵⁸

The Iraqi air force was also seeking to make major improvements in its mix of aircraft. Iraq recognized the superiority of Western fighters during the Iran-Iraq War, and sought the Mirage 2000 as a follow-on to its Mirage F-1s. At one point, it announced its intention to buy 54 Mirage 2000S fighter-bombers equipped with Matra electronic countermeasure pods, with an option to buy 12 more. Baghdad also discussed plans to build a coproduction facility in Iraq, and eventually to buy over 100 Mirage 2000S aircraft.

Iraq had been unable to finance such purchases, however, because of its failure to meet the payment schedule on its existing arms debt to France -- which totaled nearly \$6 billion.²⁵⁹ As a result, Iraq was examining the purchase of additional MiG-29s and Su-24s, and advanced Soviet attack aircraft like the MiG-27. Iraq was also considering orders of Alphajet trainers assembled in Egypt. It already had 80 Brazilian EMB-212 Tucano trainers, and was considering coproducing the Tucano in Iraq -- and had ordered Astros II multiple rocket launchers, Piranha air-to-air missiles, SS-30 and SS-60 rockets, and APCs from Brazil. It did, however, have the same financing problems with these orders that it had with France. Iraq owed Brazil at least \$120 million for past purchases when the war began.²⁶⁰

Acquiring the Mirage 2000s might have made a difference in the outcome of the Gulf War, at least in terms of raising U.N. losses, but only if Iraq had had several years to absorb the new aircraft. The Iraqi air force's constant purchases of new aircraft and munitions already forced it to repeatedly retrain and reorganize its forces. Many units were constantly in the process of conversion to new aircraft, tactics, and munitions. This meant limited flying and training time for an Iraqi air force with which was poorly organized to train its pilots even without such problems. Expansion of the force meant shortages of skilled pilots and ground crews, and created growing problems in trying to support so many different types and models of aircraft.

Something like a third of Iraq's total air combat strength had limited operational capability when the Gulf War began, and at least another third had relatively low operational standards and poor sustainability. Further, Iraq's use of so many different types of aircraft presented serious problems in redeploying air from base to base. In many cases, given bases could only support a few types of aircraft.

Iraq did have some important advantages. Unlike many Middle Eastern air forces, Iraq was able to obtain a wide range of modern air ordnance from the Soviet bloc and the West. Its air-to-air missile inventory included Soviet-made AA-2s, AA-6s, AA-7s, and AA-

8s. Its French-made inventory included R-530s and R-550 Magics. Iraqi inventories of air-to-surface missiles includes French-made AS-30 Laser guided bombs, Soviet-made X29L laser-guided missiles, Thompson CSF Atlis laser designators, Armatts, AM-39 Exocets, up to three types of cluster bombs, and electro-optical guided missiles. It included AS-4 Kitchen and AS-5 Kelt long-range air-to-ship missiles, AS-14 Kedge air-to-ground missiles, and possibly an air-launched version of the PRC-made C-801 anti-ship missile. Iraq had large stocks of napalm, binary chemical bombs, bomblet dispensers and some fuel air explosive (FAE) weapons. Iraq exhibited 9,000 kilogram bombs for its Tu-16s, with up to 8,800 pounds worth of TNT. These have impact, proximity, and air burst fuses and were developed for attacks on rear-echelon forces.²⁶¹

All of these munitions, however, depended for their effectiveness on Iraq's ability to compete in air combat and electronic warfare, and to penetrate enemy defenses without encountering effective land-based air defenses. In practice, the combination of the E-3A and F-15 gave the U.N. Coalition a decisive advantage in command and control, radar range and target characterization, and beyond-visual-range combat.

As has been discussed earlier, the Iraqi army air corps added at least 160 combat helicopters to Iraq's air strength, including 40-45 Mi-24 Hind with the AT-2 Swatter, 20-50 SA-342 Gazelle (some with HOT), 56 Bo-105 with SS-11 and HOT, 30 SA-316B Alouette III with AS-12, and 10-13 SA-321 Super Frelons. Some of the Super Frelons were equipped with AM-38 Exocet and some with AS-12 missiles. Once again, training was mixed in quality. Many pilots acquired reasonable proficiency in attack missions during the Iran-Iraq War, but comparatively few learned to fly the complex attack and exit maneuvers, and nap of the earth low altitude flight techniques, necessary to survive against a sophisticated enemy. Like the Iraqi air force, the helicopter pilots also had no experience in flying against a force equipped with advanced look down/shoot down radars and electronic warfare assets, and was often relatively easy to target.

Iraq's transport aircraft included two squadrons with 10 An-12s, six An-24s, two An-26s, 19 IL-76s, 19 IL-14s, and one DH Heron. Iraq had been using the IL-76 as a tanker since 1985, and had modified some of its MiG-23BNs (Flogger Hs) for airborne refueling by using the same system as on its Mirage F-1EQs.²⁶² The Iraqi air force had large reserves of training aircraft, including MiG-15s, MiG-21s, MiG-23Us, 2 Tu-22s, 16 Mirage F-1BQs, 50 PC-7s, and 21 EMB-312s.

Iraq's air base and logistic system was excellent by regional standards. The Air force operated from 24 main operating bases and 30 dispersal bases. The main operating bases were well designed and built, and were constructed to withstand conventional attack. Iraq could shelter nearly all its aircraft. Many bases had multiple taxiways with multiple runways.

New underground shelters based on Warsaw Pact models had been built by Yugoslav contractors at the main operating bases near Basra, Kirkuk, Mosul, Rashid, H-3, Shaibah, Habbaniya, and other bases, and to standards believed to be capable of withstanding air bursts from nuclear attacks. Iraq had structured its highway system to provide dispersal bases, had deployed runway repair kits, and provided large numbers of surface-to-air missiles and anti-aircraft guns to defend each base.²⁶³

The critical weaknesses in the basing system were that it depended on (a) the survival of the Iraqi command, control, and warning system to use the sheltered aircraft, (b) effective surviving air defenses to cover the bases against sustained attack, and (c) the shelters proved vulnerable to the earth penetrating weapons that the U.S. deployed in the final weeks before the air war.

Iraq's Land Based Air Defenses Before the Gulf War

Iraq's land-based air defenses had been extensively reorganized after Israel's Osirak raid in 1981. A network of radars, surface-to-air missiles, and anti-aircraft guns surround strategic and industrial areas, particularly in the Baghdad area. A French-supplied C³ system called the KARI was completed in 1986-1987, but was never really tested during the Iran-Iraq War. In this system, the national air defense operations center (ADOC) in Baghdad controlled Iraq's air defenses. The ADOC maintained the overall air picture and established priorities for air defense engagements.

There were five sector operations centers (SOCs) covering the north, west, center-east, south-east and far south. Each was subordinate to the ADOC and controlled air defense operations in a specific geographic area. The ADOC and SOCs controlled large numbers of ground-based weapons systems, and extensive C³I assets. There were also a large number of intercept operations centers (IOCs) to provide local air defense control. These had headquarters at Ar Rutbah, H-1, and H-3 in the west; Mosul and Qayyarah in the north, Al Taqaddum, Salman Pak, Al Jahrah, An Najaf, and An Nukhayb in the center-east; and Al Amarah, As Salman and Az Zubayr in the southeast; and Al Jahrah in the far south.

Although the system was French-supplied, Iraq patterned its overall air defense network and operations on Soviet models. It has created a strongly inter-netted, redundant, and layered air defense system that including a wide variety of radars, hardened and buried command and control sites, interceptors, surface-to-air missiles, and anti-aircraft artillery.²⁶⁴

According to one U.S. estimate, Iraq had a total of 16,000 radar-guided and heat seeking surface-to-air missiles, including the large numbers of lighter army systems described earlier, and a much smaller numbers of heavier SA-2s, SA-3s, and SA-6s. These heavier surface-to-air defense missiles were operated by a air defense force, organized into

air defense units which were part of the army, but tied operationally to the air force. Iraq had approximately 20-30 operational SA-2 batteries with 160 launch units, 25-50 SA-3 batteries with 140 launch units, and 36-55 SA-6 batteries with well over 100 fire units. Iraq claimed to have modified the SA-2 missile to use an infrared terminal seeker, to supplement the SA-2's normal radio command guidance system, but it is unclear that such systems were actually deployed. Iraq's medium surface-to-air defenses included 20 SA-8 batteries with 30-40 fire units, 60-100 SA-9 fire units, some SA-13s, and 50 to 66 Rolands.²⁶⁵

To put this air defense strength in perspective, Baghdad had more dense air defenses at the start of the Gulf War than any city in Eastern Europe, and more than seven times the total surface-to-air missile launcher strength deployed in Hanoi during the height of the Vietnam war. The U.S. Department of Defense released a highly detailed post war estimate of Iraq's land-based air defense at the time the Gulf War began that credited Iraq with 3,679 major missiles, not including 6,500 SA-7s, 400 SA-9s, 192 SA-13s, and 288 SA-14s. It indicated that Iraq had 972 anti-aircraft artillery sites, 2,404 fixed anti-aircraft guns, and 6,100 mobile anti-aircraft guns. The details of these deployments by region are shown in Table XIII-2 below, and Iraq's surviving deployments reflect the same basic concentrations of air defense weapons.

Table XIII-2

Deployment of Iraq's Air Defense Weapons Before the Gulf War

<u>Type</u>	<u>Mosul/Kirkuk</u>	<u>Baghdad</u>	<u>H-2/H-3</u>	<u>Talil/Jailbah</u>	<u>Al Basra</u>	<u>Total</u>
Missiles 122	552	90	10	118	892	
Anti-aircraft Sites	39	380	138	73	167	455
Guns	110	1,267	281	180	442	2,280
SA-2	1	10	1	1	2	15
SA-3	12	16	0	0	0	28
SA-6	0	8	6	0	8	22
SA-8	1	15	0	0	0	16
Roland	2	9	6	2	5	24
ZSU-23-4	0	8	0	0	5	13
S-60	8	10	3	2	14	37

Source: U.S. Department of Defense, The Conduct of the Persian Gulf War: Final Report, Washington, Department of Defense, April, 1992, p. 241.

Many of the surface-to-air missile and command and control units in the Iraqi system, however, had low operational readiness and proficiency. Electronic warfare capability was good by Third World standards, but scarcely competitive with that of the

U.S. Training failed to deal with saturation and advanced countermeasure attacks, was not realistic in dealing with more conventional penetrations by advanced attack aircraft, and the overall sensor/battle management system remained poor. This was demonstrated all too clearly when Iraqi guns and missiles shot down an Egyptian Alphajet flying to an arms show in Baghdad in April, 1989, although it flew along a pre-announced flight corridor at the scheduled time.²⁶⁶ Iraq still could not keep its land-based air control and warning and C³I systems operational 24 hours a day.

Iraqi Air Force Warfighting Capabilities During The Gulf War

Iraq's strategy for air combat during the Gulf War consisted of attempting to use its mix of land-based air defenses and passive defenses to force the U.N. Coalition into a costly battle of attrition, and to inflict high losses on the U.N. when it penetrated Iraqi-controlled air space to attack targets in the Kuwaiti Theater of Operations and Iraq. This strategy meant Iraq had to absorb considerable damage, but it also meant that Iraq could preserve its air forces by keeping them sheltered, and then use them -- during critical phases of the land battle -- to attack vulnerable U.N. Coalition air operations, or to strike selectively for political or strategic purposes. Such a strategy depended, however, on the survivability and effectiveness of Iraq's ground-based air defenses and command and control system, and on the survivability of Iraq's sheltered and dispersed air assets.

Estimates of Iraqi losses during the Gulf War remain somewhat uncertain, and many reports of the details of the air war are contradictory. However, it became brutally clear during the first hours of the war on January 17, 1991, that the U.N. Coalition could use cruise missiles and F-117 stealth strike fighters to successfully penetrate even the most heavily defended Iraqi targets. The U.N. Coalition used stealth and advanced air defense countermeasures, and destroyed critical links and targets in the Iraqi command and control system. At the same time, the U.N. Coalition used attack helicopters and aircraft to destroy key radars and surface-to-air missile units in the forward area, Tornados with JP-233 airfield suppression munitions to limit air operations, and F-15E, F-111 and other aircraft to attack sheltered targets from high altitudes with laser-guided weapons.

The U.N. Coalition flew 2,759 sorties the first day of the war, as many as Iraq had flown during entire six month periods of the Iran-Iraq War. U.S. aircraft fired 118 HARM anti-radiation missiles against Iraq radars the first night and nearly 950 HARM missiles during the first week. These attacks effectively shut down most Iraq radar operations for the rest of the war. When Iraq then attempted to respond with selective air-to-air combat

against what appeared to be vulnerable U.N. Coalition sorties, the U.N. shot down 14 Iraqi aircraft.²⁶⁷

Iraq's air force could not even begin to operate effectively. The U.N. attacks exposed the fact that Iraq had no real combat experience in operating its air defense command and control system, wretched command leadership, and poor pre-war training and operational readiness standards. It had no way to compensate for its loss of protection from surface-based air defenses, and the loss of the support of the major radars and command and control facilities used to manage the air battle and control combat from the ground.

Within hours of the first day of combat, Iraq's sector operating centers (SOCs) could no longer operate together and began to lose individual capability. Most hardened SOCs and intercept operations centers (IOCs) were neutralized during the first few days. This is illustrated by the fact that Iraqi radar activity had averaged 1,700 emitters per day during the period before the war. By January 20, however, it was down to less than 200 emitters and by January 21, it was down to 100 emitters or less -- a level which it did not exceed for the rest of the war. Further, Iraq's early warning radars were so badly damaged during the first few days that it had to rely on the uncoordinated medium-range radars of its surface-to-air missiles.²⁶⁸

Individual Iraqi pilots showed considerable courage in attempting to use their fighters close in on U.N. aircraft, but they were outranged by the radars of the E-3A airborne warning and air control system (AWACS) and F-15s. Even the best Iraqi aircraft lacked radars, air-to-air weapons, and electronic warfare assets that could compete with the mix of assets in U.N. Coalition forces, and Iraq's lack of air-to-air combat training and experience quickly became apparent. At the same time, Iraq could not use its reconnaissance capability to penetrate into U.N. air space, and quickly learned it could not risk flying attack aircraft into defended areas.

Iraq's loss of radars, command and control facilities -- and its vulnerability to airborne anti-radiation missiles -- allowed the U.N. to shatter the coordination of its low altitude ground defenses, anti-aircraft guns, and short-range surface-to-air missiles. Iraq fired vast numbers of rounds without really having a target, and often after all the attacking aircraft had left. At the same time, Iraqi anti-aircraft and short-range surface-to-air missile units became more and more reluctant to turn on their radars -- often firing their weapons uselessly without using their guidance radars. Such defense tactics did succeed in making the U.N. raise the altitude of its attacks and in limiting the operations of close air support aircraft in heavily defended areas, but this was more because U.N. forces could easily afford to attack at higher altitudes than because of the lethality of Iraq's short-range air defenses.

The result was an air campaign that decisively defeated Iraq by the third day of the war. Iraqi air units had the potential capability to fly 200-300 combat sorties per day on a sustained basis. They actually flew an average of 55 combat patrol and training sorties per day, and an average of 40 support sorties, during the two weeks before the beginning of the Gulf War on January 16, 1991.

The U.N. Coalition air attacks prevented Iraqi aircraft from coming close to even their training and pre-war patrol levels. On the first night of the war, the Iraqi air force flew about 25 combat and 90 support sorties. The second day it flew about 25 combat sorties and 20 support sorties. The third day, it reached its peak of 55 combat sorties and 5 support sorties. Iraq only flew about 30 combat and 40 support sorties per day during the rest of the first week of the war. Iraq quickly found that its fighters could not compete with the F-15's capability for beyond-visual-range combat, or with the F-15 in dogfights. It also found that its limited air combat and support sorties had a negligible impact on allied operations. Iraq lost 14 fighters to F-15s during this period, and lost 16 MiG-25s, MiG-29s, and Mirage F-1s by January 25.²⁶⁹

Iraq's situation grew even worse on January 23, the 7th day of the war. The U.N. Coalition shifted to attacking Iraqi aircraft in their shelters, using F-117 and F-111Fs to deliver the GBU-27 and GBU-24A/B hard target penetrating laser-guided bombs. By this time, the Iraqi air defense system had virtually collapsed, and Iraq could do nothing to defend its shelters against an attack effort that used 60% of the USAF F-111F force and 20% to 40% of its F-117 force.

On the night of January 22nd/23rd, the F-111Fs and F-117s proved they were able to destroy half the shelters on a critical air base like the Asad main operating base. These attacks destroyed Iraq's ability to ride out the U.N. attacks, and Iraq began to fly many of its top combat aircraft to Iran on January 27. Iraq had to disperse other aircraft outside its air bases, on roads and in nearby towns. These tactics allowed the Iraqi air force to keep many of its aircraft from being attacked, but effectively knocked it out of the war. In fact, Baghdad's only known attempt at an attack on a U.N. ground target took place on January 24, when two Iraqi Mirage F-1s attempted a low altitude strike on U.N. Coalition ships. Both Iraqi aircraft were shot down by a Saudi F-15C.

Once Iraq began to send its aircraft to Iran, and disperse them off base, the U.N. Coalition then shifted to flying "barrier" patrols over Iraq to prevent air activity. Iraq, however, had virtually halted all air activity. It flew no fixed wing aircraft sorties from the 15th to the 18th day of the war. It did start flying 10-15 combat sorties a day on the 19th-22nd day of the war, when the U.N. temporarily halted its barrier patrols, but flew no sorties

between the 26th and 38th day of the war. It flew less than 10 sorties on the day the land war began, and no sorties for the rest of the war.

These steps limited Iraq's air-to-air combat losses to 33 aircraft: 5 MiG-29s, 8 Mirage F-1s, 2 MiG-25s, 8 MiG-23s, 2 Su-25s, 4 MiG-21s, 3 Su-7/17s, and five helicopters. U.N. air-to-air combat losses at most totaled one F-18, which was lost to a MiG-25 using radar-guided air-to-air missiles on the first night of the war.²⁷⁰ At the same time, they made a multi-billion dollar Iraqi investment useless, left Iraq's ground forces and targets exposed, and eventually led to the loss of all the Iraqi aircraft that fled to Iran.

The critical importance of superior aircraft radars and avionics, and beyond-visual-range (BVR) kill capability, is illustrated by the fact that all fixed wing air combat kills in the war were made by the F-15, the most advanced U.S. fighters. Most kills were made by the AIM-7 radar-guided missile, and no air-to-air combat against fixed wing aircraft were made in dogfights using cannon.²⁷¹ The U.S. Department of Defense credits 5 MiG-29 kills to AIM-7s, 6 Mirage F-1 kills to AIM-7s and 2 Mirage F-1 kills to AIM-9s, two MiG-25 kills to AIM-7s, 6 MiG-23 kills to AIM-7s and 2 to AIM-9s, 2 MiG-25 kills to AIM-9s, 3 Su-7/Su-17 kills to AIM-7s, one MiG-21 to Aim-7s and 3 to Aim-9s, 1 IL-76 to AIM-7s, 2 helicopters to AIM-7s 1 helicopter to AIM-9s, and 2 helicopters to guns.²⁷²

By the end of the Gulf War, the U.S. Department of Defense estimated that 324 of Iraq's original force of 700-750 active combat aircraft were destroyed, captured, or relocated out of Iraq. A total of 44 Iraqi aircraft of all types had been killed in air-to-air combat, up to 139 aircraft had fled to Iran, and another 170 to 200 were destroyed on the ground. If one only includes losses of combat aircraft. Iraq lost a total of 33 Iraqi aircraft in air-to-air combat, 109-122 combat aircraft which fled to Iran, and another 151 which were destroyed on the ground. The only area where the Iraqi air force had not taken serious losses was in pilots. Less than 40 were killed in air-to-air combat, out of a total of over 700, and it is unlikely that it lost more than another 20-40 during allied air attacks on Iraqi air bases and facilities.²⁷³

These losses had an important impact on the quality of the Iraqi forces that remained after the war. Many of Iraq's best fighters, including many of its MiG-29s, Su-24 strike-attack fighters and Mirage F-1EQ5s fled to Iran. The Mirages included many, if not most, of Iraq's air refuelable fighters. According to U.S. air force estimates, the U.N. Coalition also destroyed 375 of the 594 hardened shelters on Iraqi air bases. Iraq also lost many of its air defense and other radars, about one-third of its SA-2s and SA-6s, some of its SA-3s, and large numbers of its mobile SA-8, SA-9, and SA-13 systems. It lost more than half of its major command and control centers, and large numbers of anti-aircraft guns.²⁷⁴

The Recovery of the Iraqi Air Force After The Gulf War²⁷⁵

Important as Iraq's losses were, they scarcely destroyed the Iraqi air force. In 1994, Iraqi air force still had roughly at least 30,000 men, including some 15,000 air defense personnel. It still retained approximately 330 to 370 combat aircraft, although some of the Iraqi aircraft counted in this total may be damaged or have limited or no operational combat capability. These totals also do not count the 109-112 Iraqi combat aircraft that flew to Iran and which have been seized by the Iraqi government.²⁷⁶

In 1992, Iraqi Prime Minister Muhammed Hamzah al-Zubayed described this seizure as part of a plot by Iran that had begun before the Gulf War. He stated that, "We realize that all this (Iranian) enthusiasm and readiness to fulfill our demands (before the war) -- followed by a chapter of treason and treachery by Iranian elements -- was part of a prepared plan. Thus, all that plundering, burning, and destruction within the chapter of treason and treachery took place."²⁷⁷

In 1994, Iraq seemed to have a total inventory that included 6-7 HD-6, Tu-16, and Tu-22 bombers. It also included 130 J-6, MiG-23BN, MiG-27, Mirage F-1EQ5, Su-7, Su-20, and Su-25 attack fighters; 180 J-7, MiG-21, MiG-25, Mirage F1-EQ, and MiG-29 air defense fighters; MiG-21 and MiG-25 reconnaissance fighters, 15 old Hawker Hunters, a surviving IL-76 Adnan AEW aircraft, 2 IL-76 tankers, and large numbers of transports and helicopters. Total surviving inventory estimates by aircraft type varied sharply by source, but Iraq seems to have retained about 6 Tu-22, 1-2 Tu-16, 30 Mirage F-1s, 15 MiG-29s, 60 MiG-23s, 15 MiG-25s, 150 MiG-21s, 30 Su-25s, and 60 Su-17s. Su-20s, Su-22s.²⁷⁸

It is unclear how many air munitions Iraq retained after the Gulf War, and some estimates put this figure as low as 50%. Iraq still, however, retained significant numbers of modern air-to-air and air-to-ground munitions. These included AA-6, AA-7, AA-8, AA-10, Matra 530, Matra 550, and Matra Super 530 air-to-air missiles, and AM-39 Exocet, HOT, AS-11, AS-12, AS-6, AS-14, AS-30L, AS-37, Silkworm C-601, air-to-surface missiles laser-guided bombs, and cluster bombs.

Iraq also retained comparatively large numbers of combat-capable trainers, transport aircraft and helicopters, and remotely piloted vehicles. The trainers included some Mirage F-1BQs, 25 PC-7s, 30 PC-9s, 50-60 Tucanos (EMB-312s), 40 L-29s and 40 L-39s. Transport assets included a mix of Soviet An-2, An-12, An-24, An-26, and IL-76 jets and propeller aircraft, and some IL-76s modified to act as tankers. The remotely piloted vehicles (RPVs) included some Iraqi-made designs, Italian designs, and Soviet designs. It is unclear how

effective Iraq was in using any of these RPV systems, but it did make use of them during the Gulf War.²⁷⁹

The Recovery of Iraqi Ground Based Air Defenses After the Gulf War

There is no expert consensus on Iraq's holdings of surface-to-air missiles, but Iraqi ground-based air defenses seem to have had a total of 20-25 Improved Hawk launchers seized from Kuwait, 130-180 SA-2 launchers, 100-125 SA-3 launchers, 100-125 SA-6s, 20-35 SA-8s, 30-45 SA-9s, some SA-13s, and around 55-65 Crotale/Roland surface-to-air missile units. Some of these systems were operated by the army. In addition, Iraq had large numbers of man-portable SA-7s and SA-14s, and some SA-16s.²⁸⁰

Most of this equipment was operational, although the Improved Hawks are not generally included in this total. It is not clear whether Iraq has learned enough from the Jordanian officers that assisted it during the war, and during the initial period after the war, to operate its Hawks. It may also be avoiding any use of the weapons because it fears the U.S. would attack any captured Hawks that showed signs of becoming operational.²⁸¹

Iraq's ground-based defenses were concentrated around Baghdad, Basra, and Kirkuk, as they were during the pre-war period. Iraqi territory is too large to attempt territorial defense, and Iraq has always concentrated on defending strategic targets, and deploying air defense zones to cover critical land force deployments. Iraq did, however, redeploy some missiles to create surface-to-air missile "traps" near the no-fly zones. These traps were designed to attack aircraft with overlapping missile coverage when they attack launchers deployed near the no-fly zones.

Iraq also made extensive efforts to improve its use of shelters, revetments, dummies, and other passive defenses. It had used such defenses since the beginning of the Iran-Iraq War, and deployed new decoys after the Gulf War in an effort to reduce its vulnerability. According to most experts, it repaired many of the bases and air facilities destroyed or damaged during the Gulf War. It has 16-20 major air bases, with H-3, H-2, and Al Asad in the west; Mosul, Qayyarah, and Kirkuk in the north, Al Jahrah, Talil, and Shaybah in the south, and 5-7 more bases within a 150 kilometer radius of Baghdad. Many of these bases had at least some surface-to-air missile defenses.

Iraq restored much of its battle control and management system, reactivated its damaged airfields, and even built one new military airfield in the south.²⁸² Many of its shelter air defense and air force command and control centers remained operational, and its French-supplied KARI air defense communications and data-link system uses fiber optic and many of these links may have survived the bombing.²⁸³ Some radars and limited elements of Iraq's

air defense C³I system were also operating, including such pre-war systems as the Soviet Spoon Rest, Squat Eye, Flat Face, Tall King, Bar Lock, Cross Slot, and Thin Skin radars. Iraq also had Soviet, Italian, and French jamming and electronic intelligence equipment.

However, most of Iraq's surface-to-air missile units, radars, automated data processing and transfer system, and central command and communications facilities had only limited operational capability. There is no way to know how many of Iraq's underground command and personnel shelters survived the war, and the various U.N. attacks on Iraq's air defenses that were made to enforce the security of the no-fly zones, but it seems likely that 50% to 66% survived the U.N. Coalition bombing campaign.

The Warfighting Capability of the Iraqi Air Force

Iraq now confronts many of the same problems in making its ground-based air defenses effective that confront Iran. It must rehabilitate and improve its radar-guided anti-aircraft guns and most of its short-range air defense systems. It needs to either modernize or replace its Rapiers. It should replace its surviving patchwork system of radars and command and control equipment, and in the short term, it must find a reliable source of parts for its SA-3s and SA-6s.

Its most serious problem is to find replacements for its French and Russian-supplied air defense system, and to create a truly modern and effective air defense system. This, however, confronts Iraq with the fact that the only missile systems upon which an effective system can be based are the Patriot, sold by the U.S., and the SA-10 and SA-12, sold by Russia. Neither country seems likely to sell such a system at any time in the near future, and more is involved than the transfer of equipment and technology.

Such a system would have to be tailored to Iraq's needs, integrate its purchase of the Patriot, SA-10 or SA-12 fully into its other air defenses, and provide suitable new sensors and air defense computer technology and software. It would have to be tailored to meet Iraq's specific topographical and operating conditions. Such a system could not simply be transferred to Iraq. It would take a major effort in terms of software, radar deployment and technology, and adaptation of Russian tactics and siting concepts to make such a system fully combat effective.²⁸⁴

The Iraqi air force faces equally serious challenges in making its fixed wing forces more effective. It has only been able to conduct limited combat aircraft operations since the U.N. cease-fire in February, 1991, and its training and readiness have unquestionably deteriorated with time. It has no major repair facilities for many of its Soviet-made fighters - - which had previously been overhauled by Soviet technicians or rebuilt in the former Soviet Union. It has growing shortages of spare parts, and had no in-country access to the Soviet

and French technical support it had relied on before the war. The Mirage F-1 is difficult to maintain, and Iraq is likely to have severe problems in keeping this aircraft operational without access to French technical support and new deliveries of parts and equipment.

Iraq almost certainly has written off its aircraft that flew to Iran during the Gulf War. As has been discussed earlier, the Iranian government announced in late July, 1992, that it would expropriate the Iraqi combat aircraft that had taken refuge in Iran during the war -- aircraft worth several billion dollars. These aircraft seem to include a total of 131-139 aircraft, of which 112 seem to be combat aircraft.

In spite of these problems, the Iraqi air force is still large enough to retain considerable combat capability. Iraq has continued to challenge the U.N.. It flew fighter and attack helicopter sorties against Shi'ites in southern Iraq in June and July, 1992, until the U.N. established no-fly zones north of the 36th parallel and south of the 32nd parallel. These no-fly zones barred any Iraqi use of fighters and helicopters. The northern zone was established shortly after the cease-fire and the southern zone was established on August 26, 1992.

Even then, Iraqi fighters actively challenged U.N. fighters by tracking them or flying into the no-fly zones. At the same time, Iraq moved some of its more expendable land-based air defense systems -- like the SA-2 -- into threatening positions or "surface-to-air missile traps" in or near the no-fly zones. Iraqi fighters also challenged U.N. forces in December 1992, and January, 1993. These actions -- coupled with further efforts to bar U.N. inspections and a challenge of Kuwait's right to secure its new border -- provoked a significant clash between U.N. and Iraqi forces in January, 1993. The U.N. forces shot down at least one Iraqi fighter, and attacked the Iraqi surface-to-air missile traps and any Iraqi radars that illuminated U.N. aircraft. They also launched two major attacks on Iraqi command and control facilities.

The Iraqi air force and air defense forces have backed down in response to U.N. challenges, but Iraq has not halted its efforts to harass U.N. inspectors, occasional radar illuminations or firings on U.N. aircraft, or cease its efforts to pressure the Kurds and use land forces to attack its Shi'ite rebels in the south.

Iraq has continued to do what it can to rebuild other aspects of its air defense capabilities. Beginning in late 1992, Iraq started to improve the quality of its air-to-air training, and to reconstitute its surface-to-air missile net. It repaired and modified some of its surface-to-air missile systems in an attempt to improve their resistance to U.S. countermeasures. It established new missile sites, and upgraded its aircraft dispersals.

The Iraqi air force is, however, operating with considerably less than half its pre-war ability to generate and sustain combat sorties, has lost much of its sensor and command and control

capabilities, and is losing more and more of its effectiveness with time. It cannot rebuild its air force to anything approaching its pre-war strength without massive foreign assistance.

Even if it does get the equipment it needs, Iraq must reorganize its command structure to provide the same degree of professionalism, and freedom from political interference, that is needed in its army. Its jury-rigged airborne sensor aircraft is a poor substitute for a true airborne warning and air control system (AWACS) or integrated airborne sensor and battle management system. Like Iran, Iraq lacks the training and sensors to compete with the West in beyond-visual-range combat, and the advanced training facilities to compete in close or dog fight combat.

To compete with Western air forces, or that of Saudi Arabia, Iraq must acquire some form of "mini-airborne warning and air control system (AWACS)", a large inventory of modern beyond-visual-range air-to-air missiles, modern remotely piloted vehicles (RPVs), improved electronic and other countermeasure equipment, and airborne refueling technology. It will need French and Russian support in repairing and reconditioning its fighters. It must find ways of integrating its fighters into an effective air control and warning system that "nets" them with its ground-based air defense system, and which avoids its past over-dependence on ground-controlled intercepts.

Iran needs to acquire modern reconnaissance and intelligence aircraft that are capable of real-time transmission of data to effective command centers and terminals in the field. It needs to work with the army to improve the sensors and weapons on its attack helicopters, and to develop an integrated concept for fixed and rotary wing close air support, and armored operations.

Like Iran, Iraq needs to firmly understand that it needs the spares, support organization, and training to greatly improve its sortie rates and sustainability. It needs to totally reorganize its training system to stress far more demanding and realistic air offense training that includes training in combined arms exercises and realistic close support and interdiction missions, and strategic bombing missions. This must include constant training with smart munitions and actual ordnance, and far better training in evading air defenses and stand-off attacks. Individual Iraqi pilots often pressed home intercepts during the early days of Desert Storm, but Iraqi air defense training needs to be completely reorganized. Ground-controlled intercept tactics are virtually unworkable in modern air warfare, and Iraq's air intercept training and tactics fall far short of the aggressive air battle and aggressor squadron techniques used by the Saudi, U.S., and British air forces.

Like Iran and most Third World states, Iraq has never organized effectively to fight as an integrated air force -- as distinguished from clusters of individual fighting elements. Iraq still seems to confuse having a large order of battle with effectiveness, and puts far too

little emphasis on high sortie rates, the effective massing of air power against given types of targets, planning sustained air campaigns, and testing, exercising, and restructuring its mix of air and land-based air defense assets to fight as an effective overall force. At some point, Iraq will need substantial deliveries of more modern French or Russian combat aircraft.

If the present U.N. embargo and sanctions are lifted, these force improvements will take time and require Iraq to make an investment of several billion dollars. In the interim, the war fighting capabilities of the Iraqi air force will remain limited. The Iraqi air force can probably dominate the skies over the Iran-Iraq border area for at least several years. It can play a major role in defeating the Kurds, and rapidly defeat the Kuwaiti air force. It probably cannot defeat the Saudi and Turkish air forces in the border areas, but they might need U.S. support to win a quick and decisive victory. The Iraqi air force can conduct limited long-range air attacks against its neighbors, retains some refueling capability, and can use some precision-guided weapons, chemical weapons, and possibly biological weapons. Iraq could use these capabilities to mass a few air raids against selected targets in Iran or across the Gulf, and could use its remaining Exocets to attack tanker and other naval targets in the Gulf. Like Iran, however, Iraq is at least half a decade away from rebuilding its air force.

IV. The Iraqi Navy

Iraq's navy has never been strong or effective. It played only a negligible role in the Iran-Iraq War, and the Iranian navy dominated the Gulf until the Western intervention to protect tanker traffic in 1987. While the Iraqi navy did operate in local waters in the northern Gulf during the Iran-Iraq War, it acquired little real combat experience. Iraq's smaller ships occasionally attacked Iran's Khor Musa convoys and mined some of the Iranian waters in the upper Gulf. However most of Iraq's warships in its Gulf ports were kept trapped in port by Iran's air and naval forces during 1980-1987, and the rest were kept in port by Iran's mining and blocking of the Shatt al-Arab.

Ironically, Iraq had deliberately allowed its navy to decay in the period before the Iran-Iraq War because it was planning a massive order of four missile frigates, six missile corvettes, an underway replenishment ship, a floating dry-dock, and naval helicopters to build-up to a strength that could directly rival Iran. As a result, it had not sought to modernize its missile patrol boats or other systems from the Soviet bloc, and had made little effort to develop a navy that was combat ready with its existing ships.

Iraq negotiated its order for the frigates, corvettes, and support vessels with Italy in February, 1981, but Italy then declared an embargo on the delivery of combat vessels. Iraq only obtained possession of the underway replenishment ship and the dry-dock, and these were unable to proceed further than Alexandria because of the threat posed by the Iranian navy. In any case, neither ship would have helped Iraq. The *Agnadeen* was a 8,706 ton Stromboli-class ship, capable of simultaneously supply two combat ships while underway, but its value depended on the delivery of the frigates and corvettes. The same was true of the dry-dock.²⁸⁵

In short, the Iraqi navy had virtually no opportunity to develop a significant open water capability before the Iran-Iraq War, and then was largely inactive for the next eight years. When the Iran-Iraq War ended, the Iraqi navy still had to wait for delivery of the Italian ships, and combat helicopters with anti-ship missiles. It was unable to take advantage of the time between the cease-fire and the beginning of a new conflict.

The Iraqi Navy During the Gulf War

When Iraq invaded Kuwait, the navy's only major combat ships consisted of an obsolescent Yugoslav 1,850 ton training ship called the *Ibn Khaldun* or *Ibn Marjid* (507), six Osa II and two-three Osa I-class guided missile fast attack craft. The frigate had no combat capability, and the Osas had some serious limitations. The Osa I and II are relatively fast attack craft, capable of speeds up to 40 knots, and the Osa II is more powerful and

slightly faster than the Osa I. The Osas' speed and maneuverability, however, have little value against forces armed with modern anti-ship missiles, and supported by aircraft.

The combat power of the Osas also depends almost solely on the quality of their missile systems. All of the Osas have a launcher that carries four Styx anti-ship missiles. While the Styx missile has a maximum ranges of 46 kilometers -- or 95 kilometers with remote target acquisition, they were old enough designs to be exceptionally vulnerable to intercept and countermeasures. Iraq had very limited long-range target acquisition capability at best.²⁸⁶

Iraq's only other operational combat ship holdings consisted of three large SO-1 patrol craft, four to five Zhuk coastal patrol craft, two Soviet T-43 and three Yevgenya-class oceangoing minesweepers, three Nestin-class inshore minesweepers, three Polnocny-class LSMs and three LSTs. The T-43s were 580 ton vessels that had two 37mm and two 25mm guns, two depth charge throwers, and a magazine that could release up to 25 mines. The Yevgenya-class vessels were 80 ton craft limited to minesweeping. The Nestin-class craft were Yugoslav-built craft designed for river use, but could be used to lay mines in shallow waters and block amphibious landings. The Polnocny-class LSMs had been modified to add a helicopter deck, and two 18-tube multiple rocket launchers, and could carry six tanks each, but had no surface warfare capability. The Iraqi navy's support vessels included two old Poluchat-class torpedo support ships, one tanker, and one small support ship. The *Agnadeen* and dry-dock were still in Alexandria.

The Iraqi navy did make effective use of some of these mine vessels, amphibious ships and patrol boats during the period between its invasion of Kuwait and the beginning of Desert Storm. Iraq used them to patrol the coast and occupy several islands, and to lay thousands of mines. Iraq had several types of imported naval mines. Iraq was building the Sigeel 400 mine, which is an air droppable non-magnetic bottom mine detonated by an acoustic sensor, with 400 kilograms of explosive. It claimed to be developing a family of eight non-magnetic bottom mines.²⁸⁷

The Iraqi navy succeeded to the point that its mine fields help discourage a Marine Corps amphibious attack and damaged several U.S. ships, but once the fighting began, however, Iraq's navy had no capability to survive the mix of air and naval power the U.N. Coalition could bring to bear. Iraq's navy was virtually destroyed as an operational force. It lost both of its Osa II guided missile patrol boats, 4-5 Osa I guided missile patrol boats, all four Zhuk-class patrol boats, its T-43 minesweepers, 1-2 Yevgenya-class inshore minesweepers, three Nestin-class riverine minesweepers, two Polnocny-class LSTs, five small patrol boats, and many of its small craft in the fighting. All of the ships it had captured from Kuwait were either destroyed or returned to Kuwait.

Iraq's performance might have been slightly better if the Iraqi navy had been able to obtain the warships it had ordered from Italy. Iraq was still awaiting all four of its Lupo-class frigates and its six Wadi Mr'agh-class corvettes. The Italian government had agreed to the delivery of all of the vessels in May, 1990, but Iraq then ran into financing problems and had only resolved these issues, and its decisions as to the final equipment to be installed on the ships, shortly before it invaded Kuwait. Iraq had paid for two of the Wadi Mr'agh (Esmeralda)-class corvettes -- the *Mussa Ben Nussair* and *Tariq Ibn Ziyad* -- and the supply-ship *Agnadeen* in 1986, but all of the Italian combat ships were still at La Spezia when the war began.

The corvettes were relatively capable 610 ton vessels. They had comparatively low range and endurance, but they were capable of maximum speeds of 37 knots, and were armed with twin modern Otomat II missile launchers, one four cell Albatross surface-to-air missile system, an OTO Melara 76mm gun, and an Agusta A-109 helicopter. They had modern radars and sonars and relatively advanced commercial grade electronic warfare equipment.²⁸⁸ The frigates were relatively large 2,525 ton vessels and each was armed with eight Otomat II ship-to-ship missile launchers (160 kilometer range), one OTO Melara 127mm gun, six 324 mm torpedo tubes, one Albatross/Aspide surface-to-air missile launcher with eight missiles, and one Agusta AB-212ASW helicopter.²⁸⁹

Delivery of these frigates and corvettes might have shifted the naval balance in Iraq's favor against Iran and Saudi Arabia. It is doubtful, however, that they would have been able to survive British and U.S. air attacks for more than a few days. The same would have been true of the ships Iraq captured from Kuwait, if the Iraqi navy had had time to learn how to operate them effectively. The Kuwaiti ships included six FNS-5 and two FPB-57 missile fast attack craft. Unlike the Osas, they were equipped with modern Exocet MM-40 missiles, and modern radars and fire control systems. The Exocet is at least a generation beyond the Styx in design and capability, and is far more difficult to intercept. At the same time, the Kuwaiti fast attack craft were relatively vulnerable to air attack, and could not match the anti-ship missile capabilities of the British and U.S. navy.

The War Fighting Capabilities of the Iraqi Navy

In 1994, the Iraqi navy only had a strength of about 1,600-2,000 men, and its surviving forces only included the frigate *Ibn Khaldun*, one Osa-class missile boat, 13 light combat vessels, 5-8 landing craft, the *Agnadeen*, 1 Yugoslav Spasilac-class transport, a floating dry-dock, and possibly one repairable Polnocny-class LST. The IISS and Jane's report that Iraq also had three 5,800 ton roll-on roll-off transport ships with helicopter

decks, a capability to carry 250 troops and 18 tanks, and the ability to embark small landing craft. These ships may be under commercial flags, and do not have the ability to beach.²⁹⁰

This inventory gives Iraq virtually no combat capability. The *Agnadeen* and dry-dock are still in Alexandria. The *Ibn Khaldun* is a comparatively large 1,850 ton ship with a maximum speed of 26 knots, but it is designed only for training purposes. Its armament consists of one 57mm Bofors gun, one 40mm Bofors anti-aircraft gun, and a four barrel 16/20mm anti-aircraft gun. It can carry a quadruple launcher for Exocet missiles, but this launcher has never been fitted. There are reports that it may have been rendered largely inoperable during the fighting in 1991, and even if it has not, it probably has only very limited operational capability because it lacks spares for its Rolls-Royce main engines.

Iraq's lighter surviving combat ships only include a maximum of one Osa-class guided missile patrol boat (doubtful), one-two Soviet-supplied Bogomol-class patrol boats, two Zhuk-class patrol boats, one Poluchat-class patrol craft, six PB-80 coastal patrol craft, some Sawari-class small inshore patrol boats, six SRN-6 hovercraft, and some small boats. Its surviving five mine craft include two Soviet Yevgenya-class and three Yugoslav Nestin-class boats.

The Bogomal-class patrol boats are the only craft large enough to be taken seriously. They may, however, be damaged. They also are only 245 ton vessels and normally carry only a 76mm gun, a 30mm gatling gun, and one SA-N-5 missile. This is a negligible combat capability, but it is possible that Iraq could refit them with one or two anti-ship missiles.

The *Mussa Ben Nussair* and *Tariq Ibn Ziyad* are being held by Italy at La Spezia. Italy has now turned the four Lupo-class ships that Iraq ordered before the Iran-Iraq War over to its own navy, and will probably sell the remaining Wadi Mr'agh-class corvettes to some other country.²⁹¹ The *Agnadeen* and Iraq's floating dry-dock are held in Alexandria in Egypt. All three of the roll-on roll-off transports are held in foreign ports. One of the personal yachts that Saddam Hussein ordered before the Iran-Iraq War, the *Al Manuser* was transferred to King Fahd of Saudi Arabia in 1987, and has never even entered Iraqi waters. A second yacht, the *Al Qadissiya*, which Saddam Hussein ordered for use on Iraq's rivers has never been delivered.²⁹²

Iraq now has even less access to the Gulf than it had when it invaded Kuwait. It has been forced to close its naval base at Umm Qasr. It is forced to use small craft and civilian ships for patrols in coastal areas. Virtually all of the larger ships that are still under its control are now laid up in Khor as Zubair, Basra, and Mina al-Bakr.

Iraq has never been able to implement its plans to acquire a large force of helicopters with anti-ship missiles and other specialized naval helicopters. The Iraqi air force does have some Mirage F-1s armed with the Exocet anti-ship missile. It does not seem to retain any

remaining capability to operate Soviet bombers with Soviet air-to-ship missiles. It lost some armed helicopters during the Gulf War, but it may retain six to seven of the 13 Aerospatiale SA-321s, armed with Exocet air-to-surface missiles it obtained during the Gulf War.

The Iraqi air force had not taken delivery on any of the major helicopter orders it had negotiated with France in 1989. These included six French Aerospatiale AB-332F Super Pumas with Exocets, and six SA-365N/FF Dauphin with AS-15TTM air-to-ship missiles. These aircraft might have given Iraq some added anti-ship capability against the U.N., although they scarcely would have altered the outcome of the fighting. The AS-332Fs were to be fitted with Varian search and fire control radars, and were to be fitted with Agrion chin-mounted radars and four AS-15T air-to-ship missiles each. The AS-15Ts have a range of up to 15 kilometers and are a much cheaper way to attack small ships than the Exocet.²⁹³

The Iraqi navy ordered five Agusta Bell AB-212s and 10 Agusta Bell A-103A helicopters from Italy before the war. It was unable to pay for most of this order, however, and it is unclear that it completed training for the few helicopters it did pay for. No armed or special purpose helicopters are currently in service in the Iraqi navy, and it still has no meaningful aviation training or capability. Even if it can obtain new deliveries, it will be years before it has operational capability.

Iraq does, however, retain a limited mine warfare capability, and some of its land-based Silkworm missile systems. The Silkworms have ranges of up to 100 kilometers, and Iraq fired two Silkworm missiles against U.N. Coalition ships during the Gulf War. Both missiles were fired on February 25. One failed and crashed into the sea, the other was destroyed by British Aerospace Sea Darts fired by the *HMS Gloucester*. Iraq can fire Exocet anti-ship missiles from some of its Mirage F-1 fighters and helicopters. It may also have some Faw 70, Faw 150, and Faw 200 missiles, which it claims are Iraqi-made versions of the Soviet SSC-3 Styx, but these are obsolescent designs at best.²⁹⁴

These limitations are so severe that there is no near-term prospect that the Iraqi navy will acquire more than the most marginal war fighting capability. It can conduct limited raids and fire some anti-ship missiles, but if it attempts to fight Iranian or Western naval and air forces, it is almost certain to be rapidly destroyed.

V. Anti-Regime Military Forces

Iraq has a large number of small opposition movements, perhaps as many as 100. Some are groups with a long history; others grew out of the Gulf War. They range from religious groups to the Iraqi Communist Party to splinter groups of the Ba'ath. What most have in common is a lack of strength, meaningful support within Iraq, and the capability to pose a direct threat to Saddam Hussein and his regime.

Iraq does have an organized democratic political opposition in the form of the Iraqi National Congress (INC), which was formed in June, 1992. The Iraqi National Congress, is based in London, and has attempted to unite various anti-regime forces into a legitimate opposition movement. However, the INC has only limited political strength and its only independent military forces are based in Kurdistan and number a few hundred men at most.²⁹⁵

An analysis by the British government in September, 1993, listed 32 main Iraqi opposition groups. These included Islamic groups -- which are largely Shi'ite, Kurdish groups, secular nationalist parties, and independents. The main parties in each group are summarized in **Table XVI-1**. Most of these parties and movements are small and relatively weak, and little prospect of achieving power unless Iraq totally disintegrates at the center. They have no military forces inside or outside Iraq, or capacity to overthrow Saddam Hussein and the Ba'ath elite by force. Only a few of the fundamentalist Shi'ites, and the parties that make up the Iraqi Kurdistan Front, are capable of fielding a limited military force.

Table XVI-1Major Opposition Groups in Iraq - Part One**Iraqi Kurdistan Front (Created 1988)**

Kurdish Democratic Party (KDP): Led by Massoud Barzani and based largely on tribal groups in the Badinan area of northern Iraq near Turkey. A traditional tribal party.

Patriotic Union of Kurdistan (PUK): Led by Jalal Talabani, the PUK is more secular and modern in character and has its regional base near Sulaymaniyah, and near the border with Iran.

United Party of Kurdistan (UPK): This party is an alliance of the Kurdistan Popular Democratic Party, Kurdistan Socialist Party of Iraq, and Popular Alliance of Socialist Kurdistan formed after the elections in the Kurdish enclave in northern Iraq in May, 1992. According to some reports, it merged with the KDP in mid-1993.

Other Kurdish Iraqi Groups

Kurdistan Branch of Iraqi Communist Party: This group has ties to the PUK, and has its main strength in the area around Shaikan, north of Mosul.

Islamic Movement in Kurdistan: A group led by Sheik Othman Abdul Aziz, centered around Halabja near the Iranian border.

Kurdish Tribal Association: An association of 20 Kurdish tribes founded in 1991, and led by Sheik Hussain.

Kurdish Conservative Party: Advocates independence for the area around Mosul.

Northern Iraqi Groups

Iraqi National Turkoman Party: Turkomans make up less than 2% of the population.

Assyrian Democratic Movement: Assyrians make up less than 2% of the population.

Islamic Shi'ite Parties

Supreme Assembly for the Islamic Revolution in Iraq (SAIRI): A major Shi'ite party led by the Ayatollah Mohammad Baqir al-Hakim whose influence is centered around Najaf and Karbala. They can probably field two to four thousand troops from among the Iraqi expatriates in Iran.

Organization of Islamic Amal (Action:) Supports the SAIRI in many ways, but acts as an independent group.

Da'wa (Call) Party: A radical party that has often attempted assassinations and attacks on Iraqi officials. It is subject to many internal divisions.

Democratic Islamic National Organization: A small Iranian-supported party based in Tehran and led by Sa'ad Youssef.

Islamic Accord (formerly the Muhajerin): Now Syrian-based, it used to be based in Iran.

Islamic Movement of Iraq

Movement of the Soldiers of the Imam: Led by Sami al-Badri, among others.

Al Khoi Foundation: A religious foundation led by the sons of the Ayatollah al-Khoi of Najaf which has ties to Shi'ite opposition groups. This is a moderate and essentially non-political organization.

Table XVI-1Major Opposition Groups in Iraq - Part Two**Islamic Sunni Parties**

Islamic Movement in Kurdistan: Led by Sheik Ali Abdul Aziz.

Islamic Bloc: Involved with a failed coup by the Muslim Brotherhood in the 1970s. Led by Mohammed al-Alusi, and connected with the Saudi regime.

Islamic Party:

Nationalist Groups

Iraqi National Assembly (Wifaq): Largely ex-Ba'ath group led by former intelligence chief Ayad al-Alawi. Based in London, and seeks to overthrow Saddam by encouraging a coup within the Ba'ath and Iraqi army.

Iraqi Democratic National Assembly: Led by Salah Omar al-Ali, a former member of the Revolutionary Command Council, who split with Saddam in the early 1970s, and defected in 1982. Based in London.

Iraqi Ba'ath Party: Small divided splinter group based in Syria.

Iraqi Socialist Party: Small party whose members were part of the now disbanded Joint Action Committee.

Iraqi Communist Party: Small Syrian-based party led by Aziz Mohammed.

Independents

Iraqi Independent Alliance: Moderate Sunni party led by General Hassan Naqib, a former Deputy Chief of Staff of the Iraqi army, who was dismissed in 1970 and defected while an Iraqi ambassador. Based in Syria.

Iraqi Free Officers: Connected with the Iraqi Independent Alliance. Seems to have been involved in an assassination attempt against Saddam Hussein.

Association of Iraqi Democrats

Free Iraqi Council: Middle class intellectual party led by Sa'ad Jabir. It advocates a democratic pluralistic Iraq and is a continuation of the old New Umma Party.

Iraqi Coordinating Committee for Dialogue and Follow-Up: Committee of opponents and critics of the Iraqi National Congress formed in London in April, 1993.

Iraqi Democratic Movement: Group of Iraqi professionals and middle class based in UAE.

Royalists: Followers of Sheriff Ali Hussein, a cousin of King Faisal.

Source: Adapted from material in the Washington Times, December 8, 1993, p. A-13 and various working papers, and corrected by Amatzia Baram.

Anti-Regime Shi'ites²⁹⁶

The Ba'ath elite's campaign against Shi'ite resistance has been discussed in previous chapters. The Iraqi army continues to steadily expand its control over the marshes and southern border areas, and now only faces token active opposition. Iran does, however, support a small military force of Iraqi exiles which is based in Iran. These military forces are composed of dissidents and Iraqi ex-prisoners of war, and SAIRI claims they have a strength of one brigade. It is unlikely, however, that the total strength of men with meaningful military training and equipment is more than 2,500-4,000. They are a light infantry force with very limited effectiveness.

These forces are under the nominal leadership of the Ayatollah Mohammad Baqir al-Hakim and other members of the Hakim family. The Ayatollah is the son of the late Grand Ayatollah Muhsin al-Hakim, who was a major religious leader in the holy city of Najaf. The Ayatollah Mohammad Baqir al-Hakim is also the leader of the Supreme Assembly for the Islamic Revolution in Iraq (SAIRI), which was created in 1982 by Hakim and Iraqi intelligence. SAIRI is an umbrella organization whose real strength now consists almost solely of the Hakim-led movement, although some groups like the Islamic Amal (Action) Organization have kept formal links to SAIRI. The Islamic Amal is led by Muhammad Taqi Modaresi. It has criticized the SAIRI as concentrating too much power under Hakim.²⁹⁷

The Islamic Da'wa or Call Party is another Shi'ite movement which has attempted to overthrow the Ba'ath elite, and which has made repeated attempts to assassinate Saddam Hussein. The movement has been ruthlessly purged by the Iraqi security services, and is now weak and divided. It was founded in 1957, by the Ayatollah Muhammad Baqir al-Sadr. Saddam executed the Ayatollah in 1980, as part of his effort to suppress any pro-Khomeini movements. It is now under the nominal leadership of the Hojatol-Islam Muhammad Mahdi Asefi, but other leaders include Abu Bilal al-Adib and Sheik Nasiri.²⁹⁸

It is unclear that the SAIRI and Hakim family now have large scale support in Iraq. While many religious Shi'ites have reason to resent the regime, SAIRI is often seen as an Iranian front group. There are a number of other Shi'ite parties, and many Shi'ites who oppose the regime do not support any organized party. Decades of Ba'ath effort to suppress Shi'ite resistance, coupled to ruthless action against the uprisings after the Gulf War, has taught many other Shi'ites the cost of any overt opposition. Further, the Ba'ath has been able to coopt many Shi'ites into supporting the regime.

The bulk of the Shi'ites in the marshes are not affiliated with SAIRI. They are refugees from the uprisings after the Gulf War, opponents of the Ba'ath that have chosen not to flee

to Iran, and deserters. Many have been in the marshes since the Iran-Iraq War, and have taken advantage of the fact that the Marsh Arabs (Ma'dan) are Shi'ites and traditional opponents of the government in Baghdad. There is no way to estimate how many opponents of the regime are now in the marshes, but the remaining organized military resistance in the marshes probably totals under 3,000 men. These forces seem to lack cohesion and are composed of scattered elements. Some are little more than bandits and/or groups of deserters that have been living in the marshes since the Iran-Iraq War. They have little military effectiveness, and are incapable of more than the most limited local offensive action, although their raids on government and Ba'ath party posts irritate the Iraqi government and make night travel dangerous in rural areas in the south. This is why the regime has put so much effort into eliminating them, and they are slowly being defeated in detail by the Iraqi armed forces. Many fled to Iran during 1993.²⁹⁹

The suppression of Shi'ite resistance is also leading to the destruction of one of the unique cultures of the Middle East. The marshes that are filled with small islands and reeds that often grow 20 feet high, which provide cover to the Shi'ite resistance and deserters, have also been the home of over 100,000 Marsh Arabs (Ma'dan). The Ba'ath regime has not only conducted massive engineering operations to drain the 6,800 miles of marsh caused by the Tigris and Euphrates, it has pressured the Marsh Arabs to leave their homes.

Since the spring of 1991, this mix of politics and engineering has driven many Marsh Arabs out of the area, and has steadily deprived the rest of the wetlands they use for fishing and a unique ecosystem and system of agriculture. The government's development of four canals and host of dams has opened a 350 mile long canal between Baghdad and Basra. It has required a massive effort involving thousands of men and large numbers of heavy construction vehicles, but it is steadily removing the cover provided by the marsh lands. Ironically, the so-called irrigation canal delivers its output directly into the Gulf.

The no-fly zone south of the 32nd parallel that the U.N. created on August 27, 1992 has done nothing to protect the Shi'ites in the marshes or the Marsh Arabs (Ma'dan). It has not stopped the Iraqi army from building a new net work of roads, strong points, and fire bases in the marshes. The Iraqi forces also often fly helicopter support for the armed forces, and there are unconfirmed reports that the Iraqi military forces have used poison gas. The army has been accused of destroying up to 350 Marsh Arab (Ma'dan) villages -- destroying 70 villages and forcing the relocation of nearly 50,000 people in December 1991 and January 1992 alone. It has been accused by organizations like Middle East Watch of bulldozing villages, shooting over 450 young Marsh Arabs, setting fires, and killing and poisoning the fish and wildlife used for food. All of these charges have been confirmed by visitors in the region and by satellite photography.³⁰⁰

The Kurdish Resistance

Saddam faces a more serious challenge from the Kurds. The Kurds make up about 15% to 20% of Iraq's population, or a total of about 2.8 to 3.5 million people.³⁰¹ They occupy much of northeastern Iraq, although it is difficult to separate Kurdish areas precisely from non-Kurdish areas, and this has a significant impact in determining of potential rights to oil reserves.

Iraq's Kurds are largely Sunni and belong to the Shafii school of law, but some (the Fayli Kurds) are Shi'ite and they speak several different dialects -- principally Kurmanji in the north and Sorani in the south. They have long been politically and tribally divided. A substantial number have been fully integrated into Iraqi society, although a majority certainly supported the creation of a separate enclave after the Gulf War. However, a significant number of Kurds have been assimilated into Iraqi society and support the regime. At least one group -- the Kurdish Workers Party is a far left-wing party that opposes the present enclave and demands full independence. The Kurdish Workers Party is based in Syria, and has Syrian and Iranian backing. It claims to have 20,000 men.³⁰²

At present, the Kurdish enclave operates under an elected government composed of the Iraqi Kurdistan Front, which is a parallel government combining the Kurdish Democratic Party (KDP) -- led by Massoud Barzani, and the Patriotic Union of Kurdistan (PUK) -- led by Jalal Talabani. The KDP was founded in 1946, and led the revolt against the central government in the 1960s and 1970s. The PUK was formed in the 1964 as a splinter group of the KDP.³⁰³

The Kurdish military forces defending the Kurdish enclave consist largely of disorganized militias, with some experienced guerrilla elements that served as armed rebels under the leadership of the Barzanis and Talabani before the creation of the Kurdish security zone.³⁰⁴ Estimates of forces of the Kurdish Democratic Party (KDP) total as high as 25,000 actives armed with light artillery, small arms, multiple rocket launchers, mortars and SA-7s. The KDP is said to have a reserve militia of 30,000 additional men.³⁰⁵ The Patriotic Union of Kurdistan claims to have 12,000 combat troops, plus 6,000 men in support. It has some T-54 and T-55 tanks, artillery weapons and multiple rocket launchers, 106mm recoilless rifles, and 400 60mm 82mm, and 120mm mortars. It is said to have 200 light anti-aircraft machine guns and SA-7s.

Manning and equipment totals, however, have little to do with the effectiveness of the forces involved. All the forces in the Kurdish security zone are not equivalent in combat power to a single Iraqi army light mechanized brigade. The Kurdish forces are at best capable of acting as light infantry and guerrillas. Although some estimates indicate that there

are up to 3.5 million Kurds in the area, the fighting strength of the major factions is probably less than half the strength they claim, and efforts to unite the factions based in Iraq into an effective fighting force have made only the most limited progress. The Kurdish forces in the security zone are also largely isolated from outside military support. Turkey does not provide military support, and threatens to cut the Iraqi Kurds off from outside contact if they back the PKK and other groups of Turkish Kurds that are hostile to the Turkish government.

Syria backs rival Kurdish factions, as does Iran. Iran supports Islamic fundamentalist Kurdish groups, and has been accused of helping them attack Kurdish villages in Iraq. Both Barzani and Talabani have charged that Iran has sent hostile armed Kurdish groups into the region and supports other factions.

The Iraqi army remains deployed around the Kurdish enclave, and could invade the zone within days if the U.N. ceased to provide support. The Kurds could not hold either the open country or the cities in the enclave in the face of attacks by the Iraqi army, and guerrilla resistance might do the Kurdish people more harm than good. Iraq demonstrated that it was willing to use poison gas, destroy some 2,000-4,000 Kurdish villages, and drive hundreds of thousands of Kurds into exile to win control of Kurdish territory in Operation Anfal in 1988-1989, and again in March-April, 1991.

As a result, the security of the Kurdish-controlled zone depends almost solely on the willingness of Turkey, the U.S., and U.N. to maintain a no-fly zone and security guarantees to the zone. Turkey has so far continued to support Operation Poised Hammer, but its civil war with its own Kurdish rebels continues to intensity, and it is unclear how long Turkey will provide such support.³⁰⁶

The Effectiveness of Opposition Military Forces

If Saddam does face any serious opposition, it consists of hidden movements within the armed forces, his own coterie, and leading Sunni and Shi'ite clans like the al-Juburi clan, Dulaym clan, and Ubayd clan. The long history of purges in the Ba'ath and Iraqi military since the Gulf War indicates that such opposition may exist, but it is impossible to characterize or analyze. The main threat to the regime lies from within the regime.³⁰⁷

In practice, it is the regime which is a threat to its more overt opponents, and not its opponents who are a threat to the regime. Saddam Hussein and the Ba'ath elite have ruthlessly suppressed Shi'ite opposition and religious resistance of any kind. They have killed tens of thousands of Kurds, and persecuted hundreds of thousands more. They do not face any significant armed opposition, although the risk of internal coups from within the security forces and the military cannot be dismissed.

¹ The military manpower, force strength, and equipment estimates in this section are made by the author using a wide range of sources, including computerized data bases, interviews, and press clipping services. Most are impossible to reference in ways of use to the reader. The force strength statistics are generally taken from the latest edition of the International Institute for Strategic Studies Military Balance (IISS, London), in this case, the 1993-1994 edition.

Extensive use has also been made of the annual editions of the Jaffee Center for Strategic Studies, The Military Balance in the Middle East (JCSS, Tel Aviv), especially the 1992-1993 edition and working materials from the coming edition. Material has been drawn from computer print outs from NEXIS, the United States Naval Institute data base, and from the DMS/FI Market Intelligence Reports data base. Other sources include Michael Eisenstadt, Like A Phoenix form the Ashes: The Future of Iraqi Military Power, Washington Institute Policy Papers, No. 36, Washington, Washington Institute, 1993; See Michael Eisenstadt, "The Iraqi Armed Forces Two Years On," Jane's Intelligence Review, March, 1993, pp. 121-127; Military Technology "World Defense Almanac for 1992-1993," published in early 1993; Foreign Affairs Division, "Middle East Arms Control and Related Issues," Washington, Congressional Research Service, 91-384F, May 1, 1991; Middle East Economic Digest, "MEED Special Report: Defense," Volume 35, December 13, 1991; Art Pine, "Iraq Rebuilds Its Forces," Los Angeles Times, June 30, 1993, p. 1; George Joffe, "Iraq's Strategic Role," Jane's Defense Weekly, May, 1993, pp. 221-224; and Bill Gertz, "In 2 Years, Iraq Has Rebuilt its Capability," Washington Times, January 14, 1993, p. A-9.

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² CIA, World Factbook, 1992, pp. 161-163.

³ Many of the details in this analysis are based on discussions with Amatzia Baram.

⁴ Economist, August 23, 1991, p. 36; New York Times, June 3, 1991; June 11, 1991, p. A-10; November 3, 1991, p. 4; Washington Post, July 19, 1991, p. A-16.

⁵ The Sunday Times, April 18, 1993, p. 19; discussions with Amatzia Baram.

⁶ "For Possible Coup in Iraq, U.S. Plans." New York Times, December 11, 1991. p. A7.

⁷ Much of this analysis is based on work by Kenneth Katzman of the Congressional Research Service. See "Saddam Fires Defense Aide, Names Cousin." Washington Post, November 7, 1991. p. A46.

⁸ "Hussein's Half Brother Is Named to Iraqi Post," New York Times, November 14, 1991. p. A15.

⁹ Experts differ sharply on the details of these changes. See Washington Post, September 14, 1991, p. A-31; November 7, 1991, p. A-46, November 14, 1991, p. A-47, December 14, 1991, p. A-15; Wall Street Journal, November 11, 1991, p. A-10, December 26, 1991, p. A-10 ; Jane's Defense Weekly, November 16, 1991, p. 926, July 13, 1991, p. 61; The Estimate, November 22-December 5, 1991, p. 1; Washington Times, November 26, 1991, p. A7; New York Times, November 7, 1991, p. 3; Los Angeles Times, November 14, 1991, p. 4; Michael Eisenstadt, "Recent Changes in Saddam's Inner Circle: Cracks in the Wall?" Policywatch, Number 22, November 22, 1991, pp. 1-2; Baltimore Sun, June 21, 1991, p. 7.

¹⁰ New York Times, December 11, 1991. p. A7.

¹¹ Washington Post, April 15, 1992, p. A-32, July 3, p. A-1, July 4, 1992, p. A-14, July 10, 1992, p. A-14; New York Times, July 4, 1992, p. A-4, July 6, 1992, p. A-6, July 7, 1992, p. A-3, July 10, 1992, p. A-3 .

¹² Washington Post, October 4, 1992, p. A-35.

¹³ The Sunday Times, April 18, 1993, p. 19; discussions with Amatzia Baram.

¹⁴ Many of the details in this analysis are based on discussions with Amatzia Baram.

¹⁵ Baltimore Sun, April 15, 1993, p. 6A; Washington Times, April 27, 1993, p. A-2.

¹⁶ New York Times, September 13, 1993, p. A-23.

¹⁷ Washington Post, November 27, 1997, p. A-20.

¹⁸ The author is deeply indebted to Amatzia Baram for his help in drafting this section. Also see Michael Eisenstadt, "The Iraqi Armed Forces Two Years On," Jane's Intelligence Review, March, 1993, pp. 121-127, and Like A Phoenix from the Ashes, pp. 10-13; Judith Miller and Laurie Mylroie, Saddam Hussein and the Crisis in the Gulf, New York, Random House, pp. 48-50; Samir al-Khalil, Republic of Fear, New York,

Pantheon, 1990, pp. 14-16, 30-31, 36-37, 133, 143-145; Adel Darwish and Gregory Alexander, Unholy Babylon, London, Victor Gollancz, 1991, pp. 139-140, 219-226, 257-260.

¹⁹ Shi'ites and Iraqi deserters fled into the Huwaizah Marshes which begin south of Amara between the Tigris and the border with Iran, and the other marsh areas along the Euphrates east of Nasirya, and extend down past the junction of the two rivers to Basra. New York Times, March 15, 1991, p. 1.

²⁰ A maximum of 400,000 moved into Turkey and 300,000 moved near to the border, 800,000 moved into Iran and 700,000 moved near to the border. These estimates are high, and the true number may have only been 50%-66% as large.

²¹ Economist, August 23, 1991, p. 36; Washington Times, October 8, 1991, p. 7, October 11, 1991, p. A-9, November, 18, 1991, p. A-7; New York Times, November 6, 1991, p. 16; November 15, 1991, p. A-9; Washington Post, July 20, 1991, p. A-14, July 22, 1991, p. A-18, September 10, 1991, p. A-24; International Defense Review, 7/1991, pp. 703-704.

²² Economist, August 23, 1991, p. 36; Guardian, January 14, 1992, p. 8; New York Times, October 9, 1991, p. A-6, October 20, 1991, p. A-1; October 27, 1991, p. A-3, August 12, 1992, p. A-1; Baltimore Sun, January 16, 1992, p. 7A, October 28, 1991, p. A-2; Washington Post, October 12, 1991, p. A-20, October 26, 1991, p. A-15, May 19, 1992, p. A-12, May 21, 1992, p. A-44, May 23, 1992, p. A-20. For a discussion of some of the history and activities involved, see Ofra Bengio, "Baghdad Between Sh'ia and Kurds," Policy Focus, No. 18, Washington, The Washington Institute for Near East Policy, February, 1992; Turkish Times, June 15, 1992, p. 1; Christian Science Monitor, June 10, 1992, p. 1.

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there are two division equivalents.

²³⁶ These estimates are based primarily on interviews with various experts. The 1993 IISS data show only 2,200 tanks, but this count does not track with the intelligence data the U.S. has declassified in its studies of the Gulf War or the estimates of other experts. It may represent an attempt to count fully operational tanks, but this is unclear.

²³⁷ The IISS estimates 4,200 OAFVs, including 1,500 BTR-50, BTR-60, AML-60, AML-90, EE-9, and EE-3 reconnaissance vehicles; 700 BMP-1 and BMP-2 armored fighting vehicles; and 2,000 BTR-50, BTR-60, BTR-152, OT-62, OT-64, MTLB, YW-531, M-113A1/A2, Panhard M-3, and EE-11 armored personnel carriers. A few experts estimates Iraq only had about 2,000-2,300 operational other armored vehicles. Additional sources include interviews in London, December, 1991 and April 1993, in Switzerland and Israel, January, 1992, in Switzerland, January, 1993, IISS data, and the views of various experts as of May and June, October, and November, 1993 ; Jane's Defense Weekly, February 22, 1992, p. 284; Jerusalem Post, January 25, 1992, p. 9; Washington Times, January 20, 1992, p. 10, January 17, 1992, p. A-1; Wall Street Journal, November 11, 1991, p. A-10; Jane's Defense Weekly, November 16, 1991, p. 926, February 22, 1992, pp. 284; The Estimate, November 22-December 5, 1991, p. 1; Michael Eisenstadt, "Recent Changes in Saddam's Inner Circle: Cracks in the Wall?" Policywatch, Number 22, November 22, 1991, pp. 1-2; Defense News, February 24, 1992, p. 1; Washington Post, November 7, 1991, p. A-46, March 13, 1992, p. A-19, August 6, 1992, p. A-39; Jane's Defense Weekly, August 8, 1992, p. 8., and

²³⁸ Sources in addition to those cited at the start of this section include interviews in London, December, 1991 and April 1993, in Switzerland and Israel, January, 1992, in Switzerland, January, 1993, IISS data, and the views other experts as of May, June, October, and November, 1993; The IISS estimate is similar to the author's. ; Jane's Defense Weekly, February 22, 1992, p. 284; Jerusalem Post, January 25, 1992, p. 9; New York Times, March 12, 1992, p. A-10; Washington Times, January 20, 1992, p. 10; Washington Post, November 7, 1991, p. A-46, November 14, 1991, p. A-47, March 13, 1992, p. A-19; Wall Street Journal, November 11, 1991, p. A-10; Jane's Defense Weekly, November 16, 1991, p. 926, February 22, 1992, pp. 284; The Estimate, November 22-December 5, 1991, p. 1; Michael Eisenstadt, "Recent Changes in Saddam's Inner Circle: Cracks in the Wall?" Policywatch, Number 22, November 22, 1991, pp. 1-2; Defense News, February 24, 1992, p. 1.

²³⁹ The IISS estimates 500. It is doubtful that this many are operational.

²⁴⁰ Yezid Sayigh, Arab Military Industry: Capability, Performance, and Impact, London, Brassey's, 1992, pp. 103-130.

²⁴¹ Many of the details in this analysis are based on discussions with Amatzia Baram.

²⁴² See the detailed history of the attack on Republican Guard units and the resulting losses by name in Department of Defense, The Conduct of the Persian Gulf War: Final Report, Washington, Department of Defense, April, 1992, pp. 93-95, 104-113, 355, 401. Also references in the April 15, 1993 draft of the U.S.

Air Force Gulf War Air Power Survey, pp. 9-10.

²⁴³ In addition to the sources listed at the start of the Iraq section, the author has drawn on interviews with various U.S. and foreign experts in March, April, October, and November, 1993, and IISS, The Military Balance, 1993-1994, IISS, London, 1993, pp. 115-117; USNI Data Base. Military Technology, World Defense Almanac: The Balance of Military Power, Vol. XVII, Issue 1-1993, ISSN 0722-3226, pp. 139-142; Kenneth Katzman, Iraq: Future Policy Options," Congressional Research Service, CRS 91-596F, December 12, 1991, pp. 23-30; FBIS, October 13, 1991; Michael Eisenstadt, "The Iraqi Armed Forces Two Years On," Jane's Intelligence Review, pp. 121-127. March, 1993, and RUSI Working Notes, August, 1992-September, 1993.

²⁴⁴ See Michael Eisenstadt, "The Iraqi Armed Forces Two Years On," Jane's Intelligence Review, March, 1993, pp. 121-127.

²⁴⁵ Additional sources include Interviews in London, December, 1991, in Switzerland and Israel, January, 1992, and interviews with various U.S. and foreign experts in March, April, and October, 1993; Jane's Defense Weekly, February 22, 1992, p. 284; Jerusalem Post, January 25, 1992, p. 9; Washington Times, January 20, 1992, p. 10; Washington Post, November 7, 1991, p. A-46, November 14, 1991, p. A-47; Wall Street Journal, November 11, 1991, p. A-10; Jane's Defense Weekly, November 16, 1991, p. 926, February 22, 1992, pp. 284; The Estimate, November 22-December 5, 1991, p. 1; Michael Eisenstadt, "Recent Changes in Saddam's Inner Circle: Cracks in the Wall?" Policywatch, Number 22, November 22, 1991, pp. 1-2; Defense News, February 24, 1992, p. 1.

²⁴⁶ Many of the details in this analysis are based on discussions with Amatzia Baram.

²⁴⁷ U.S. Air Force, "Reaching Globally, Reaching Powerfully: The United States Air Force in the Gulf War," Washington, Department of the Air Force, September, 1991, pp. 4-5; London Financial Times, April 29, 1989, p. 11, July 26, 1989, p. 20; Jane's Defense Weekly, May 13, 1989, p. 837; April 22, 1989, p. 687, August 12, 1989, p. 255, September 30, 1989, p. 674, Defense News, May 8, 1989, p. 6; International Defense Review, 6/189, pp. 835-841; Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992; U.S. Air Force, Gulf War Air Power Survey, April 15, 1993, p. 11.

²⁴⁸ U.S. Air Force, "Reaching Globally, Reaching Powerfully: The United States Air Force in the Gulf War," Washington, Department of the Air Force, September, 1991, pp. 4-5.

²⁴⁹ Jane's Defense Weekly, July 8, 1989. Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, p. II-358. Pawloski indicates that Mirage F-1's were utilized in both the interceptor and attack roles. Iraq placed its first order for 30 multi-role F-EQ's and 6 dual-seat F-1BQ with Magic air-to-air missiles in 1977, and the aircraft began delivery in January 1981. They initially were deployed to Qayyarah Airbase, where a substantial French training and support organization was maintained. In late 1979, an additional order was placed for

24, and 29 more were ordered in 1982 that included 23 newly configured F-1EQ4-200s and 6 F-1BQ-200s with a fixed-probe air refueling system.

The Mirage F-1 is an "almost" all-weather (Pulse Radar) single seat interceptor with a short duration Mach 2.0 capability. The Cyrano IV Radar has a 25 NM acquisition capability against bomber sized targets and around 15 NM capability against fighters. The Cyrano IV has a "down look" track capability utilizing a "fixed echo elimination" scheme, but it will not support Super 530 Radar Missile requirements. The Iraqi F-1's are configured primarily with Magic One, R550 IR Missiles and Super 530 of both the IR and SA type. Aircraft performance and handling is similar to a hard-wing F-4. Some of the final delivered Mirage F-1's were fitted with the Agave Radar optimized for anti-ship operations with Exocet. The Agave is not compatible with air-to-air radar missiles.

Iraq ordered 20 F-1EQ5-200's and 4 F-BQ5-200s, with Agave Anti-Ship radar's replacing the Cyrano IV radar's, and these were delivered by October 1984. Up until that time, 5 Super Etendards were loaned to the Iraqi Air Force. By mid 1983 some 6 F-1's were lost in combat as well as 79 Soviet aircraft of various types. Another buy of 24 F-1E/BQ6-200 Exocet capable aircraft were ordered in September 1985 bringing the total F-1 fleet to 113 machines. The first of this last-batch arrived in 1987. A further 12-16 order was put in for attrition aircraft in 1988. Towards the end of 1983, France delivered to Iraq 5 Super Etendards which were utilized as Exocet platforms for several years, then returned to the French when Mirage F-1's were received in their place.

The Iraqi Mirage F-1s were delivered with a full complement of French weapons:

- Super 530 SA & IR air-to-air missiles
- R550 IR AIM
- Aerospatiale AS-30L ASM
- Thompson-Brandt 68/100 mm rockets
- Matra ARMAT ARM missile
- Exocets
- South African "Cluster" Bombs
- Matra conventional "slick" and "retarded" bombs

Mirage F-1's with Exocets operated long range missions that required airborne refueling with converted AN-12 "Cubs" using French buddy stores with drogues. There are probably several air refueling candidates for the Iraqi Air Force, including IL-76 conversions as demonstrated by the Soviets.

²⁵⁰ The Su-24 has a wing area of 575 square feet, an empty weight of 41,845 pounds, carries ,3385 gallons or 22,000 pounds of fuel, has a take off weight of 871,570 pounds with bombs and two external fuel tanks, carries 2,800 gallons or 18,200 pounds of external fuel, has a combat thrust to weight ratio of 1.02, a combat wing loading of 96 pounds per square foot, and a maximum load factor of 7.5G. Jane's Soviet Intelligence Review, July, 1990, pp. 298-300; Jane's Defense Weekly, June 25, 1985, pp. 1226-1227; and Dick Pawloski,

Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, General Dynamics DWIC-91, Fort Worth Division, February, 1992, pp. I-65 and I-110 to I-117.

²⁵¹ Aviation Week and Space Technology, April 10, 1989, pp. 19-20; New York Times, April 5, 1989, September 7, 1989; Washington Times, January 16, 1989; FBIS/NES, April 10, 1989.

²⁵² The extraordinary range of different estimates of Iraqi strength is illustrated in Norman Friedman, Desert Victory, Annapolis, Naval Institute Press, 1991, p. 308; Bruce W. Watson, Military Lessons of the Gulf War, London, Greenhill, 1991, pp. 61-81; James F. Dunnigham & Austin Bay, From Shield to Storm, New York, Morrow, p. 323; Roy Braybrook, Air Power: The Coalition and Iraqi Air Forces, London, Osprey, 1991, p. 7.

²⁵³ The high end of the range seems more correct and is based on Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, p. II-361. Some estimates of the Mirage F-1 strength go as high as 70 aircraft, but seem to include aircraft in the air defense role. These same estimates show 60 Su-20s in the FGA units, and 40 F-6s and 40 Su-7s in other combat units.

²⁵⁴ Many of the MiG-21s were not operational. Iraq had up to 40 MiG-19s in quasi-operational status and possibly some F-6s.

²⁵⁵ The U.S. count and list of air bases is based upon slides circulated by the U.S. Air Force in introducing the April 15, 1993 draft of the Gulf War Air Power Survey.

²⁵⁶ Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, p. II-361.

²⁵⁷ Jane's Defense Weekly, March 3, 1990, p. 386.

²⁵⁸ Jane's Defense Weekly, May 13, 1989, p. 836 and October 7, 1989, p. 693; Air International, March, 1991, p. 118; Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, pp. II-354 to II-355. Some estimates imply the second aircraft was fully operational, but this is uncertain.

²⁵⁹ Defense Electronics, February 1989, p. 10; United States News and World Report, April 10, 1989, p. 18.

²⁶⁰ Jane's Defense Weekly, April 22, 1989, p. 697-698; August 5, 1989, p. 196, September 30, 1989, p. 674, February 10, 1990, p. 267; International Defense Review, 6/189, pp. 835-841.

²⁶¹ Defense News, May 8, 1989, p. 6. According to work by Dick Pawloski, Iraq also has a supply of AS-9 "Kyle" anti-radar missile which is a scaled down derivative of the AS-4 "Kitchen". It is believed that it has at least three interchangeable passive radar homing heads for each of the three main "ground and ship threat emitter" frequency bands. It is expected that the Iraqi's have modified it to engage the Western Hawk and Patriot systems. The missile must be built-up before each flight, specifically targeting the seeker to the specific threat system that is to be engaged. It is a bit smaller than the "Kitchen" being 6.0 m long, 0.5 m in diameter, and having a 2.0 m wingspan. The ARM version of the MiG-21 sized "Kitchen" utilizes a 1000

kg HE warhead. The scaled "Kyle" has a launch weight of around 750 kg and utilizes a considerably smaller 250 kg warhead. It has two delta wings a mid-body with a clipped delta vertical tail and horizontal tail planes. There is a folded lower vertical fin. It utilizes a liquid fueled rocket which requires fairly substantial ground support in preparation. It is employed as a "high flier", similar in profile to the "Kitchen". It will go up to a Mach 2.0 cruise altitude of around 70,000 ft for a range of around 90 km and eventually high dive down in a steep 80 degree dive on the target. The "Kyle" has been replaced in the Soviet Air Force by several other missiles such as the AS-11 "Kilter", AS-12 "Kegler" and other more modern systems. It is not believed that Iraq has any of these more advanced versions. See Duncan Lennox's assessment in the October 89 Jane's Soviet Intelligence Review, page 442.

²⁶² Defense News, May 8, 1989, p. 6.

²⁶³ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 13-15; Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, p. II-361.

²⁶⁴ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 13-15; Slides to U.S. Air Force presentation of the April 15, 1993 draft of the Gulf War Air Power study.

²⁶⁵ These estimates were projected by different sources and the launcher or fire unit counts seem to be either rounded or based on standard Soviet battery holdings. According to Palowski, Iraq had the following radar order of battle:

Early Warning & Surveillance

- Spoon Rest D/ P-12M	USSR(147-161 MHz)
- Flat Face A/ P-15	USSR(800-900 HHZ)
- Squat Eye/ P-15M	USSR(800-900 HMz)
- Bar Lock/ P-35/37	USSR(2695-3125 MHz)
- Tall King/ P-14	USSR(160-180 MHz)
- TRS-2215 (mobile)	FR (E/F)
- TRS-2230	FR (E/F)
- AN/TPS-32 (3D)	US (2905-3080)
- AWACS (IL-76)	FR

Surface-to-Air Missile Systems

- SA-2 Fansong/Guideline
- SA-3 Low Blow/Goa
- SA-5 Square Pair/Gammon
- SA-6 Straight Flush/Gainful
- SA-7 Grail (IR Hand Held)

-
- SA-8 Land Roll/Gecko
 - SA-9 Gaskin (IR Vehicle Mounted)
 - SA-13 Gopher (IR Vehicle Mounted)
 - SA-14 Gremlin (IR Hand Held)
 - SA-15 Track with Tube Launched Missiles (not confirmed)
 - SA-16 (not confirmed)
 - SA-19 Mounted on 2S6 Gun-Track (not confirmed)
 - ROLAND
 - HAWK
 - ASPEDITE

London Financial Times, April 29, 1989, p. 11, July 26, 1989, p. 20; Jane's Defense Weekly, May 13, 1989, p. 837; April 22, 1989, p. 687, August 12, 1989, p. 255, September 30, 1989, p. 674, Defense News, May 8, 1989, p. 6; International Defense Review, 6/189, pp. 835-841.

²⁶⁶ The Iraqis were on alert after reports that Israel might attack Iraqi chemical and nuclear facilities. Washington Post, April 29, 1989, p. 16.

²⁶⁷ This analysis of the air war relies heavily on the U.S. Air Force analysis in "Reaching Globally, Reaching Powerfully: The United States Air Force in the Gulf War," Washington, Department of the Air Force, September, 1991, pp. 32-34; U.S. Air Force Gulf War Air Power Survey, April 15, 1993, and Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992

²⁶⁸ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 201-203.

²⁶⁹ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 202-206.

²⁷⁰ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, p. 204; U.S. Air Force, Gulf War Air Power Survey, April 15, 1993 draft, Chapter 3, pp. 4-5.

²⁷¹ While many sources provided a great deal of data on the causes of individual losses, much of these data conflict. F-15s seem to have shot down 35 aircraft, A-10s shot down 2, F-18s shot down 2, and F-14s may have shot down one.

²⁷² Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 13-15, and 216. Dick Pawloski estimates Iraqi air-to-air combat losses and causes as follows:

5 MiG-29 Fulcrum's

... (3) AIM-7 Kills

... (2) Maneuvering Suicide's

9 F-1 Mirages

... (6) AIM-7 Kills

... (2) AIM-9 Kills
 ... (1) Maneuvering Suicide
 4 MiG-21/F-7 Fish beds
 ... (3) AIM-9 Kills
 ... (1) AIM-7 Kill
 8 MiG-23 Floggers
 ... (6) AIM-7 Kills
 ... (2) AIM-9 Kills
 2 MiG-25 Fox bats
 ... (2) AIM-7 Kills
 6 Su-7/17/22
 ... (3) AIM-7 Kills
 ... (2) AIM-9 Kills
 ... (1) Mk-83 Bomb
 2 Su-25 Frogfoot
 ... (2) AIM-9 Kills
 1 IL-76 Candid transport
 ... 20mm Gun (under debate as an AIM-7 Kill)
 1 PC-9 Trainer
 ... pilot bailout
 6 Helicopters
 ... (2) AIM-7 Kills
 ... (1) AIM-9 Kills
 ... (2) Gun Kills
 ... (1) LGB

 (23) AIM-7 Kills
 (12) AIM-9 Kills
 (02) 30mm Gun Kills
 (01) 20mm Gun Kill
 (03) Maneuvering Suicides
 (01) Bailout
 (02) Air-to-Ground Ordnance (1 Walleye pending)

 44 Total

²⁷³ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 13-15, 202-206, and 216; U.S. Air Force, Gulf War Air Power Survey, April 15, 1993 draft, Chapter 3, pp. 80-9.

²⁷⁴ U.S. Air Force, "Reaching Globally, Reaching Powerfully: The United States Air Force in the Gulf War," Washington, Department of the Air Force, September, 1991, pp. 32-34; Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, p. 204. Dick Pawloski puts losses at 44 aircraft, including 6 MiG-29s, 11 Mirage F-1s, 4 MiG-21s, 8 MiG-23s, 2 MiG-25s, 2 Su-25s, 7 Su-7/20/22s, and 7 helicopters. Pawloski, op cit., p. II-376; U.S. Air Force, Gulf War Air Power Survey, April 15, 1993 draft, Chapter 3, pp. 80-9.

²⁷⁵ In addition to the sources listed at the start of the Iraq section, the author has drawn on interviews with various U.S. and foreign experts in March, April, October, and November, 1993, and IISS, The Military Balance, 1993-1994, IISS, London, 1993, pp. 115-117; USNI Data Base. Military Technology, World Defense Almanac: The Balance of Military Power, Vol. XVII, Issue 1-1993, ISSN 0722-3226, pp. 139-142; Kenneth Katzman, Iraq: Future Policy Options," Congressional Research Service, CRS 91-596F, December 12, 1991, pp. 23-30; FBIS, October 13, 1991; Michael Eisenstadt, "The Iraqi Armed Forces Two Years On," Jane's Intelligence Review, pp. 121-127. March, 1993, and RUSI Working Notes, August, 1992-September, 1993.

²⁷⁶ The author's estimate of aircraft lost to Iran is discussed in the section on the Iranian Air Force.

²⁷⁷ FBIS NES 92-054, March 19, 1992, p. 16.

²⁷⁸ The IISS estimates are similar.

²⁷⁹ In addition to the sources listed at the start of the Iraq section, see Kenneth Katzman, Iraq: Future Policy Options," Congressional Research Service, CRS 91-596F, December 12, 1991, pp. 23-30; FBIS, October 13, 1991; Washington Times, August 2, 1991, p. B-5; London Financial Times, October 4, 1991, p. 4; AP AM cycle, June 12, 1991; New York Times, March 25, 1991, p. A-1.

²⁸⁰ The reader should be aware that these estimates are extremely uncertain and are based largely on expert estimates of the estimated losses during the Gulf War. There is a sharp difference of opinion among some U.S. experts as to the size of Iraq's losses during the conflict.

²⁸¹ The SAM launcher estimates are based on discussions with an Israel expert and are highly uncertain. Iran's decision was reported in the New York Times, July 31, 1992, p. 6.

²⁸² Wall Street Journal, August 19, 1992, p. A-3.

²⁸³ Michael Eisenstadt, "The Iraqi Armed Forces Two Years On," Jane's Intelligence Review, pp. 121-127. March, 1993.

²⁸⁴ Based on interviews with British, U.S., and Israel experts. Washington Times, January 16, 1992, p. G-4; Washington Post, February 1, 1992, p. A1, February 2, 1992, pp. A1 and A25, February 5, p. A-19; Financial Times, February 6, 1992, p. 4; Christian Science Monitor, February 6, 1992, p. 19; Defense News,

February 17, 1992, p. 1

²⁸⁵ Peter Gilchrist, Sea power: The Coalition and Iraqi Navies, London, Osprey Publishing, 1991, pp. 17-20; Arnold Meisner, Desert Storm: The Sea War, Osceola, Motor Books, 1991; IISS, The Military Balance, 1990-1991, IISS, London, 1990.

²⁸⁶ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 13-15.

²⁸⁷ Defense News, May 8, 1989, p. 6; Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 13-15.

²⁸⁸ While the two corvettes were designed to have six ILAS-3 anti-submarine warfare torpedo mountings, these were not delivered.

²⁸⁹ Jane's Defense Weekly, February 11, 1989, p. 205; May 29, 1989, p. 1002; , 1991-1992, p. 292; Jane's Fighting Ships, 1991-1992, pp. 292-293.

²⁹⁰ This analysis draws heavily on U.S. Naval Institute, The Naval Institute Guide to the Combat Fleets of the World, 1993, Their Ships, Aircraft, and Armament, Annapolis, Naval Institute, 1993; Jane's Fighting Ships, 1992-1993; IISS, The Military Balance, 1993-1994, IISS, London, 1993, pp. 115-117; USNI Data Base. Military Technology, World Defense Almanac: The Balance of Military Power, Vol. XVII, Issue 1-1993, ISSN 0722-3226, pp. 139-142.

²⁹¹ Military Technology, 2/92, pp. 97-98.

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²⁹³ Defense News, May 8, 1989, p. 6.

²⁹⁴ These and other army strength estimates are based upon Interviews in London, December, 1991, in Switzerland and Israel, January, 1992; Jane's Defense Weekly, February 22, 1992, p. 284; Jerusalem Post, January 25, 1992, p. 9; Washington Times, January 20, 1992, p. 10; Washington Post, November 7, 1991, p. A-46, November 14, 1991, p. A-47; Wall Street Journal, November 11, 1991, p. A-10; Jane's Defense Weekly, November 16, 1991, p. 926, February 22, 1992, pp. 284; The Estimate, November 22-December 5, 1991, p. 1; Michael Eisenstadt, "Recent Changes in Saddam's Inner Circle: Cracks in the Wall?" Policywatch, Number 22, November 22, 1991, pp. 1-2; Defense News, February 24, 1992, p. 1.

²⁹⁵ See Amatzia Baram, "Two Roads to Revolutionary Shi'ite Fundamentalism in Iraq," in Martin E. Marty and R. Scott Appleby, Accounting for Fundamentalisms: The Dynamic Character of Movements, Chicago, University of Chicago Press, 1994, pp. 531-586. Also Washington Post, June 23, 1993, p. A-13.

²⁹⁶ See Amatzia Baram, "Two Roads to Revolutionary Shi'ite Fundamentalism in Iraq," in Martin E. Marty and R. Scott Appleby, Accounting for Fundamentalisms: The Dynamic Character of Movements, Chicago, University of Chicago Press, 1994, pp. 531-586, and Kenneth Katzman, Iraq's Opposition, Washington, Congressional Research Service 93-422F, April 19, 1993.; Washington Post, October 13, 1993, p. A-17, October 28, 1993, p. A-21, November 19, 1992, p. 31, June 8, 1993, p. A-17, June 23, 1993, p. A-13, June

29, 1993, p. A-14; Baltimore Sun, September 28, 1992, p. 2A.

²⁹⁷ See Amatzia Baram, "Two Roads to Revolutionary Shi'ite Fundamentalism in Iraq," in Martin E. Marty and R. Scott Appleby, Accounting for Fundamentalisms: The Dynamic Character of Movements, Chicago, University of Chicago Press, 1994, pp. 531-586, and Kenneth Katzman, Iraq's Opposition, Washington, Congressional Research Service 93-422F, April 19, 1993.

²⁹⁸ See Amatzia Baram, "Two Roads to Revolutionary Shi'ite Fundamentalism in Iraq," in Martin E. Marty and R. Scott Appleby, Accounting for Fundamentalisms: The Dynamic Character of Movements, Chicago, University of Chicago Press, 1994, pp. 531-586, and Kenneth Katzman, Iraq's Opposition, Washington, Congressional Research Service 93-422F, April 19, 1993.

²⁹⁹ Washington Post, September 7, 1992, p. A-19, November 21, 1992, pp. A-16 and A-21, June 29, 1993, p. A-14, July 24, 1993, p. A-18, October 18, 1993, p. A-1; Baltimore Sun, December 8, 1992, p. 4A; Philadelphia Inquirer, November 21, 1992, p. A-2; New York Times, June 26, 1992, A-19, August 19, 1992, p. A-1, August 27, 1992, p. A-14; Los Angeles Times, August 14, 1992, p. A-1, August 19, 1992, p. A-1; Washington Times, September 6, 1992, p. A-10, September 12, 1992, p. A-7, March 1, 1993, p. A-2, March 2, 1993, p. A-2 The IISS, Military Balance, 1993-1994, p. 117.

³⁰⁰ Washington Post, September 7, 1992 p. 19, November 21, 1992, p. A-16 and A-21, June 29, 1993, p. A-14, July 24, 1993, p. A-18; Baltimore Sun, December 8, 1992, p. 4A; Time, March 29, 1993, p. 32;

³⁰¹ CIA World Factbook, 1992, p. 162.

³⁰² Much of this discussion of Kurdish ethnicity is based on working papers by David McDowall. Washington Post, November 2, 1992, p. A-18; New York Times, October 25, 1992, p. A-15.

³⁰³ See Kenneth Katzman, Iraq's Opposition, Washington, Congressional Research Service 93-422F, April 19, 1993.

³⁰⁴ Washington Post, November 2, 1992, p. A-18

³⁰⁵ These estimates are adapted from the IISS, Military Balance, 1992-1993, p. 111.

³⁰⁶ Washington Post, November 2, 1992, p. A-17, April 30, 1993, p. A-45; Christian Science Monitor, January 25, 1993, p. 18; Financial Times, April 2, 1992, p. 3, April 30, 1993, p. 5; The Economist, February 6, 1993, pp. 49-50; New York Times, June 26, 1993, p. A-19; Los Angeles Times, July 20, 1992, p. C2; Chemical and Engineering News, May 3, 1993, pp. 8-9.

³⁰⁷ Many of the details in this analysis are based on discussions with Amatzia Baram.

VI. Iraq and Weapons of Mass Destruction

As is the case with Iran, weapons of mass destruction offer Iraq a potential way of compensating for the weaknesses of its conventional forces and its weaknesses relative to the West. Iraq can also draw on what is left from a vast pre-war effort. No country in the Middle East, and perhaps in the developing world, has spent as much to acquire weapons of mass destruction as Iraq. While there is no way of precisely costing Iraq's effort to acquire long-range missiles and biological, chemical, and nuclear weapons, few outside experts feel that Iraq has spent less than \$10 billion dollars. The U.S. government has also released a list of 52 businesses and 32 front organizations that Iraq used to buy the materials and technology it needed for such weapons.³⁰⁸

Iraq has lost much of the capability it had to build and use weapons of mass destruction before the Gulf War. At the same time, it has retained some of its resources in spite of its wartime losses and the efforts of the U.N. to destroy such weapons under the terms of the cease-fire. Iraq can probably still manufacture some chemical and biological agents. It retains up to 100-200 Scud and extended-range Scud missiles, and it retains both the technology it had before the war and a considerable amount of equipment.

The Impact of the U.N. Effort Since the Cease-fire

The U.N. has not been entirely successful in depriving Iraq of its weapons of mass destruction, but it has played a major role in exposing and reducing Iraq's capabilities. Under the terms of the cease-fire in the Gulf War, Iraq committed itself to allowing U.N. inspected destruction of its biological, chemical, and nuclear weapons facilities, and long-range missiles. On April 3, 1991, the U.N. Security Council passed Resolution 687, which led to the creation of a Special Commission to prepare a plan for the destruction and removal of Iraq's biological, chemical, and nuclear weapons materials and facilities. This U.N. Special Commission (UNSCOM) authorized the International Atomic Energy Agency (IAEA) to carry out part of this task and created a force of U.N. inspectors to perform to rest.

The scale of the effort to destroy Iraq's missiles and weapons of mass destruction has proved to be much more demanding than was originally anticipated. As a result of the data allied intelligence efforts uncovered during the Gulf War, and the post-Gulf War U.N. inspection effort, it has become apparent that Iraq had far more missiles and launchers than experts had suspected before the war. It has also become apparent that Iraq has taken routes to acquiring nuclear material unknown to Western intelligence, and has far larger numbers of missile, biological, chemical, and nuclear facilities. U.N. experts have estimated that Iraq had

52 missile storage, assembly, and maintenance facilities, 13 facilities associated with biological weapons facilities, 48 facilities associated with chemical weapons, and 20 facilities associated with nuclear weapons, and these totals may be an undercount.

Iraq has been least successful in hiding its large nuclear facilities, where it proved difficult to conceal or disperse major equipment, although it has succeeded in hiding much of its technical data, the names of many of its suppliers, and much of its smaller equipment. The U.N. has also supervised the destruction of much of Iraq's remaining chemical weapons and production equipment, but Iraq has hidden some of this equipment, some precursors and feedstocks, and now has the technology to manufacture limited amounts of weapons in laboratory or commercial facilities. Iraq seems to have dispersed at least some of its biological warfare and production capabilities before Desert Storm began, and most of this equipment remains intact.

This hide and seek game between the U.N. and Iraq may go on for years -- even if Iraq appear to be more compliant. In spite of its constant challenges of the U.N.'s right to inspection during 1991-1993, Iraq appeared to agree to U.N. terms for long term monitoring of its facilities and activities relating to weapons of mass destruction on November 26, 1993. Iraq's Foreign Minister, Mohammed Said Sahaf, stated Iraq's agreement in a letter to Jose Luis Jesus, the acting president of the U.N. Security Council.

It was plain, however, that Iraq only sent the letter because U.N. Security Council Resolutions 687, 707 and 715 made this the only way it could resume its oil exports, and reduce the impact of the U.N. embargo. The Iraqi letter also did not, meet all the U.N.'s terms. No mention is made of human rights, the Kurds, recognition of Kuwait's sovereignty, or Iraq's agreement to the new border with Kuwait. While Rolf Ekeus, the head of the U.N. inspection effort, called Iraq's agreement a "breakthrough", he also said it would not affect the technology and weapons that Iraq had already concealed, and that it could take up to six months to test a system for long-term monitoring to make sure it was fully operational.³⁰⁹

Even if Iraq does allow the U.N. to put such a system in place, this is unlikely to solve the problem. Iraq will retain the technology base it acquired before the Gulf War, and can go on with a great deal of research and engineering activity with little fear of a challenge from the U.N. Iraq is unlikely to give up any biological and chemical capabilities that the U.N. cannot locate, and it has had nearly three years in which to hide any weapons and equipment. Most experts believe that Iraq has managed to conceal much of its biological warfare equipment, and some chemical weapons and feedstocks.

Most of Iraq's missile production and assembly facilities seem to have been destroyed, along with some of its remaining missiles and launchers, and. Iraq will have serious problems in rebuilding its missile production capabilities. Few experts believe,

however, that Iraq will abandon its missile efforts. Many experts believe that Iraq has hidden 100 to 200 missiles and some launchers, and virtually all experts believe Iraq can recover many of its missile warfare capabilities within three to five years if the U.N. sanctions should be lifted -- or seller countries should choose to violate them.

Iraq's Missile Weapons

In order to understand Iraq's future capabilities to deliver long-range missiles, it is necessary to understand the history of Iraq's development efforts with such weapons, and Iraq's war fighting experience in using ballistic missiles. Iraq has little success in using unguided rockets like the Soviet FROG against military targets during the Iran-Iraq War. It has, however, claimed to have developed its own cluster munitions warhead version of the FROG, called the Laith 90, with a range of 90 kilometers. It has also claimed to develop an Ababil 100 artillery rocket system using a 400mm diameter rocket mounted in a four launcher canister on a truck. Iraq claims this rocket has a maximum range of 100 kilometers, and a warhead with either 300 anti-tank fragmentation bomblets or 25 anti-tank minelets. These systems were not used during the Gulf War, and no estimate exists of how many of these systems were operational and deployed.³¹⁰

Like Iran, Iraq made use of the Scud B in the Iran-Iraq War. It launched these missiles against Iranian population centers to the rear of the battlefield.³¹¹ Iraq could not attack key targets like the Iranian capital of Tehran with the Scud B, however, because Tehran is about 510 kilometers from the Iraqi border -- about 220 kilometers beyond the range of the Scud B.³¹² As a result, Iraq tried from 1982 onwards to acquire the longer-range missiles it needed to attack targets deep in Iran.

There is still considerable uncertainty as to exactly how Iraq got the technology to modify its Scuds. Various sources have claimed Iraq received Chinese, Egyptian, French, German, and/or Soviet help. All of these claims may be true, and other nations seem to be involved. In any case, Iraq tested a new missile called the Al Hussein in August, 1987.

The precise range-payload capabilities of Al Hussein could not be determined as a result of the attacks made during either the Iran-Iraq or Gulf wars because the Iraqis regularly moved the missile launch sites during this phase of their attack. The U.S. officially indicates that this missile had a range of about 375-400 miles, or 650 kilometers, and a CEP of 3,000 meters.³¹³ One Israeli source estimates that the missile has a maximum range of 600 kilometers, a warhead weight of 300 kilograms, and a flight time of 420 seconds, and a CEP of around 1,700-2,300 meters.³¹⁴ Other experts indicate it has a range of 375 miles and a warhead weight of only 250 pounds.³¹⁵ The improved Iraqi Scuds may also have had re-fire times of 60 minutes versus 160 minutes for the earlier model Scuds.³¹⁶ The research for the

modification seems to have occurred at a facility at Taji, the missile was modified at a facility in the Nasr missile factory and its mobile launchers were produced at a facility near Daura.³¹⁷

The Al Hussein gave Iraq a missile that could reach Tehran and Qom from positions south of Baghdad, and Iraq soon began to use them. Iraq fired an average of nearly three Scuds a day, and some estimates indicate that it fired over 160 missiles at Tehran between February 29 and April 18, 1988.³¹⁸ Other sources indicate that Iraq launched a total of approximately 360 Scud Bs and Al Hussein missiles at Tehran and other Iranian cities during the "war of the cities."³¹⁹

There is still some controversy over the way in which Iraq extended the range of the system. It seems to have modified a standard Scud by (a) cutting its warhead payload from around 800 kilograms to around 200-250 kilograms, and (b) altering it to burn all its propellant at the cost of reliability.³²⁰ Iraq could also have gotten higher payloads of up to 500 kilograms by using strap-on boosters. There are unconfirmed reports of weld marks and other alterations on fragments of the Scuds recovered in Iran, but most experts now discount this possibility.

After the August, 1988 cease-fire, Iraq developed more advanced missiles. On April 25, 1988, Iraq tested a missile which was initially called the Al-Abbas. It was later renamed the Al-Hijarah or "Stones", after the stones used by the Palestinian children and teenagers in the Intifada. The Al-Hijarah missile was a still further modification of the Scud with additional fuel capacity, rather than an original design. This reliance on modification may account for the fact that it proved to be unstable during the Gulf War and often broke up upon reentry.

By 1990, the Al-Hijarah matured into a system whose performance was initially estimated as having a maximum range of 700-900 kilometers, a 100 to 300 kilogram payload, a flight time of 540 seconds, and seems to have an operational CEP at maximum range of 2,500 to 3,000 meters.³²¹ Iraq did not demonstrate this maximum range during the Gulf War, and some experts feel the missile's range may actually be below 800 kilometers, with a payload below 200 kilograms, and an operational CEP of 3,000 meters.³²²

Iraq quietly tested and deployed chemical warheads for both its regular and longer-range Scuds.³²³ The timing of Iraq's chemical warhead tests is uncertain, but U.N. inspection efforts later showed that Iraq developed had binary chemical warheads for all three of its Scud variants at the time of the Gulf War.³²⁴ These warhead designs were not particularly reliable or effective, but they could still have been used as terror weapons.

All of these developments were made possible by the fact that Iraq invested up to \$3 billion on missile and other advanced weapons facilities between 1980 and 1990, and this funded a massive missile research and development establishment. As part of this effort Iraq established research links with Argentina and Egypt, and joined them in a project called Badr 2000. This project was supposed to turn a large Argentine weather rocket called the Condor -- which Argentina had developed in the late 1970s -- into a two-stage solid fuel long-range missile, with a payload of 450 kilograms and a maximum range of 950 kilometers.

While Egypt and Argentina eventually canceled their work on the Badr 2000, Iraq tried to continue the project in Iraq.³²⁵ According to one report, it set up facilities to produce the most cases and nozzles at the Dhu al-Fiqar factory at Fallujah, the solid fuel mixing and casting at the Taj al-Ma'arik factory near Latifyah, and motor assembly and testing at the al-Yawm al-Azim factory near Musayyib. The project was managed largely by Iraqis, using a wide range of foreign experts, and some technical workers hired in Pakistan.³²⁶ Iraq may, however, have abandoned the Badr 2000. Argentina's guidance system technology was inadequate and had lagged far behind its development schedule. Egypt had not met a single goal for its share of the project, and little serious attention seems to have been paid to warhead design.

Iraq had additional problems. It had little success with efforts to modify the SA-2, SA-3, and SA-6 to the surface-to-surface role, although it is unclear how serious such efforts were. Such modifications have serious inherent accuracy and range-payload problems. Iraq's Sa'ad 16 facility was not able to operate much of the equipment Iraq had imported to build more advanced warheads when the Gulf War began, and Iraq was still seeking carbon fiber warhead technology and manufacturing equipment to improve its warhead capabilities. Iraq's reliance on relatively crude metal warheads helps explain the failure of many of the extended range Scuds it launched against Israel and Saudi Arabia, as well as some of the problems in the design of its chemical warheads.³²⁷

Iraq had more success with other systems. Somewhat ironically, given the rivalry between Argentina and Brazil, Iraq hired a separate 23 man missile technology development team from Brazil. This team was led by retired Major General Hugo de Olivera Piva, the ex-director of Brazil's Aerospace Technology Center. Piva headed the effort to convert Brazil's Sonda IV space rocket into a missile large enough to carry a nuclear warhead. This team helped Iraq develop two related systems: The Al Abid and the Tamuz.

The Al Abid first attracted attention on December 5, 1989, when Iraqi TV showed the launching of long-range booster at the Al-Anbar Space Research Center, which it

claimed reached a range close to 1,500 nautical miles.³²⁸ This three stage system was called the Al Abid, and was built with the assistance of the Canadian Super Gun designer, Dr. Gerald Bull, as well as the Brazilian team. The Al Abid seems to have been a 48 ton missile whose main booster used a cluster of five Scuds. The second stage used two Scuds, and the third stage was of Brazilian design. While the primary did reach an altitude of 12,000 meters, the other two stages either failed to separate, or may not have been activated during in the test. Nevertheless, the test showed Iraq would eventually be capable of launching a satellite into orbit or firing much longer range missiles.³²⁹

A few days later -- on December 14, 1989 -- Iraq announced it had developed another new missile called the Tamuz 1. It claimed it had tested the missile twice and that the launches had reached ranges of up to 1,500 kilometers.³³⁰ The Tamuz was also being built with Brazilian assistance, but -- in spite of Iraqi claims -- it does not seem to have been tested and may still have been in the developmental stage when the war began. The Tamuz seems to have been a three stage, liquid fueled, 48 ton missile similar to the Al Abid. It may have used the same booster system -- with five Al-Abbas boosters in the first stage, one in the second stage, and a third stage with a 750 kilogram payload.³³¹

Some experts feel that the Tamuz could have had a range of roughly 2,000 kilometers, with its completed guidance package, once it was deployed. Others experts believe that a range of 1,250-1,500 kilometers was more likely once a military payload was added. Such a missile would be very complex, involve a great deal of launch preparation and launch time, and require large fixed facilities. It would, however, have been the first Iraqi missile with a high range-payload at ranges of 1,000 to 2,000 kilometers.³³² It could have delivered a large nuclear weapon -- or large chemical or biological weapons payload -- against any target in Israel and Iran from launch sites deep in Iraq. U.N. inspections after the Gulf War confirm that Iraq had been actively working on nuclear warhead designs for its missiles.³³³

While any such performance estimates are highly controversial, one expert gave the following comparison of the performance characteristics of existing Iraq's missiles and the Tamuz:³³⁴

Table XVII-1

Comparative Performance of Iraqi Surface-to-Surface Missile Systems

	<u>Normal SCUD B</u>	<u>Al-Hussein</u>	<u>Al-Hijarah</u>	<u>Tamuz/ Al Abid</u>
date first appeared	03Aug87	18Mar88	07Dec89	-
number of stages	1	1	2	3
diameter (meters)	0.884	0.884	0.884 m	-
length (meters)	11.7	12.55	13 m	-
weight (kilograms)	6,300	7,340	34,500	-
range (kilometers)	280	600	750	1,200-1,500
chemical-warhead (kilograms)				
total weight	985	190	220	-
weight of agent	555 t	107	-	-
CEP (meters)	900 m	3,000 m	3,000	-
flight time (minutes)	6.0 - 6.5	8.0 - 9.0	10-12	-
flight Mach	4.0	4.0	4.0	-
fuse	variable proximity	variable proximity	variable proximity	-

Source: Adapted by the author from material in U.S. Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18 and working paper by Dick Pawloski.

Iraq also improved its missile deployment capabilities. It obtained more Soviet-made transporter erector launchers (TELs) for its regular and improved Scuds, and developed its own mobile launchers. It also set up a large number of pre-surveyed sites, and some sites with fixed launchers. In February 1990, U.S. intelligence detected Iraqi construction of five fixed missile launcher complexes in western Iraq. These complexes included 28 operational launchers, and even the 600 kilometer range Al-Hussein could reach the Israel cities of Tel Aviv, Haifa, and Israel's nuclear facility in Dimona from these launchers. They also could reach targets throughout Syria and in much of Turkey.

Iraq's "Super Guns"

In addition to its missiles, Iraq experimented with advanced "gun" systems, in "Project Babylon", although these systems were still in the developmental stage when the Gulf War began. This Iraqi effort became public on April 10, 1990, when British customs officials at Teeside seized eight steel tubes bound for Iraq. These tubes were part of a giant "cannon" that could hurl projectiles hundreds of miles, and part of a long series of shipments. Britain later disclosed that 44 such tubes had already been sent to Iraq, and that devices that could serve as the breach for such a "gun" had been intercepted in Turkey.³³⁵

These "super guns" were designed by Dr. Gerald Bull, a Canadian ballistics expert who was murdered outside his home in Brussels on March 22, 1990. They were an extension of work that Bull had done earlier for the U.S. and Canada in what was called "Project Harp".³³⁶ Bull's primary interest was in using advanced solid-propellant gun technology to launch satellites, and he headed a firm called Space Research Corporation (SRC), which was headquartered in Brussels.³³⁷ Iraq, however, seems to have been the only country willing to fund his work, and he turned to military applications.

U.N. inspection teams found after the war that Iraq already had a 356mm gun, and confirmed earlier intelligence reports that the tubes were to be used in two 1000mm prototype guns. The 356mm experimental gun had been operational for several years, and had been tested seven times. It evidently had not been used for about a year before the Gulf War. It was built into the slope of a mountain at Jabal Hamrayn, near Bir Uгла, about 200 kilometers north of Baghdad. The gun had been tested largely for proof of principle at relatively short ranges.³³⁸

The British firm of Walter Sommers had supplied the steel tubing for the 356mm gun during mid-1988 through early 1989, and other parts had come from Germany, Spain, and France. It was hardly a highly lethal long-range weapon. It fired a projectile of 75 kilograms (165 pound), but it could only carry 15 kilograms (30 pounds) of high explosive. While

some of its design data claimed a maximum range of 750 kilometers, its real-world range was probably about 150 kilometers (93 miles) to 180 kilometers (120 miles), and Israel was some 825 kilometers (550 miles) away.³³⁹

Neither of the 1000mm guns were assembled, and only one had sufficient components to indicate it might be operational in the near future. The parts were stored for this gun at Iskandariyah. According to some reports, it was supposed to be about 131 feet (40 meters) long, with a 39" breech, and weigh up to 402 tons.³⁴⁰ The steel tubes, which seems to have been a recoil mechanism, and a frame for swinging the tube up to 60 meters, were all to be made by Walter Sommers Limited and Sheffield Forgemasters in the U.K.³⁴¹ Iraq also ordered large amounts of propellants to be used for the gun from a firm in Belgium. This came to light when the British firm Astra bought the Belgian Company of PRB, and found the order on its books.³⁴²

Data released by the U.N. inspection teams indicated that each gun was to be in 26 sections and about 160 meters long (the length of 1 1/2 football fields). They calculated that it was designed to fire a 1,000 kilogram (2,200 pound) projective with 408 kilograms (898 pounds) of high explosive or payload.³⁴³ Some experts estimate that it would have been able to fire weapons of mass destruction at ranges range of up to 1,000 miles; others that it was designed to put payloads of 300 to 500 pounds into orbit.³⁴⁴

Bull does seem to have been working on a rocket-assisted shell designed to launch a satellite called Martlet IV, but the design was in its early conceptual stages, and might have taken a decade to implement -- if it was practical at all. The design called for a projectile that the gun could fire at three kilometers per second and which would reach a height of 27 kilometers. A first stage rocket was then supposed to take the projectile to 48 kilometers, and a third stage rocket was to accelerate it to a velocity of 80 kilometers. A third stage rocket was then supposed to accelerate the projectile to 105 kilometers, and a speed of nine kilometers per second. This would carry the projectile to a fractional orbit at an altitude of 1,700-2,000 kilometers. A final insert motor was then supposed to put it fully into orbit. All of this was to be done using automatic timing without radio control or correction from the ground.

It is far from clear that the gun could ever have used technology this complex to launch a payload large enough to act as a militarily significant communication satellite or to serve useful intelligence needs, or that Bull could have solved the timing and acceleration problems without the resources of a nation with far more advanced technical capabilities

than those of Iraq. Further, it is unclear that Bull had designed a breech system capable of handling the immense recoil from the larger gun.³⁴⁵

The situation is somewhat different in terms of such a gun's ability to fire weapons of mass destruction. There are indications that Iraq planned to target the guns against Israel and use shells with biological weapons, although it is unclear whether Iraq's plans had moved beyond the conceptual stage. The design of such a shell would have been extremely complicated, and Bull does not seem to have worked on such a design. It is very doubtful that Iraq could have designed such a round, and such a design would challenge the design, manufacturing, test, and evaluation capabilities of even the most sophisticated country.³⁴⁶

While technically impressive, these "super guns" may have been little more "super toys". They were at best rail mobile, and it is unclear that the 1,000 mm gun could have been moved without disassembly. Once they fire, their trajectory can be used to target them. This might not have presented problems in firing at Iran, because Iraq had superior fighter cover, but would have presented serious problems in any attack on Israel. It is unclear that they can lift enough payload to launch a satellite for most military purposes, or that most of the required sensor, processing, and communications technologies could withstand the shock of firing the gun. They present major problems in terms of designing a reliable shell that can effectively disperse biological agents, and their rate of fire seems to be too slow for high volume delivery of chemical weapons. They may well have been more suitable as terror weapons than as effective military systems.

Iraq's Missile Activity During the Gulf War

There is no way to determine exactly how many missiles Iraq had in inventory at the beginning of the Gulf War. Iraq almost certainly had over 1,000 Scuds of all types, and at least several hundred extended range Al Hussein and Al Abbas missiles. Iraq also changed the deployment of these missiles before its invasion of Kuwait, and expanded its missile deployments to cover its western as well as its eastern borders.

In March, 1990, Iraq deployed from 12 to 18 fixed Al-Abbas missile launchers at three fixed sites in southern, western, and northern Iraq. The northern and southern sites gave Iraq the ability to strike deeper into Iran, but the western and southern sites gave Iraq the ability to strike at other targets and provided coverage of targets in Israel, Syria, and Turkey.³⁴⁷ The site nearest to Israel was near the H-2 airfield in western Iraq, on the road between Iraq and Jordan, and had six launchers oriented towards targets in Israel or Syria. In addition, Iraq had nine prepared launch sites for Scud missiles with 62 launch positions, although several normally did not have launchers deployed.³⁴⁸

In April, 1990, information surfaced that Iraq might be setting up a new missile test range in Mauritania in west Africa. This test range gave Iraq the ability to test missiles in excess of 1,000 miles -- tests that were impossible in Iraq without crossing international borders. Finally, in July, 1990, it became apparent that Iraq had quietly sought to buy titanium furnaces from the U.S. These furnaces can be used to manufacture a number of lightweight titanium missile parts, including advanced nose cone designs for warheads.³⁴⁹

The Condor, Tamuz, and any other new missiles were still in the development stage when the Gulf War took place. However, on October 9, 1990, Saddam Hussein announced that Iraq had developed yet another new missile that could hit Israel. The timing of this announcement was suspicious. It came in the midst of a growing confrontation between Iraq and the nations supporting the U.N. blockade and military coalition that came as a reaction to Iraq's invasion of Kuwait. It also came the day after a major clash between Israel and Palestinians at the Temple Mount in Jerusalem that Saddam Hussein was trying to exploit to weaken Arab support for the U.N..³⁵⁰

Once the fighting began, Iraq proved it could hit targets in both Israel and Saudi Arabia, and its missile forces proved to be almost impossible to target.³⁵¹ U.N. planners focused on the fact Iraq had created a number of presurveyed launch sites and fixed missile sites between its invasion of Kuwait in August, 1990. These included 28 fixed launchers in Western Iraq, with other fixed sites near Taji, Baghdad, and Daura.³⁵² As a result, many U.S. intelligence experts felt Iraq's missile forces would be easy to target. They estimated that Iraq only had 28 fixed launchers, with 28 more under construction, and 36 Soviet-supplied mobile missile launchers at the time the war began. This estimate gave Iraq's surface-to-surface missile brigade an active strength of three to four regiments with three launchers each, and a deployed strength of 9-12 launchers.³⁵³

As a result, Iraq had more launchers than the U.S. estimated, and it seems to have deployed new transporter-erector-launchers (TEL)s called the Al Walid or Al Nida, which Iraq had displayed at the Baghdad International Arms Exhibition in 1989. Some experts feel this unit became operational before the war, and supplemented Iraq's standard Soviet-designed MAZ-543 launchers.³⁵⁴ The U.S. estimates also did not take account of Iraq's dispersal capabilities, Iraq's decoy launchers, the number of vehicles with similar appearance in launch areas, the Scud's rapid redeployment times, concealment options, and Iraq's use of decoys.

As it became clear that the U.N. was serious about establishing an offensive capability, Iraq ceased to plan for any use of its fixed launch facilities. It moved the location

of its Scud launch units away from positions directed against Israel, and dispersed them to various parts of the country. It reduced its dependence on fixed sites, and sites that allied intelligence had detected before the actual fighting in the Gulf War began. Iraq pre-surveyed and set up a large number of sites in the launch areas that could be used to fire on Israel and Saudi Arabia in the months before combat began. This allowed Iraq to scatter its missile units over a wide amount of territory, to create broad launch zones, and develop the capability to hide its TELs and missiles with camouflage, in civil buildings, or other places of concealment. Iraq's TELs and support vehicles were also difficult to distinguish from commercial vehicles without extensive reconnaissance, and usually moved at night. Iraq made extensive use of "shoot and scoot" tactics, and redeployed its missiles and equipment shortly before a firing to minimize their vulnerability make targeting far more difficult.

The exact range of support equipment Iraq deployed with its missile units during the Gulf War is uncertain. Iraq is known to have used the Soviet "End Tray" meteorological radar associated with the FROG 7 and Scud B in some of its missile deployments, and the UAZ-452T support vehicles. It is not known how effective any of this support equipment was at the ranges of the Al-Hussein and Al-Hijarah.³⁵⁵

There survivability of Iraq's missile launchers allowed it to achieve its only real military "success" of the war. The pattern of Iraq's launches during the war is shown in **Table XVII-2**. The first Scud strike came late on the afternoon of January 17th, in the form of two Scuds aimed at Israel. The first strike on Saudi Arabia took place on January 18th. These strikes might have caused large scale panic, and brought Israel into the war, if it had not been for the Patriot air defense system. A Patriot hit the second round of Scuds aimed at Dhahran at 17,000 feet, and the U.S. provided aid to Israel in readying its Patriot missile systems, rushing 32 missiles to Israel in 17 hours.

The Patriot system, however, was a point defense anti-tactical ballistic missile system, and could not provide anything approaching a leak-proof defense system. It also could not prevent missile debris and warheads falling on populated areas. As a result, the U.N. Coalition was forced into a massive Scud hunt that consumed some 2,493 sorties. The Coalition tried to create two "Scud boxes" to cover the most likely launch areas in Iraq for strikes against Israel and Saudi Arabia. Both the U.S. and U.K. deployed special operations forces to help find the missiles. The U.S. used its DSP satellites to try to locate missile launches. It used F-15Es with Lantirn to target and kill missiles, and F-16C/Ds and A-10s to patrol roads and key launch areas. It used B-52s and F-117As to hit possible storage and production facilities.

This effort never succeeded in halting the Iraqi Scud launches, and may never have killed a single Iraqi Scud launcher, although it certainly affected launch rates, accuracy, and reliability. The U.N. Coalition had no way to locate and destroy most of Iraq's missiles. As the pace of Coalition air strikes increased, the Iraqis hid their Scud TELs in towns and under underpasses. They made more aggressive up their "shoot and scoot" tactics, and this made it very difficult for U.N. fighters to detect and kill missiles during the brief periods when they deployed in the open to launch. As a result, Iraq reached its peak firing rate of 10 missiles as late as the 10th day of the war, and was able to launch its last missiles on February 25th. Iraq may never have lost a mobile launcher to U.N. air attacks, and the U.S. was still striking at Iraqi Scud forces when the war ended on February 27th.³⁵⁶

Table XVII-2

Iraqi Surface-to-Surface Missile Launches During the Gulf War

Result	Target			Total
	<u>Israel</u>	<u>Saudi Arabia</u>	<u>Bahrain</u>	
Total Fired	40	48	3	91
Missed Country	1	3	2	6
Missed Target Area	15	11	1	27
Intercepted by Patriot	34	11	0	45
Hit Target	0	13	0	13
Debris Hit	7	7	0	14

Source: OSD Public Affairs, March, 1991

Iraq did not fire any missiles with chemical warheads at U.N. Coalition targets during the Gulf War, and the damage done by most of its missile strikes was relatively limited.³⁵⁷ Nevertheless, a lucky hit near Dhahran killed 28 U.S. soldiers and wounded 97 others. This not only was Iraq's only long-range offensive success of the war, it killed more U.N. soldiers than any single land engagement of the war, and Iraq's missile attacks on Israel

damaged a number of urban areas, caused additional civilian casualties, and achieved world-wide publicity.

Iraq's strikes would have had far more impact if it had used chemical warheads, although U.N. inspectors found after the war that Iraq's chemical warheads were relatively crude and unreliable. Soviet technicians who inspected the Iraqi missiles felt much of the basic missile modification work was also crude, and that this explained the break up of many Iraqi modified Scuds during their approach towards targets in Israel. They also felt that the chemical warheads were unbalanced, and would have made these problems far worse -- potentially making the warheads burn up or depriving them of much of their effectiveness.³⁵⁸ It seems likely, however, that Iraq was deterred by the fear of massive U.N. and/or Israeli retaliation, rather than by technical considerations.

Iraq's Missile Activity After the Gulf War

There is no way to tell how much of Iraq's missile capabilities survived the Gulf War. There are radically different estimates of how much of its missiles, launch equipment, missile parts, and manufacturing equipment it dispersed before the U.N. Coalition attacks and then recovered and hid after the Gulf War. In its initial report to the U.N. after the war, Iraq declared that it had 52 ballistic missiles, 38 launchers, 30 chemical-filled warheads, and 23 conventionally armed warheads at five sites. It then admitted that it had nine more missiles at one of its sites.³⁵⁹

In the months that followed, the U.N. identified at least 17 facilities where the Iraqi government conducted research, production, testing and repair of ballistic missiles, launchers, and rocket fuel.³⁶⁰ By February 1992, the U.N. had destroyed all the stocks that Iraq had declared and a substantial amount of additional equipment. By this time, the U.N. had destroyed over 80 missiles, 11 missile decoys, dozens of fixed and mobile launchers, 8 missile transporters, and 146 missile storage units.³⁶¹ The U.N. had also found the 30 chemical warheads for Iraq's Scud missiles stored in the Dujael area, some 18 miles away from the position Iraq had declared. Sixteen used a unitary nerve gas warhead and 14 were binary.³⁶²

It is clear, however, that Iraq is probably concealing a large number of missiles and launchers, as well as much of the manufacturing equipment, parts, and test equipment that it had purchased before the war. Some estimates indicated that Iraq had imported a total of 819 Scuds from the former Soviet Union alone to launch or modify before the war, and that Iraq might still have 100-200 missiles, and 12-20 launchers. In testimony before Congress in January, 1992, the Director of the U.S. Central Intelligence Agency (CIA) estimated that

Iraq might still possess "hundreds" of missiles. The U.N. inspection teams in Iraq issued a somewhat similar estimate in November, 1992.³⁶³

While there is no way to know how many missiles and launchers survive as of 1994, it is clear that Iraq could have deployed such missiles in underground missile storage sites it built before the war and that it seems to have built new sites after the cease-fire.³⁶⁴ Further, Iraq has continued to defy U.N. orders to destroy the equipment the U.N. did discover. In February, 1993, it was bold enough to deploy the special fuel trucks used to launch Scud missiles in areas outside Baghdad. In June and July, it attempted to deny U.N. inspectors access to its missile test ranges.³⁶⁵

It seems likely that Iraq will recover some Scud launching capabilities relatively quickly the moment it ceases to be subject to U.N. inspection. It may well be able to give such weapons chemical warheads -- which it could probably prepare covertly using chemical weapons made in laboratory or non-military facilities. It will be much longer, however, before it can recover its ability to modify additional missiles, or move towards manufacturing of more advanced systems. What is more uncertain is whether Iraq can obtain the liquid fuel and oxidizer necessary to launch the missiles without building a new facility. According to one expert, it obtained all of its fuel and oxidizer supplies from the former Soviet Union before the Gulf War, and such supplies only have a storage life of 12-18 months.³⁶⁶

Iraq will probably remain inferior to Iran in missile warfare capabilities for some time after the U.N. embargo is lifted, and Iran could probably win any near-term repetition of the "war of the cities". Until Iraq can acquire new missiles, it will not be able to hit point or small area targets. Its surviving missiles lack the accuracy, and Iraq lacks long-range targeting capability. Iraq could, however, launch significant missile attacks against Iran, against coastal area targets in the upper Gulf, against Turkey, and against Israel and Syria. Its missiles pose a threat largely in terms of intimidation and popular fear, but not in terms of destroying military targets, paralyzing war fighting capabilities, or destroying particular buildings and facilities.

Like Iran's missiles, Iraq's missiles would be vulnerable to point defense by the improved Patriot, and the U.S. could counter large-scale attacks by attacking the launch sites with U.S. air power. The U.S. has no current way, however, to prevent Iraq from confronting it with the same "Scud hunt" problems it had during the Gulf War: It would be almost impossible for the U.S. to hunt out and destroy enough of Iran's missile capabilities to halt all attacks. As is the case with the missile threat from Iran, the U.S. might well be

forced into deterring missile strikes by escalating its attacks on other high value Iraqi targets.

Iraq has a clear incentive to acquire more lethal chemical and biological warheads for its ballistic missiles, and to develop and produce cruise missiles in Iraq. Iraq's Scud variants have probably lost much of their "terror" effect as long as they are equipped with conventional warheads. The relatively crude chemical warheads that Iraq had in inventory during the Gulf War would not have been particularly lethal if it had used them, and Iraq risked provoking far more damage to Iraq than it could inflict on its neighbors.

The balance of terror seems unlikely to favor Iraq, even if it does develop more effective chemical warheads, unless it can avoid Western or Israel retaliation. Chemical weapons simply are not lethal enough to inflict the kind of massive damage on a southern Gulf state or Israel that could in any way compensate for the devastating damage that the U.S. could inflict on Iraq with conventional air and missile power, or Israel could inflict with its own weapons of mass destruction. Chemical weapons probably no longer could give Iraq any advantage over Iran. While nerve warheads might kill several hundred people with a lucky strike, and several thousand under worst case conditions, Iraq cannot launch large enough volleys to achieve critical war fighting damage, and it is unlikely to regain its prior technical lead over Iran.

Biological warheads create a higher risk. The effective delivery of highly lethal biological weapons may be beyond Iraq's near-term level of technology, but the discussion of how Iran could use such weapons has already shown that even anthrax can be extremely deadly, and no one should underestimate the "terror" effect even a crude biological warhead. Such a weapon might give Iraq major political and strategic advantages in terms of intimidation, and the ability to launch strikes whose political impact was out of all proportion to their direct military value. The use of toxins or persistent biological weapons like Anthrax could achieve significant military effects or population damage, and Iraq might just take the risk of using an agent that was a communicable disease, rather than military agents which require direct exposure to the original payload or which are tailored to control their infectiousness.

It is also impossible to dismiss the risk that Iraq will devote sufficient resources using its domestic resources and covert purchases of technology and equipment to develop far more effective biological warheads by the end of the decade. The weaponization and deployment of such warheads involves technical challenges in terms of dry storable agents, microencapsulation, dissemination at critical heights, and predicting wind and temperature over the target area that may well be beyond Iraq's capability. There are experts that seriously question whether any missile warhead technology would achieve extremely high

lethalities -- given the combined challenge of developing a suitable biological weapon and suitable warhead technology. The risk does, however, exist, and it should be noted that it would be much easier to weaponize a biological agent for delivery by a relatively slow flying aircraft or cruise missiles than for a ballistic missile.³⁶⁷

As for cruise missiles, Iraq has even more of an incentive to develop a cruise missile than Iran. Iraq has much of the technology already. It was working on modifications of the Chinese Silkworm (HY-2) cruise missile that were designed to have ranges of 75, 150, and 200 kilometers at its Nasr missile factory before the war.³⁶⁸ Its use of remotely piloted vehicles during the Gulf War led to some initial fears that these might be equipped with chemical or biological agents. While Iraq has no more capability than Iran to develop and deploy a Tomahawk (TLAM)-like missile, it may be able to build a missile about half the size of a small fighter aircraft and with a payload of about 500 kilograms. Iraq already has the technology needed for fusing and to equip such a system with CBW and cluster warheads. Navigation systems and jet engines would be a major potential problem.

While Iraq may find major problems in acquiring long-range ballistic missiles, parts and manufacturing capability, it might be able to acquire what it needs to make cruise missiles covertly or on the black market even while U.N. sanctions are still in force. Iraq should be able to solve the problem of acquiring a suitable guidance system over time. Current inertial navigation systems (INS) would introduce errors of at least several kilometers at ranges of 1,000 kilometers and the risk of total guidance failure could exceed two-thirds of the missiles fired. However, Iraq may well be able to acquire better guidance systems using covert means. As has been discussed earlier, U.S. studies indicate that a commercial differential global positioning system (GPS), integrated with the inertial navigation system (INS) and a radar altimeter, might produce an accuracy as good as 15 meters. Some existing remotely piloted vehicles, such as the South African Skua claim such performance. Commercial technology is becoming available for differential global positioning system (GPS) guidance with accuracies of 2 to 5 meters.

Iraq would face the same problems in acquiring suitable engines as Iran. While there are many suitable commercially available reciprocating and gas turbine engines, finding a reliable and efficient turbofan engine for such an application might be difficult. It is doubtful that Iraq could design and build such an engine, but it does have most of the needed design and manufacturing skills. Airframe-engine-warhead integration and testing would be challenging and possibly beyond Iraq's manufacturing skills. However, it is inherently easier to integrate and test a cruise missile than a long-range ballistic missile, and less detectable when such a system used coded or no telemetry.³⁶⁹

Such systems could reach a wide range of targets. A border area deployed system with only a 500 kilometer range could cover half of Iran, south eastern Turkey, All of Kuwait, the Gulf coast of Saudi Arabia, Bahrain and most of Qatar, the northern UAE, and northern Oman. A system with a 1,200 kilometer range could reach Israel, the eastern two-thirds of Turkey, most of Saudi Arabia and all of the other southern Gulf states including Oman. Such a system could also be programmed to avoid major air defense concentrations at a sacrifice of about 20% of its range.

Iraqi Chemical Weapons Programs

Iraq is a signatory to the Geneva Protocols of 1925, prohibiting the use of poison gas, and the Biological Warfare Convention of 1972, banning the development, production, and deployment or stockpiling of biological weapons. This did not, however, prevent it from producing and using chemical weapons in the Iran-Iraq War. Chemical weapons offered Iraq a highly lethal weapon that was well within its technical and manufacturing capability.

When the Iran-Iraq War began, Iraq initially used only non-lethal CS gas, or some form of blister agents. It seems to have used them in its attack on Susangerd in November, 1980, in attacks on Dezful and other areas in mid-1981, in defending against the Iranian attacks on Dezful and Sush in late March, 1982, and in the battles to defend Basra and Mandali in the fall and winter of 1982.³⁷⁰ Iraq does, however, seem to have produced some mustard gas at a plant at Samara, and to have constructed two small pilot plants to produce nerve gas there -- with a planned capacity of around 30-50 tons per year.³⁷¹

By 1983, Iraqi production of mustard gas was sufficient for Iraq to begin to deliver small amounts of poison gas with artillery, fighters, and Mi-8 helicopters. It is unclear exactly when Iraq developed bombs using chemical agents, but Iraqi Su-7 Fitter aircraft began using modified 250 kilogram bombs that Iraq had bought from Spain. The mustard gas in these bombs was exceptionally pure, and this may indicate that Iraq was still producing batches under laboratory conditions, rather than mass producing mustard gas in tons.³⁷² These uses of lethal gas did not produce major casualties, although Iran's reaction indicated that it had a major psychological impact on Iranian troops. Iraq, however, made major efforts to acquire the technology and feedstocks from other countries to expand its chemical weapons production facilities.

Mustard gas also offered Iraq significant military advantages which apply to any future uses of this gas. Mustard gas is a blistering agent which is 10 to 100 times less lethal than the simpler nerve agents in terms of direct exposure, and slow to act on those who are exposed. Lethality, however, is not the only issue in measuring the effectiveness of chemical weapons. Mustard gas is easier to produce, handle, and deliver. It attacks the lungs, eyes,

and skin, and gas masks alone are not effective protection. Mustard gas can also be more effective than many nerve gases for several important tactical purposes, particularly against infantry, or exposed humans in other target areas. It persists for several days to several weeks, and its wounds are slow to heal. Limited exposures to mustard gas can blind or blister for periods of 4 to 6 weeks. Casualties consume large amounts of medical services and support. These properties of mustard gas gave it considerable effectiveness against Iranian infantry, which often spent considerable time lying in exposed locations and had relatively poor medical facilities.

Once Iraq began to use chemical weapons, it encountered growing problems in importing the feedstocks it needed. As a result, it began to acquire technology and equipment it needed, to manufacture ethylene oxide and the other chemicals it needed to make thiodiglycol and produce mustard gas. Iraq had already begun to build up its ethylene production facilities in the late 1970s, and these facilities were located at Petrochemical Complex No. 1 near Basra

There is some debate about whether Iraq began to drop bombs using nerve gas in 1984 or 1985. It seems likely that Iraq began to use small amounts of nerve gas in response to Iran's offensives in 1984. This nerve gas consisted of non-persistent "G-agents", principally Sarin (GB). These agents are extremely lethal, and act almost instantly when the skin, eyes, and wet tissue of their victims are exposed. Nerve gases are difficult to detect, and troops require excellent protection and an antidote in order to prevent high casualties. The G-agents persist for only a few minutes to a few days, and allow an attacker relatively rapid tactical movement into exposed areas. In contrast, persistent agents may remain lethal for several days to several weeks. Friendly troops can only operate in exposed areas if they have full protection, and occupy the area for only a limited amount of time. This is why persistent agents are much better suited to fixed targets like air bases and logistic centers, or defensive operations where they can be used against the rear areas of the enemy with only limited risk to friendly troops.³⁷³

Iraq's initial production of poison gas seems to have taken place near Basra. Basra, however, was within range of Iranian artillery fire at the start of the war, and came under fire again in the mid 1980s. This may explain why Iraq constructed a large 25 square kilometer chemical weapons production and research facility at Muthanna. Muthanna is about 100 kilometers northwest of Baghdad, and is near the air base at Habbaniya. It was constructed with numerous heavily sheltered facilities, and was defended by troops and SA-2 missiles. The complex became the largest single Iraqi production facility for mustard gas. Production seems to have begun in 1983, and to have climbed steadily to the point where Iraq could produce large quantities of mustard gas in 1985.³⁷⁴

Iraq also set up major new Iraqi research center for chemical weapons at Salman Pak, 56 kilometers south of Baghdad. This facility was later expanded to work on biological and other advanced weapons. According to some reports, it experimented with cyanide, hydrogen-cyanide, cyanogen-chloride, psychochemical agents like BZ, and Lewisite gases as well as the nerve, mustard, and CS gases that Iraq used extensively in the Iran-Iraq War.³⁷⁵

Iraq was able to produce mustard gas and nerve agents in significant quantity by 1985 or 1986, although Muthanna did not reach full capacity production of either mustard or nerve gases until the late 1980s.³⁷⁶ U.N. inspectors estimated that it eventually reached a peak production capacity of 5 tons of mustard gas and 2.5 tons of Sarin per day.³⁷⁷ When U.N. inspectors examined Muthanna after the war, it still had 225 tons of nerve agent, and 280 tons of mustard gas.³⁷⁸ According to some reports, this plant was the facility that developed nerve gas warheads for Iraq's long-range missiles.

Iraq made additional efforts to produce the precursor chemicals or feedstocks necessary to manufacture nerve gas, and reduce its dependence on outside sources. There are reports that Iraq set up yet another gas warfare complex at Fallujah, 65 kilometers west of Baghdad. Some reports indicated before the U.N. inspections began that the Fallujah facility had three plants capable of producing 1,000 tons per month of Sarin, and had produced large amounts of persistent VX nerve gas.³⁷⁹ Persistent V-agents like VX retain their lethal effect for periods of several days to several weeks. They are slightly slower to kill than G-agents, but they kill far more quickly than mustard gas.³⁸⁰ These reports also indicated that Fallujah was the main center of Iraqi loading of artillery shells and rockets with nerve gas.

The U.N. found after the war, however, that Fallujah was used largely to produce precursors like phosphorous trichloride, phosphorous chloride, and thionyl chloride, and to store chemical weapons stocks.³⁸¹ Iraq seems to have completed construction of the special refinery and other facilities at Al Fallujah, northwest of Baghdad, before the August, 1988 cease-fire.³⁸²

According to other reports, Iraq also began construction of a new Petrochemical Complex No. 2 ethylene plant near Musayyib in 1988, which was scheduled to begin operations in 1991.³⁸³ The Basra plant was designed with a capacity to produce 410,000 tons of ethylene products a year, and the Musayyib facility to produce 420,000 tons of ethylene and 67,000 tons of ethylene oxide.³⁸⁴

Iraq's other efforts to expand its chemical weapons production capabilities are difficult to confirm. There are some reports Iraq was already developing a phosphate industry centered at Akashat and Al Qa'im, and had adapted powdered detergent and fertilizer plants to use its phosphate ore to feedstocks. Iraq may also have expanded its

facility at Rutbah, just south of Ashkhat, to produce acids and other chemical components before the Gulf War. Other reports indicate Iraq established a complex called "Project 9320" in the area which had three factories to produce secondary chemicals to aid in the manufacture of nerve gas.³⁸⁵

As a result of all these developments, Iraq seems to have expanded from production levels of about 10 tons a month of all types of gases by late 1985, to a capacity of over 50 tons per month by late 1986.³⁸⁶ In late 1987, Iraq could produce over 60 tons of mustard gas a month and four tons each of Tabun and Sarin.³⁸⁷ In early 1988, Iraq could produce over 70 tons of mustard gas a month and six tons each of Tabun and Sarin.³⁸⁸ These totals do not include possible production of Soman, a choking agent like phosgene, blood agents like hydrogen cyanide and cyanogen cyanide, vesicants like Lewisite and agents like Adamsite and chloropicrin.³⁸⁹

Production continued to expand after the August, 1988 cease-fire in the Iran-Iraq War, and Iraq produced large amounts of mustard and nerve gas weapons before its operations were halted by U.N. Coalition bombing.³⁹⁰ According to one estimate, Iraq had at least ten major storage bunkers for chemical weapons scattered throughout Iraq the time the bombing began. This same estimate indicates Iraq was able to produce up to 3,500 tons of mustard gas and 2,000 tons of Sarin and Tabun a year by 1989, or more than 20 times the amount it could produce in 1985, and Iraq was producing persistent agents VX and VR-55, and its plant at Fallujah was being expanded to a capacity of 2,000 tons per month.³⁹¹ This production would have given Iraq enough chemical agents to arm 250,000 - 500,000 tube and rocket artillery rounds each year, as well as smaller numbers of bombs, but it may sharply exaggerate Iraq's capabilities.³⁹²

What is clear is that Iraq used poison gas regularly between 1988 and 1989, as part of its military effort to suppress Kurdish military resistance. This was confirmed by a British defense laboratory that tested soil and bomb damage fragments taken from Kurdish villages in the north of Iraq. The Chemical and Biological Defense Establishment at Porton Down found low levels of sulfur mustard gas and the nerve gas Sarin (GB). These traces were found in Birjinni, a village of about 200 in northern Iraq. This village had been selected because eyewitnesses had said Iraqi planes dropped three clusters of four chemical bombs on August 25, 1988, and killed at least four people.³⁹³

Saddam Hussein stated on April 2, 1990, that Iraq had "double-combined chemical" weapons, and had them since the last year of the Iran-Iraq War. Such weapons later proved to be a crude technology for storing alcohol in nerve gas weapons that it acquired in 1984 or 1985, and used during the latter half of the Iran-Iraq War.

Iraq does not appear have been able to manufacture "dusty" mustard gas when the Gulf War began.³⁹⁴ Such a capability is important because blood agents rapidly defeat many military gas masks. "Dusty" mustard gas overcomes defenses in a different way. It is a powdered form of mustard gas which is very persistent, and which can coat particles so small that they are only several microns in size and which may be able to penetrate protective clothing and filters. Iraq also does not seem to have had "cocktail" chemical weapons which mix several chemical agents together to provide different kinds of lethality and/or defeat different forms of protection. While some sources indicate that Iraq used "cocktails" of cyanogen with mustard gas and Tabun in Kurdistan, this has not been confirmed.³⁹⁵

Iraq and Chemical Weapons during the Gulf War

By the time the Gulf War began, Iraqi doctrine called for the regular training of all combined arms elements in chemical warfare. Iraqi field forces were equipped with numerous dual-capable delivery systems, and sophisticated chemical protection, reconnaissance, and decontamination gear. Delivery systems included rifle grenades, 81mm mortars; 152mm, 130mm, and 122mm artillery rounds; bombs, bomblets, 90 mm air-to-ground rockets, 216 kilogram FROG and 555 kilogram Scud warheads, and possibly land mines, and cruise missiles.³⁹⁶

While Iraqi regular army and air force units fired the weapons that deliver chemical weapons, there were special chemical troops integrated throughout all of the branches of the Iraqi armed forces which are responsible for the care, build-up, and delivery of chemical weapons. They had a status approaching that of a separate combat arm, and included units and sub-units responsible for chemical defense, radiation and chemical reconnaissance, the operation of smoke and flame generators, the identification of chemical targets and meteorological analysis, and decontamination. Each corps had a chemical battalion, each independent brigade or division had a chemical company, regiments had chemical platoons, and chemical sections were assigned to battalions or platoons with weapons capable of delivering chemical weapons. As many as 50% of Iraq's combat aircraft and artillery weapons could deliver chemical rounds.³⁹⁷

Soon after Iraq invaded Kuwait, it made threats to use chemical weapons in dealing with the Western and Arab reaction to its invasion of Kuwait and build-up on the Saudi border. For example, Saddam Hussein gave a speech stating that foreign hostages would be dispersed to military and key civil locations throughout Iraq, including Iraq's major chemical weapons production facilities, on August 20, 1990. Iraq also made demonstrative gestures. It conspicuously loaded its aircraft with chemical weapons so that this could be detected by

U.S. intelligence before removing the weapons and placing them in back in their normal storage sites.

During the fall of 1990, Iraq dispersed chemical weapons in number of rear area facilities. By November, 1990, Iraq had built up large dispersed and sheltered stocks of chemical weapons in its territory outside the Kuwaiti Theater of Operations (KTO). It deployed a wide range of delivery systems to its forces supporting its invasion of Kuwait, gave out protection and decontamination gear, issued detailed instructions on chemical warfare to its unit commanders, and built decontamination trenches in the forward and rear areas.

As has been noted earlier, however, Iraq never used chemical weapons against a U.N. target during the Gulf War -- although there are some indications a chemical device may have gone off in Iraq.³⁹⁸ This failure to use chemical warfare could have several different causes. It seems likely that it was the result of a combination of (a) the purity and storage problems discussed earlier, (b) Iraqi fear of U.N. Coalition or Israeli retaliation with nuclear or chemical weapons, (c) the shattering impact of Coalition bombing, and (d) the fact Iraq quickly lost much of its command and control and distribution capability. Given Iraq's willingness to use chemical weapons against Iran and the Kurds, however, it seems likely that the principle factor was the U.N. and Israel's ability to retaliate. The first few days of the U.N. Coalition air campaign had shown Iraq that the Coalition could expand its conventional strategic bombing campaign to far more devastating levels by attacking key commercial and government targets.

There is no question that Iraq could have used chemical weapons in spite of its technical problems. It had ample stocks of chemical weapons, and had equipped its units with chemical protection and decontamination gear, and with the operational instructions for using chemical weapons.³⁹⁹ The size of Iraq's gas capabilities is indicated by the stocks the U.N. recovered after the war. Iraq initially declared to the U.N. that it had 500-550 metric tons of mustard gas and nerve agents in April, 1991. It increased this total to 650 metric tons in May, and to over 700 metric tons in July. To illustrate the scale of Iraq's effort to deceive the U.N. inspectors, it initially declared only 105 155mm artillery shells filled with mustard gas, and the U.N. eventually found 12,634.⁴⁰⁰

The U.N. went on to find 355 tons of mustard gas and nerve agents, 650 tons of intermediate chemicals, 6,920 chemical filled rocket warheads, and 1,376 aerial bombs.⁴⁰¹ As of February, 1992, the U.N. had found 45,755 filled chemical munitions versus the 10,000 to 11,000 that Iraq had initially declared, 78,675 unfilled munitions, 355 tons of bulk agent, and 3,173 tons of precursors for chemical weapons versus the 650 tons that Iraq had

originally declared. Some U.N. and U.S. sources estimated that Iraq might still be concealing up to 50,000 more rounds than it declared.⁴⁰²

Many of the munitions the U.N. did find were stored at the Al Muthanna State Establishment, a 25 square kilometer complex about 100 kilometers north of Baghdad, and near the air base at Habbaniya. Large numbers of chemical weapons were also found at four other sites, known as Fallujah 1, Fallujah 2, Fallujah 3, and Muhammediyat Stores.

The artillery shells were each filled with 3.5 liters of mustard agent using a tetyl burster charge. In addition to the 155mm artillery shells, the U.N. found 20,000 120mm mortar bombs filled with non-lethal CS gas. (Many damaged in the U.N. bombing). There were some experimental conversions of 130mm and 152mm smoke shells, and roughly 10,000 122mm rocket rounds filled with between 6.4 and 9 liters of nerve gas. These rocket rounds were poorly designed, and were corroded by a combination of the effects of the gas and decomposition of the solid fuel rocket motor.

The U.N. found bombs filled with mustard gas, and two types of nerve gas. While the mustard gas weapons were of relatively high design quality -- and had been damaged largely by mishandling and poor storage -- the nerve agents had quality problems. They consisted of GB (Sarin), GF, or a mixture of the two. They were chemically unstable, and soon broke down into lethal compounds. As a result, Iraq produced GB in batches, and only loaded its nerve gas weapons a few days before their use. The U.N. also found that Iraq's "binary weapons" were relatively crude. They were not storable binary weapons with agents kept in the bomb and automatically mixed. The bombs were prefilled with suitable alcohols and DF then had to be manually added and stirred. Such a procedure is dangerous for the operator, and can lead to improper mixture of the agent.

Iraq had four main types of these bombs. The smallest was the LD-250, a modification of a Spanish 250 pound smoke bomb. Each normally carried 64 liters of mustard gas, and the U.N. found 915 bombs filled with mustard gas out of a declared total of 110. There were also some 250 bombs filled with CS gas, but the U.N. did not find these in significant numbers. Iraq had a 500 pound bomb called the AALD-500. This contained 150 liters of mustard gas, and the U.N. found 676 such weapons. There were two bombs using nerve gas. One was the DB-2, which contained 400 liters of GB. The other was the R-400, which contained 102 liters of binary GB. The U.N. found 336 bombs of this type.

The U.N. found Iraq had produced 50 warheads for the Al Hussein missile. Nine had been destroyed in static testing and 11 had been used in training. The U.N. found that the remaining warheads had left in an orchard near a road. Sixteen of the 30 remaining warheads had unitary GB warheads, and 14 were of the binary type. The binary warheads were partially filled with alcohol to allow them to be armed by adding DF. The warheads were

poorly welded, had generally poor construction, and the burster charge was badly placed. It is uncertain whether such warheads could have done any real damage, and some experts feel that might have tumbled and broken up on reentry.

Finally, the U.N. found 300 tons of bulk agent stored in containers ranging from barrels to large tanks. Most of this agent was mustard gas, but at least 35 tons was GB. Much of the GB had broken down in storage. The U.N. found 2,579 tons of precursors out of the 3,173 tons Iraq had declared. It is possible that much of this total spilled or evaporated, but it is uncertain what happened to the remainder.⁴⁰³

The U.N. investigations showed that Iraq had significant problems in keeping its agents pure, and in developing corrosion-proof materials. Nearly 25% of the weapons the U.N. found had leaked, although it was often impossible to distinguish between problems with the chemical agents, problems with the weapons design, and problems because of wartime damage or rapid post-war movement and inadequate storage.⁴⁰⁴ Further, none of the Iraqi chemical weapons had any kind of special markings, and the U.N. inspectors found chemical and conventional bombs stored together at Kadzir air base. This raises serious questions about Iraqi safety procedures and inventory control.

Iraq's Current Chemical Weapons Capabilities

The U.N. inspection effort has discovered and destroyed a great deal of Iraq's chemical weapons and production equipment, including items like production equipment concealed in a milk plant near Mosul. Nevertheless, Iraq had ample time to disperse many of its chemical weapons, precursors, and production systems before the Gulf War began, and continued to hide and disperse them after it signed a cease-fire.⁴⁰⁵

Most experts feel Iraq has retained significant stocks of weapons. Robert Gates, the Director of Central Intelligence, testified to Congress in early 1992, that much of Iraq's "hard to get production equipment" for chemical weapons had been "hidden" before the allied bombing attacks. He also estimated that, "If U.N. sanctions are relaxed, we believe Iraq could produce modest quantities of chemical agents almost immediately, but it would take a year or more to recover the chemical weapons capability it previously enjoyed."⁴⁰⁶

Some experts feel Gates exaggerated the ease with which Iraq could acquire a significant chemical capability and that it might take several years and several hundred million dollars worth of imported equipment to develop a major war fighting capability. They note that Iraq lost much of its feedstock production capability during the bombing of Samara -- which was very heavily hit during the war. The difference, however, is a matter of a relatively few years, and probably one of definition. The large amounts of gas needed to support a major land offensive are very different from the comparatively limited amounts needed to arm several hundred missile warheads and aircraft bombs.

Iraq will almost certainly be able to recover significant near-term capability to threaten enemy population centers and area targets with missile and air strikes within a relatively short time after it is freed from U.N. control.⁴⁰⁷ Iraq will probably take three to five years to recover a significant capability to use chemical agents in enough shells, rockets, bombs, and warheads to fight a major land war once U.N. controls are lifted. It has lost a significant amount of its production capability, and will initially be limited to laboratory or small batch production. This still, however, will allow a nation as advanced as Iraqi to covertly produce several hundred gas weapons -- including missile warheads. There is virtually no way that any current inspection and control regime can prevent this.

Iraq's present and future chemical warfare capabilities will give it an added ability to intimidate and threaten southern Gulf states. Like Iran, however, Iraq will face the problem any use of such weapons against the southern Gulf and the West, or any other sophisticated military power like Russia or Turkey, would rapidly escalate a conflict. Iraq would be confronted by the risks of massive conventional retaliation. It will also be some time before Iraq can duplicate Iran's capability to conduct a chemical war near its borders. The most it will be able to do is launch limited long-range missile attacks and air raids, and chemical weapons in unconventional warfare.

Table XVII-3Chemical Agents Iraq Now Has the Technical Capacity to Produce

<u>Type of Agent</u>	<u>Delivery Method</u>	<u>Symptoms</u>	<u>Effects</u>	<u>Rate of Action</u>
<u>Confirmed</u>				
Blistering-Mustard (Possibly Dusty spray, Mustard)	Missile, artillery, bomb, aerial types; land mine	No early symptoms for mustard searing of eyes, stinging of skin	Blisters skin, destroys respiratory tract, causes temporary blindness	Minutes
Nerve- Sarin (GB), Tabun (GB), VK/VX?	Missile, Difficult artillery, bomb, aerial spray, land mine	Incapacitates breathing, drooling, nausea, vomiting, convulsions	Seconds or kills when delivered in high concentrations	
<u>Suspected in At Least Limited Amounts</u>				
Blood - Cyanide	Missile, artillery, bomb	Convulsions and coma	Incapacitates or kills when delivered in high concentrations	Minutes
<u>Possible at Experimental Level</u>				
Choking - Phosgene	Missile, artillery, bomb	Coughing, choking, nausea, headache	Damages and floods lungs	Hours

Source: James Blackwell, Thunder in the Desert, New York, Bantam, 1990, p. 35; Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, pp. II-336 to II-338; U.S. Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18.

Iraqi Biological Weapons

As is the case with Iran, it is far harder to document the history of Iraq's efforts to develop biological weapons than its efforts to develop chemical and nuclear weapons. This often leads to a neglect of Iraq's capabilities in this area, or to claims that charges Iraq has developed biological weapons are not serious. There is a virtually unanimous consensus among Western experts, however, that Iraq has devoted significant resources to such weapons since 1986, and that there is substantial classified evidence to prove this. This illustrates a key problem in tracking the proliferation of weapons of mass destruction in the Middle East. Biological weapons offer nations like Iran and Iraq a cheap and effective way of acquiring weapons of mass destruction. At the same time, nations like Iran and Iraq can make their efforts to develop such weapons extremely difficult to detect, and can conceal production facilities and actual production far more easily than they can conceal the facilities to produce chemical and nuclear weapons.

While there have been some highly controversial charges that Iraq has used mycotoxins against its Kurdish population since early in the Iran-Iraq War, these charges have not been confirmed.⁴⁰⁸ Most of the examples and symptoms cited in these charges can also be more easily explained by the poor sanitary and health conditions affecting the population in the area. The use of mycotoxins or "yellow rain" weapons cannot be ruled out, but reports that the Iraqi secret service used biological agents or toxins to poison the food in Kurdish refugee camps in mid-1989, and produce 700 dead and 4,000 casualties, seem dubious.⁴⁰⁹

Iraq has strongly denied developing such weapons as well as reports that it has used them against the Kurds.⁴¹⁰ Virtually all Western experts agree, however, that Iraq began working on biological weapons in the 1970s, conducted extensive research on mycotoxins beginning in the mid-1980s and was producing biological weapons at four different facilities when the Gulf War began.⁴¹¹

U.S. government sources have listed anthrax and botulinum toxin as being among the weapons Iraq was producing.⁴¹² While these are not exotic biological agents, botulinum toxin is potentially about three million times more potent than a nerve agent like Sarin. A Scud missile warhead capable of optimal distribution of its full payload of botulinum could theoretically contaminate an area of 3,700 square kilometers, or 16 times the area that could be covered with the same payload of Sarin. It is also important to note that, by the time any symptoms appear, treatment for botulinum has little chance of success. Rapid field detection methods do not exist for biological agents, but botulinum can debilitate in a few hours and

kill in as little as 12. In contrast, anthrax can cover an even larger area. It is less lethal, and takes two to four days to kill, but is also much more persistent.⁴¹³

There not only are strong indications that Iraq produced agents like botulin and anthrax, but that it has conducted research into typhoid, cholera, tularemia, and equine encephalitis.⁴¹⁴ After the Gulf War, it became clear that Iraq's main sites of research were the Biological Research Centre of the Scientific Research Council in Baghdad and the Nuclear Research Institute of the Atomic Energy Commission in Tuwaitha -- which housed one of the leading biological research laboratories in Iraq. Salman Pak was a major center for the development and production of biological weapons, as well as chemical weapons. Work was also done by the Genetic Engineering and Biotechnology Research Center, of the Scientific Research Council, which was located in Baghdad. Iraq established this Genetic Engineering and Biotechnology Research Center shortly after the Iran-Iraq War, and was one of the first nations to ratify a U.N. agreement setting up international centers for such research in Trieste, Italy and New Dehli, India.

Iraq had at least twenty refrigerated storage facilities that may have been designed to store biological weapons, and additional facilities seem to have existed at Abu Ghurayb, Al Kindi, Taji (north of Baghdad), and Latifya. It was creating a major new facility at Al Hakim -- which was being expanded into a biological warfare research and production center.⁴¹⁵

Iraq established tight censorship over any discussion of these facilities, and many aspects of its biological research efforts, and Iraq seems to have prevented any unclassified publications on anthrax and botulinum neurotoxins after the late 1970s. A post-war study found one Iraq article on each area during the entire period from 1969 to 1991, although anthrax is a potential health hazard in Iraq. Similarly, no Iraqi research was published on tularemia and West Nile fever, although Iraq acquired the cultures for these diseases, as well as 17 shipments of cultures of various toxins and bacteria from the American Type Culture Collection during the period between 1985 and 1991.⁴¹⁶

Some of Iraq's biological warfare facilities were co-located with industrial plants. The Iraqi Ministry of Industry and Military Industrialization created a State Enterprise for Drug Industries at Samara which consolidated plants originally built with Soviet assistance, but which later benefited from East German and West German support. It also established a research laboratory for the State Enterprise for Drug Industries which was located in close proximity with the Iraqi State Company for Pesticide Production.⁴¹⁷

Other facilities included the Al-Kindi Company for Serum and Vaccine Production, a major French-designed factory for manufacturing the vaccine for hoof and mouth disease at Doura, Baghdad. Some reports indicate this plant could make up to 12 million doses per year, and had a research effort designed to allow it to manufacture up to 15 different

vaccines. They included a production facility at Tahi and the Arab Company for Antibiotic Industries in Baghdad -- an Iraqi-Jordanian-Saudi government-owned firm that is building a factory capable of make 200 tons of penicillin a year. This latter project received extensive support from a German firm called V-Consult Ingenieur.⁴¹⁸

There are reports that Iraq acquired mobile toxicological laboratories from German companies. These laboratories theoretically are for "agricultural chemistry" but the German firms involved in supplying them include Karl Kolb, a firm that actively helped Iraq acquire chemical weapons.⁴¹⁹ Further, German firms called Josef Kuhn and Plato-Kuehn seem to have sold Iraq 2.7 grams of mycotoxins called T-2 and HT-2, which it acquired from their parent U.S. firm, Sigma Chemie.⁴²⁰ The U.S. State Department has charged that these are the same toxins Vietnam used in Cambodia and the former Soviet Union used in Afghanistan. Sigma Chemie is also reported to have transferred precursor viruses for biological weapons, and Iraq seems to have obtained the strains for a number of viruses that can be used for biological warfare from centers in the U.S. under the guise of requesting them for medical research.⁴²¹

There is no reliable way to determine all the biological weapons Iraq was developing before the Gulf War, although the head of the British government's Defense Arms Control Unit, Peter Verker, has stated that,⁴²² "Biological research activities for military purposes had been undertaken at Salman Pak since 1986, and included research into some of the most effective biological agents -- the organisms which cause gas gangrene (*clostridium perfringens*), anthrax, (*bacillus anthracis*), and botulism (*clostridium botulinum*)."

U.N. inspection teams also found some indications of brucellosis and tularemia research.⁴²³ Other logical biological weapons include equine encephalitis, enterotoxins, and possibly cholera and typhoid. Iraq seems to have had weapons production facilities at Salman Pak, and at least some stock piles of toxins and probably of stable weapons like anthrax. It is also clear that Iraq had at least three to six other biological warfare sites, and probably had a number of other storage facilities.

The U.N. did not find conclusive evidence that Iraq was actually making biological weapons, but many Iraqi facilities were only inspected by the U.N. long after the war -- if at all. The equipment to produce biological weapons is very easy to disperse and is largely dual-use in character, and there are strong indications Iraq began such a dispersal before the U.N. bombing campaign. The U.N. never recovered much of the equipment Iraq stole from biological research facilities in Kuwait, and has been able to keep all of its university research equipment and facilities. As a result, Iraqi biological weapons activity has never received the attention given to Iraq's other weapons of mass destruction.

Iraq can also rapidly set up covert production centers at university research centers, medical goods and drug production plants, or virtually any other facility where it can maintain a secure biological research and production activity. Robert Gates, the Director of Central Intelligence, responded to questions about Iraq's biological weapons effort in January, 1992, by stating that "the biological weapons program was also damaged, but critical equipment for it, too, was hidden during the war." Iraq could produce biological agents "in a matter of weeks."⁴²⁴

The spectrum of possible biological weapons or agents is shown in Table XVII-4. They give Iraq an enhanced capability to deter and intimidate the southern Gulf and the West. Iraq could make overt use of biological weapons in much the same way it could use chemical weapons. Iraq could also make covert use of such weapons -- which lend themselves to tailored attacks in terms of delay effects and are particularly well suited to unconventional warfare or "terrorism".⁴²⁵ Biological weapons are also Iraq's only near term answer to the effectiveness of the U.N. inspection and destruction of Iraq's far more visible nuclear, chemical, and missile capabilities. Given Iraq's past history, this makes biological weapons an answer that Iraq is very likely to take.

Table XVII-4Key Biological Weapons that Iran and Iraq Might Weaponize: Part One

Disease	Infectivity	Transmissibility	Incubation Period	Mortality	Therapy
<u>Viral</u>					
Chikungunya fever	high?	none	2-6 days	very low (-1%)	none
Dengue fever	high	none	5-2 days	very low (-1%)	none
Eastern equine					
encephalitis	high	none	5-10 days	high (+60%)	developmental
Tick borne					
encephalitis	high	none	1-2 weeks	up to 30%	developmental
Venezuelan equine					
encephalitis	high	none	2-5 days	Low (-1%)	developmental
Hepatitis A	-	-	15-40 days	-	-
Hepatitis B	-	-	40-150 days	-	-
Influenza	high	none	1-3 days	usually low	available
Yellow fever	high	none	3-6 days	up to 40%	available
Smallpox (Variola)	high	high	7-16 days	up to 30%	available
<u>Rickettsial</u>					
Coxiella Burneti					
(Q-fever)	high	negligible	10-21 day	Low (-1%)	antibiotic
Mooseri -	-	6-14 days	-	-	-
Prowazeki	-	-	6-15 days	-	-
Psittacosis	high	moderate-high	4-15 days	Mod-high	antibiotic
Rickettsi					
(Rocky mountain					
spotted fever)	high	none	3-10 days	up to 80%	antibiotic
Tsutsugamushi	-	-	-	-	-
Epidemic typhus	high	none	6-15 days	up to 70%	antibiotic/ vaccine
<u>Bacterial</u>					
Anthrax (pulmonary)	mod-high	negligible	1-5 days	usually fatal	antibiotic/ vaccine

Brucellosis	high	none	1-3 days	-25%	antibiotic
Cholera low	high	1-5 days	up to 80%	antibiotic/ vaccine	
Glanders	high	none	2-1 days	usually fatal	poor antibiotic
Meloidosis	high	none	1-5 days	usually fatal	moderate antibiotic
Plague (pneumonic)	high	high	2-5 days	usually fatal vaccine	antibiotic/
Tularemia	high	negligible	1-10 days	low to 60% vaccine	antibiotic/
Typhoid fever	mod-high	moderate-high	7-21 days	up to 10% vaccine	antibiotic/
Dysentery	high	high	1-4 days	low to high vaccine	antibiotic/

Table XVII-4Key Biological Weapons that Iran and Iraq Might Weaponize: Part Two

Disease	Infectivity	Transmissibility	Incubation Period	Mortality	Therapy
<u>Fungal</u>					
Coccidioidomycosis	high	none	1-3 days	low	none
Coccidioides Immitis	high	none	10-21 days	low	none
Histoplasma					
Capsulatum	-	-	15-18 days	-	-
Nocardia Asteroides	-	-	-	-	-
<u>Toxins^a</u>					
Botulinum toxin	high	none	12-72 hours lar paralysis	high neromusc-	vaccine
Mycotoxin	high	none	hours or days	low to high	?
Staphylococcus	moderate	none	24-48 hours	incapacitating	?

a. Many sources classify as chemical weapons because toxin are chemical poisons.

Adapted from Report of the Secretary General, Department of Political and Security Affairs, Chemical and Bacteriological (Biological) Weapons and the Effects of Their Possible Use, New York, United Nations, 1969, pp. 26, 29, 37-52, 116-117; Jane's NBC Protection Equipment, 1991-1992; James Smith, "Biological Warfare Developments," Jane's Intelligence Review, November, 1991, pp. 483-487.

Iraqi Nuclear Weapons Efforts

Iraq denied that it was seeking nuclear weapons from the time such development was first suspected in the 1970s until U.N. inspectors found direct proof in 1991. Long before this admission, however, there was overwhelming evidence that Iraq was obtaining specialized expertise and technology of a kind that could only be explained by a covert nuclear weapons program.⁴²⁶

Iraq's major nuclear research efforts began in 1959, when it ordered a small research reactor from the former Soviet Union. This 5 megawatt light-water reactor, called the IRT-2000, used highly enriched uranium and went on line in 1968. This reactor was later used to test the production of plutonium from spent reactor fuel, although no confirmed reports exist regarding these tests until 1988.⁴²⁷ Iraq's next major acquisition was the purchase of the "Isis" or "Tamuz II" reactor from France in 1976. This was a small 800 kilowatt light water reactor using highly enriched uranium, and it went on line in 1980. During this period, Iraq established a significant nuclear research effort and set up a laboratory scale uranium purification plant at Tuwaitha with Italian support. Iraq is known to have tried unsuccessfully to purchase bulk depleted uranium and reactor fuel pins from the U.S. and Canada.⁴²⁸

The key step Iraq took in developing a nuclear weapon during the late 1970s and early 1980s was the purchase of the Osirak (Tamuz I) light water reactor from France in 1976. This reactor was originally designed to use 158 pounds (78 kilograms) of highly enriched uranium. This amount of enriched material would have been sufficient to manufacture up to three nuclear weapons.⁴²⁹ Iraq also obtained Italian assistance in developing fuel fabrication capability, and in obtaining a plutonium reprocessing technology with a capacity of up to 8 kilograms per year. This equipment included three radiologically shielded "hot cells" which could extract plutonium from uranium irradiated in a reactor, and related equipment suitable for producing plutonium.⁴³⁰ The "hot cells" were particularly important to a nuclear weapons effort because the 40 megawatt Osirak reactor was unusually large for research purposes, and could be used to irradiate uranium in "hot cells" to produce plutonium.

Experts still disagree over the extent to which the Osirak reactor complex was designed for nuclear weapons purposes, but it seems clear that Iraq was interested in nuclear weapons and not in nuclear power. While Iraq claimed that the reactor was purely for research purposes, its covert efforts to acquire plutonium "hot cells" and reprocessing capability make these claims extremely unlikely. So does Iraq's insistence during this period

on trying to obtain 158 pounds of highly enriched uranium from France after France reacted to international pressure by limiting its supply to Iraq to 55 pounds at any one time.⁴³¹

Iraq bought large amounts of natural uranium from Brazil, Portugal, Niger, and Italy in 1980 and 1981 that it could not process into reactor fuel, but could process into uranium in could irradiate into plutonium.⁴³² Plutonium can be produced by exposing uranium to neutrons within a reactor and then chemically separating out the uranium. Iraq also placed an order in early 1980 for 25,000 pounds of depleted uranium fuel pins from a German firm called NUKEM. The pins were sized for irradiation in the Osirak reactor, and had no other real purpose than to produce about ten to twelve kilograms of weapons grade plutonium. By 1990, Iraq had at least 332,000 kilograms of yellow cake, 116,000 kilograms of UO_2 , 2,577 kilograms of UCl_4 , 0.465 kilograms of UF_6 , 1,850 kilograms of ADU, 2,050 kilograms of UO_3 , 310 kilograms of UF_4 , and 2,255 kilograms of UO_4 .⁴³³

Iraq could count on being able to use the irradiation approach to proliferation because of the limits on international inspection before the Gulf War. While the Osirak reactor was under International Atomic Energy Agency (IAEA) inspection, and French technicians were working at the site, Iraq seems to have followed roughly the same approach to disguising its nuclear weapons efforts that Sweden had used in the early 1960s. While the fuel cells at the Osirak reactor were subject to inspection, they were only subject to inspection after Iraq declared that material was present. The IAEA had no right to inspect the cells on an on-going basis or the fabrication of the material being inspected. According to one Israeli source, the reactor also had a covert chamber for irradiating uranium which allowed it to produce significant amounts of plutonium -- enough to produce one to two bombs over a period of two to three years. This allowed Iraq to "comply" with the IAEA, while developing an ability to handle plutonium technology and stockpiling material for weapons purposes.⁴³⁴

This mix of factors that led Israel to a series of efforts to halt or destroy the reactor. Israeli agents almost certainly planted a bomb in April, 1979, that destroyed the reactor's first set of core structures while they were still awaiting shipment to Iraq in Seine sur Mer, France. Israeli agents also seem to have assassinated Dr. Yahya el-Meshad, an Egyptian physicist working for Iraq, and to have bombed several of the French and Italian companies working on the project.⁴³⁵ Finally, on June 7, 1981, Israel launched the highly publicized air raid that destroyed the Osirak reactor before it could become operational.

At the time when Israel attacked and destroyed the reactor, Iraq was negotiating to buy a heavy water power reactor from Italy and a sizable reprocessing facility whose purpose was almost certainly plutonium production. This series of deals seem to have halted after it became clear that Israel would take military action to prevent it from going

forward.⁴³⁶ While France initially agreed to rebuild the Osirak reactor, it failed to do so because of a mix of U.S. and other international pressures, the Iran-Iraq War, and Iraqi payment problems.⁴³⁷ This forced Iraq to find other ways to produce its fissionable material. Iraq continued to give the search for a replacement for Osirak very high priority, and but it also started a major uranium enrichment effort, and tried develop a capability to process plutonium.

Like Iran, Iraq used nuclear power as its "cover" in attempting to obtain new nuclear reactors. In 1984 -- in the midst of the Iran-Iraq War, while unable to export its oil, and while nearly bankrupt -- Iraq announced it was seeking to provide 10% of its power needs with nuclear power, and had contracted with the former Soviet Union in 1984, to build at 440 megawatt plant at a cost of \$2 billion. The plant was supposed to be built by the Soviet Atomnergo group, but even before Iraq's invasion of Kuwait, there was no sign that Iraq would get the former Soviet Union to start construction, or that former Soviet Union would build a new reactor that Iraq could integrate into a weapons development cycle.

Iraq was more successful in obtaining support in finding other ways of obtaining fissile materials and in getting nuclear weapons technology. Reports of Iraqi cooperation with other proliferating nations during this period are uncertain, but it seems likely that such cooperation took place. Iraq cooperated with Brazil in some aspects of missile research during this period, and Brazil then was actively involved in manufacturing centrifuges, and had used many of the same suppliers for its centrifuge development effort as Iraq. Brazil sold Iraq substantial amounts of uranium, and had a research cooperation agreement with Iraq that at least lasted to 1989. Argentina sold Iraq uranium and missile technology, and may have cooperated with Iraq on some aspects of fissile material manufacture.

While Pakistan had closer ties to Iran than Iraq, Iraq signed a nuclear research cooperation agreement with Pakistan and Egypt in 1985. At least some Pakistani scientists associated with Pakistan's centrifuge plant at Kahuta, near Islamabad, seem to have visited Iraq. Iraq was also the leading member of the Arab Atomic Energy Commission, which was established in December, 1988, and which includes Jordan, Kuwait, Lebanon, Libya, Palestine, Saudi Arabia, Syria, and Tunisia⁴³⁸

Iraq's Nuclear Efforts After 1988

U.S. experts estimate that Iraq spent up to \$10 billion during the 1980s to acquire Calutron and centrifuge enrichment facilities, to develop other methods of enrichment, and to acquire the technology and equipment to use fissile material in a nuclear weapon.⁴³⁹ This involved what the U.N. Special Commission (UNSCOM) later called, "a grandiose and over-designed program."⁴⁴⁰ By this time, the Iraqi program was called Petrochemical 3 or PC-3.

At the time the Gulf War began, Iraq had some 20,000 Iraqi workers involved in its nuclear weapons effort. There were eight dedicated nuclear weapons development sites, with dozens of major processing buildings worth several billion dollars.

In addition, a wide range of other facilities have some connection to the Iraqi nuclear weapons effort are listed in **Table XVII-5**.⁴⁴¹

Table XVII-5Key Iraqi Nuclear Weapons Facilities: Part One

- o Abu Ghraib:* Military base and fuel-rod storage.
- o Abu Sukhayr:* Exploratory mine located about 25 kilometers south-west of Najaf. Production from September, 1988 to end of 1990, when was flooded. uranium in ore ranged from 80 to 800 ppm.
- o Ahashat:* Phosphate and open faced uranium mine. uranium extraction.
- o Amil:* Liquid nitrogen for Calutron program.
- o Amir:* Calutron component manufacturing: Magnet cores, return irons, ion sources, collector parts.
- o Ameen:* Calutron component manufacturing - prototype components.
- o Atheer:* Some 350,000 square feet of lab space that was largely untouched by the war. Nuclear weapons design and testing of high explosives. Hydrodynamic studies. Large cold isostatic press for shaping explosive charges by Asea Brown Boveri. High temperature vacuum induction furnaces by Arthur Pfeiffer Vacuum Technik GmbH. Planned casting and machining of fissile material, machining of uranium plates, and assembly of explosive structure and core of nuclear weapons. Plasma coating molds and mold fabrication. Design of regular implosion type nuclear weapon.⁴⁴²
- o Badr:* Centrifuge component manufacturing. Civil contracting for Al Furat project.
- o Daura (SEHEE):* Calutron component manufacturing - Vacuum chamber parts. Civil contracting for Al Furat project.
- o Dijila:* Electronics plant supporting general fabrication activities for the IAEC. No specialized weapons production equipment.
- o Fao:* Contracting for Al Furat project.
- o Falluja:* Military base and equipment storage.
- o Furat (Farat or Pharat):* Centrifuge research. Two centrifuge manufacturing sites. Maraging centrifuge facility. Had begun with a Beams type and was capable of making the more advanced Zippe type by mid-1987. Iraqi initially claimed they were capable of producing up to 200 centrifuges a year. The manufacturing equipment intended for installation indicates that the true figure was 2,000.

o IRT-5000: Po-210 production.

o Jazirah: uranium processing; UCl₄ production. Calutron and centrifuge production.

o Al Hadre: High Explosives research and hydrodynamic studies.

o Hatteen: High explosives research; main explosive structure research.

o Musayyib: Materials research and high explosive test site. Test range for shaped charges. Power plant.
Nuclear weapons laboratories.

o Mosel: UCl₄ production.

o Nafad: Calutron component storage.

Table XVII-5Key Iraqi Nuclear Weapons Facilities: Part Two

- o Nasser Works:* Centrifuge component manufacturing and machining.
- o Al Qa Qaa:* Development of non-nuclear components and explosives for nuclear weapons. HMX production and casting for weapon, pressing and machining, main explosive structure of weapon, explosive lens building, and lens assembly. Detonator research. Exploding bridge wire detonators. Research facility for Ministry of Industry and Military Industrialization.
- o Qa'im:* Superphosphated fertilizer plant, uranium extraction plant and yellow cake production. Heavily damaged during the war.
- o Al Radwan:* Centrifuge component manufacturing: Magnet cores, return irons, ion sources, collector parts.
- o Al Rashidiya:* Maraging centrifuge facility.
- o Ar Rabiyyah:* Manufacturing workshops for producing metal and ceramic components for the IAEC. Its main function was support of the calutron program. It had high quality, although not specialized, machine tool capabilities. It was badly damaged by a cruise missile attack in early 1993.
- o Saddam Works:* Calutron component manufacturing and centrifuge machining.
- o Salladine:* Calutron component manufacturing -- electrical control panels.
- o Ash Shakyli:* Warehouse storing centrifuge components.
- o Ash Sharqat:* About 250 kilometers north of Baghdad. Worked started in 1988. Three groups of facilities. uranium enrichment for Calutron. An Iraqi duplicate of Tarmiyah, with 600mm and 1,200mm Calutrons, was under construction but not yet operational.
- o Suwayrah:* Nuclear equipment.
- o Tarmiyah:* Calutron research. Main production site for uranium enrichment. 8 working 1,200mm Calutrons. 17 1,200mm improved Calutrons being installed. Building for 20 600mm Calutrons under construction. Capacity of 90 600mm and 1,200mm Calutrons. This could have produced 15 kilograms of 93% enriched uranium per year, and more of less enriched uranium. (This complex was built by the Yugoslav Federal Directorate of Supply and Procurement and equipped by the Yugoslav firm of EMO electrical Engineering).⁴⁴³ Also, computer facility. Largely destroyed during the war.

o Technical University of Baghdad: Streak video cameras and related equipment suitable for weaponization work by Hamamatsu.⁴⁴⁴

o Tikrit: Storage of yellow cake.

o Tuwaiha: A major research and production center. Site of damaged Tamuz 1 and Tamuz 2 reactors, and IRT-5000 reactor (heavily damaged in war). Nuclear physics labs. Main computer facility with IBM-370 main frame and many IBM PS/2s. uranium research and development. UCl_4 and UF_6 production. Calutron and centrifuge tests, plutonium separation, and chemical separation. 5 working Calutrons. Gaseous diffusion research. Po-210 extraction and neutron initiator research and design. UF_4 production. Metal reduction, casting, and machining. Research on implosion nuclear weapon. Firing system research and design.

o Zaafarniyah: Al Dijla and Al-Rabee sites fabricated Calutron components.

o Walid: Centrifuge factory.

Most of these facilities were not declared to the IAEA and were not subject to its inspection, and many only became known after the U.N. inspections began following the Gulf War. While Iraq relied on dispersal and secrecy to protect some of these facilities, it also established surface-to-air missile defenses at major facilities like Tuwaitha.⁴⁴⁵ These defenses were combined with hardened shelters at locations like Tuwaitha and Al Atheer, and Iraq had at least one underground facility in a mountain near Irbil.⁴⁴⁶

In spite of all its efforts, Iraq only had a total of 27.5 pounds (11.3 kilograms) of French-supplied 93% enriched uranium for the Tamuz 1 reactor destroyed by Israel, and 22.3 kilograms of Russian-supplied uranium with levels of enrichment varying from 36% to 80% for its Russian-supplied IRT-5000 research reactor by the late 1980s.⁴⁴⁷ Only the French material could be used in a bomb. Using this limited amount material to build even a single weapon also required the use of very complex implosion technology, since such material cannot be used in the simpler weapon's designs made possible by using plutonium or mixes of uranium and plutonium. Iraq would also have had no surplus material to test its weapon design.⁴⁴⁸

The U.N. Special Commission (UNSCOM) did find after the Gulf War that Iraq had managed to extract a little over five grams of weapons grade plutonium. Later examination of the source of Iraq's plutonium indicated that it came from two sources. First, 2.26 grams of plutonium had been separated at a small laboratory at the Tuwaitha Nuclear Research Center. This had evidently been separated between 1982 and 1988 after the IAEA exempted five fuel elements for the Soviet IRT-5000 research reactor from inspection which contained 10% enriched uranium. Such an IAEA exemption is normal for small amounts of material used for research purposes.

The second batch of 3 grams was also separated at Tuwaitha. This time, however, Iraq used natural uranium that it had separated at Al Qa'im in northern Iraq. Iran inserted about 11 kilograms of this processed uranium into its research reactor. Iraq had sent another 8 kilograms to Tuwaitha by the start of the war, but not this had not been processed by the time the U.N. inspected the facility.

This plutonium enrichment activity demonstrates Iraq's interest in nuclear weapons, but it must be kept in careful perspective. Iraq never pursued an intensive effort to develop large amounts of plutonium. In fact, if Iraq had used its facilities in this way, 24 hours a day for a year, it would still only have obtained 100 grams of plutonium. It takes approximately 8 to 10 kilograms of plutonium to make a nuclear weapon, and there is no evidence that Iraq had a secret reactor or large scale facility for plutonium production. This is, however, a possibility and some U.N. inspectors and outside experts feel that Iraq may still have a facility the U.N. has not found.⁴⁴⁹

Iraq turned to cascade technology with even less success. It studied gaseous diffusion from 1982 to 1987, but concluded that it required a more advanced industrial infrastructure than Iraq had available, and abandoned it for centrifuge and Calutron technology.⁴⁵⁰

Iraq actively sought centrifuge technology from the U.S., Europe, and the People's Republic of China, and this led to a number of incidents over attempts to smuggle equipment to Iraq. The U.S. blocked an attempted to acquire the specialized pumps needed for cascade facilities in February, 1989, and other Iraqi attempts to smuggle centrifuge technology from the U.S. to Iraq in 1988 and 1989 were blocked by U.S. officials. Nevertheless, Iraq made progress towards creating a centrifuge enrichment capability, and meeting a long-term goal of 10,000 operating centrifuges.⁴⁵¹ Iraq had a Beams-type centrifuge by mid-1987, and a more advanced Zippe-type by mid-1988. The U.N. Special Commission (UNSCOM) found that Iraq purchased centrifuge technology and equipment from thirteen different German companies, and found a plant at Al Furat that had escaped the U.N. bombing that Iraq had designed to produce 200 centrifuges a year.⁴⁵² .

Iraq used the designs for an early URENCO G1 centrifuge -- possibly obtained through Interatom, a wholly owned subsidiary of Siemens. It also had some of the designs for the URENCO G2 and G3 centrifuges, and a 1988 centrifuge design by MAN Technologies GmbH of Munich.⁴⁵³ It acquired the specialized drill presses, and rolling machines or lathes, for manufacturing enrichment centrifuges during 1987-1988.⁴⁵⁴ Iraq acquired machinery to manufacture end caps and flow-forming machines to make the thin and precisely machined rotors for centrifuges out of maraging-steel tubes. It acquired 240,000 ferrite magnet spacers, 300 tons of special aluminum alloy for vacuum housings, and 84 tons of special aluminum alloy for molecular pumps. In 1989, Iraq acquired at least 100 tons of maraging steel-350, a high nickel content steel whose primary use is in uranium centrifuges, although not enough was found to provide for a major centrifuge manufacturing effort and some experts feel Iraq's rotors were still of low grade at the time of U.N. inspection.⁴⁵⁵

Iraq obtained the samarium cobalt magnets used to hold the centrifuge in place during high speed rotation. It acquired the specialized vacuum pumps used to circulate uranium hexafluoride gas through gas centrifuges.⁴⁵⁶ Iraq set up a hydrogen fluoride plant at Al-Qa'im, in a facility plant used for phosphate production. Hydrogen fluoride is needed to produce uranium fluoride gas.⁴⁵⁷ Iraq made enough progress to set up a maraging centrifuge facility at Al Farat, and another at Al Rashidiya. The German investigation of the actions of H&H and technicians associated with MAN, indicated that this manufacturer played a major role in setting up a nuclear materials research and centrifuge manufacturing plant at

Tuwaitha, and that research and development work on centrifuges was taking place at the Sa'ad 16 center near Mosul.⁴⁵⁸ Iraq planned to have a 100 machine cascade in operation by 1993 and a 500 machine cascade in operation by 1996. If all its plans had succeeded, it might have had 2,000 machines on line by the late 1990. Under optimal conditions, a line or cascade of 2,000 centrifuges can produce 40 to 50 pounds of highly enriched uranium a year, or about enough to produce one bomb.

The centrifuge, however, is a difficult path to enrichment.⁴⁵⁹ The U.N. Special Commission (UNSCOM) found serious problems in the quality of Iraq's centrifuge technology and production equipment, and stated that, "...Procurement of tons of specialty metals and components, enough to build thousands of machines, was discovered....Two centrifuge prototypes were tested with some success in test bed experiments....The Iraqi program was in a very early stage using clandestinely obtained European designs and illicitly obtained materials to build a few research machines." ⁴⁶⁰

To put the Iraqi effort in perspective, Pakistan seems to have taken nine years to build a centrifuge enrichment facility, and still only seems to have about 1,000 out of 14,000 centrifuges running at its plant at any one time. Brazil took ten years to get a small plant running at Aramar, with only 50-75 centrifuges, although it was well on its way to operating a full scale 2,000-3,000 centrifuge plant by 1990.⁴⁶¹

As for other methods of enrichment, Iraq showed no interest in laser isotope separation, limited interest in chemical and jet nozzle separation, and a major interest in Calutron enrichment. Iraq tried both Japanese and French techniques for chemical separation which rely on catalysts to speed up the exchanges between U-235 and U-238. It abandoned the Japanese technique, but continued working on the French technique in order to obtain a relatively cheap and efficient method of low level enrichment. It only seems to have made limited progress in jet nozzle technology, and abandoned it.⁴⁶²

Iraq's efforts to use Calutrons were somewhat more successful, and were only discovered after the Gulf War. The Iraqi effort was so covert that it led a number of experts to speculate that Iraq had taken advantage of deception techniques to hide its activities from U.S. satellites that it obtained from the Soviets after the Israeli attack on Osirak, and from studying U.S. satellite photos of Iran that the U.S. had supplied to Iraq during the Iran-Iraq War.⁴⁶³

Iraq's major Calutron facilities have been listed earlier, but the U.N. has not fully disclosed what it has discovered about the Iraqi Calutron effort or the names of its foreign suppliers. It is clear, however, that Iraq set up electro-magnetic isotope separation (EMIS) facilities at Ad Dijjla, Tarmiya, Ar Rabiya, Al Hamath and in the Zaafarniya section of Baghdad.⁴⁶⁴ After the Gulf War, the U.N. Special Commission (UNSCOM) found these

involved the production of massive equipment assemblies that included at least thirty 12 foot disks weighing 60 tons.⁴⁶⁵

While several Calutrons were built, their importance has been exaggerated in the press. The U.N. Special Commission (UNSCOM) stated in June, 1993, that "The program was facing serious difficulties in start up and implementation due to a lack of technical depth among Iraqi technicians. It would have been several years before it produced enough uranium for military purposes."⁴⁶⁶

Iraqi plans seem to have called for 70 alpha and 20 beta Calutrons to have become operational during August, 1989-December, 1992, but only eight alpha Calutrons were installed by the end of 1989. Iraq was just beginning to install another 17 alpha machines when the U.N. attacked in 1990, and it is unlikely that Iraq could have had enough machines operational to produce one nuclear a year before 1994 at the earliest. The machines that were installed do not appear to have been functioning with high reliability, at a significant scale, or with the throughput required to support a major weapons effort. They could, however, have been more effective as a way of preparing enrichment material for further enrichment by centrifuges. The U.N. Special Commission (UNSCOM) noted that the Calutrons could be used for high capacity-low enrichment operation and the centrifuges for low capacity-high enrichment.⁴⁶⁷

Although the U.N. eventually traced about 500 tons of natural uranium that moved into the Iraqi processing system, Iraq seems to have produced only grams of enriched uranium and milligrams of 40%-45% enriched uranium in the facility at Tuwaitha, which was constructed in 1985-1986. Iraq began operating the Calutrons at Tarmiya in February, 1990, and produced a total of 500 grams of 4% enriched uranium with some at a high of 10%. However, the facility at Tarmiya was still in the test bed stage when the war ended, and each Calutron had four ion sources and a design beam current of 145 milliamps of uranium ions. Iraq was experiencing problems in keeping all the ion sources operating at once and in maintaining stable beams, but had evidently solved most of its the development problems except the ion source.⁴⁶⁸

Iraq was installing a circular system, or "racetrack", of 17 Calutrons when the war began to produce low enriched uranium when the war began, with the goal of installing up to 70 low enrichment units and 20 high enrichment units. None of the high enrichment Calutrons were installed or operating, but U.N. officials speculated that they might eventually have produced 12-90 kilograms a year of uranium with an enrichment level of at least 90%. Such production, however, required all four beams in each machine to operate at 145 milliamps and all machines to operate an average of 55% of the time. An output of 8-9 kilograms would have been more likely.

As its enrichment effort moved forward, Iraq steadily expanded what Iraq later admitted was its nuclear weapons design facility at Al Atheer.⁴⁶⁹ Al Atheer was involved in research relating to the production of plutonium, polonium-210, natural uranium metal, enriched uranium metal and yellow cerium sulfide.⁴⁷⁰ It worked on detonation and neutronic tests, nuclear initiation, and used flash X-Rays to see what happened during nuclear weapons detonation tests. It also worked on firing systems, control, and guidance. Projects included explosive lens testing and analysis, natural uranium reflector design, polonium 210/beryllium neutron initiators, hardened iron tampers, synchronization and timing systems, pulse power equipment, charging power equipment, junction switches, capacitors, and related measurements.⁴⁷¹

The U.N. found some 40,000 pages of documents relating to the Iraqi nuclear weapons design effort, and sophisticated one and two-dimensional computer codes tailored to nuclear weapons design.⁴⁷² Work by the U.N. inspection teams found that Iraq had concluded that gun type devices need more material, although they were simpler and had fewer calculation requirements. This led Iraq to concentrate on an intermediary implosion type device, and to focus on a yield of 20 kilotons -- similar to the nominal yield of the weapon dropped on Nagasaki. Iraq had performed 20 detonation experiments relating to such designs by May 31, 1990 -- the last date referred to in U.N.-held Iraqi reports.⁴⁷³ It is important to note that no records have yet been discovered for the period after May, 1990, and that no record exists of design activity using plutonium weapons although Iraq had plutonium.

The Iraqi weapons design the U.N. did find could have produced a weapon weighing about 1,000 kilograms (one metric ton).⁴⁷⁴ This mass, and the basic weapons design, was consistent with deployment as the warhead of a Scud missile. The actual weapon was similar in some ways to the U.S. "Trinity" weapon that the U.S. set off in New Mexico on July 16, 1945. It consisted of a "soccer ball" shaped set of explosive lenses surrounding a pit of fissile material enclosed in a reflector -- made out of depleted uranium or beryllium. The pit was a solid sphere of uranium, with sufficient highly enriched uranium to approach one critical mass. Using such a large mass of uranium greatly increases the probability that a nuclear device will produce a significant yield even if the high explosive is relatively unsophisticated, and reduces the amount of explosive needed to compress the enriched material to supercriticality.

At the time the Gulf War began, Iraq had purchased components for the high melting point explosive (HMX) and rapid detonation explosive (RDX) needed to compress fissile material into a critical mass.⁴⁷⁵ The Iraqis had ample supplies of Baratol and HDX high explosives, and understood the use of aluminum "flying plates" to increase the pressure

wave. Although the Iraqis were experimenting with single high explosive lenses to test their ability to produce a large enough planar shock wave to set off the critical mass, there is some question as to whether they could have properly shaped the shock front around such a mass.

Iraq planned to use a hardened iron tamper, and to use a polonium-210 metal/beryllium neutron initiator. The neutron initiator is the device needed to supply a burst of high energy neutrons at the correct instant necessary to start the chain reaction and keep it from damping out. Iraq obtained its polonium 210 from Bismuth, and completed 20 tests of a polonium-beryllium neutron initiator.⁴⁷⁶ Iraq had designed and successfully tested its own neutron initiator using explosive lenses and dummy core material just before the Gulf War began. Iraq had also developed and tested high energy pulse junction switches, which can act as a somewhat inferior substitute for krytrons.

The krytrons would have been superior, and this helps explain Iraq's effort to smuggle high speed, high voltage, capacitors from the U.S. in March, 1990 ⁴⁷⁷ It is not absolutely certain that Iraq wanted the capacitors for nuclear weapons. They have a number of other potential military applications, such as triggering the high explosive charges in a gas cannon, the capacitors are co-axial, high voltage, low inductance devices that have exceptional resistance to humidity, vibration, and shock. Nevertheless, the krytrons involved were identical to the devices used in U.S. nuclear weapons and they are perfectly suited to deliver the instant burst of electricity, or triggering charge, necessary to detonate all of the high explosive hemispheres surrounding nuclear material in order to ensure that it is compressed into critical mass with optimum efficiency.⁴⁷⁸ Without access to such technology, Iraq still faced problems in miniaturizing its nuclear devices, mating them to missile warheads, making effective use of its limited fissile material, and enhancing the yields it could obtain. It also risked producing weapons sensitive to shock and accidents.

Because Iraq calculated that minor shifts in design could produce a yield as low as 1 kiloton, and lacked predetermined values for several critical calculations, it was using one dimensional integrated codes for much of its design work. The bulk of this calculation work seems to have been done at Tuwaitha, using and IBM 370 mainframe and smaller IBM PS/2 computers, although the hydrostatic calculations were performed on an NEC mainframe computer. The U.N. found Iraq had conducted such computation to support weaponization studies, hydrodynamic calculations, exploding wire studies, initial neutron initiator studies, energy source studies, neptunium and U-233 experiments, and lithium-6 experiments⁴⁷⁹

Iraq had obtained x-ray crystal measurement, mass spectrometers, and beryllium. It bought \$96 million worth of computers from the U.S. between 1984 and 1990, about \$26 million of which went to Iraqi military facilities, and large amounts of optical fiber.⁴⁸⁰

Further, the U.N. Special Commission (UNSCOM) reported that Iraq was producing, or had obtained, up to 220 pounds of lithium-6 a year. Lithium-6 can be used both in thermonuclear weapons, and to enhance the yield of fission weapons. The U.N. concluded from Iraqi records that Iraq was using Lithium to work on a boosted weapon.⁴⁸¹

The exact level of Iraq's overall success in warhead design at the time the Gulf War began is still a matter of some debate. The report of IAEA Director Hans Blix to the U.N. Security Council on the results of the sixth IAEA inspection of Iraq indicates that Iraq had made substantial progress:⁴⁸²

"The key result of the sixth inspection is the uncovering of documents that show conclusively that Iraq was very well advanced in a program to develop an implosion-type nuclear weapon and that links existed to a surface-to-surface missile project. In deed, so advanced has this program been deemed to be that the time needed to reach bomb-making capacity seems to have been determined by the time necessary for the enrichment facilities, rather than the weapons design activities.

"...The sixth report also uncovered evidence of broad based Iraqi international procurement efforts in violation of laws of States from which the export originated. However, much, if not most of the procurement of which evidence will be available, will be found to pertain to equipment and material not subject to export controls elsewhere." ⁴⁸³

What is not clear is whether Iraq could have deployed a weapon without testing or several years of additional development and research work.⁴⁸⁴ Iraq might not have found predictability of yield to be critical. Even a partial success, or "fizzle", that only produced a 5-6 kiloton yield is still an extremely effectively weapon. An outright failure to explode, however, could cost Iraq roughly \$100 to \$200 million per weapon until it developed a major fissile material production capability, and represent a significant portion of Iraq's total stockpile.

Iraq faced the risk that a nuclear weapon susceptible to shock, accidental triggering, or partial detonation from causes ranging from static electricity to misuse of safety interlocks could do devastating damage to Iraqi territory. There are some indications that the bomb Iraq designed "crammed" so much high explosive into a narrow area that it was highly sensitive to shock and accidental detonation.⁴⁸⁵

Iraq also faced the challenge of mating a nuclear weapon to a delivery system. It had to develop the technology necessary to carry bombs on airplanes in ways that ensure safety and proper release, develop accurate delivery methods, and fuse the bombs to provide reliable control over the height of burst.⁴⁸⁶ It needed to develop similar technology for missiles, as well as missiles that are so reliable that there is almost a zero chance of the loss

of one of Iraq's limited number of warheads. The warhead performance of Iraq's longer range missiles were extremely unreliable at the time of the Gulf War, and presented a risk of missing a target by several kilometers, and of misses that could detonate at virtually any point within their maximum range if the missile malfunctions.

Finally, Iraq faced the problem of nuclear weapons security. The seizure of a nuclear weapon could give any political faction a dominant role in a coup attempt or struggle for power. In the case of a revolution, or ideological struggle, it could easily threaten the existence of the regime or lead to the use of a weapon that could trigger a major war. Creating effective security systems and devices, however, is not easy. Security devices that are internal in the weapon are probably the only way of ensuring a reasonable degree of central government control, but effective designs must be built into every aspect of the weapons design and can interfere with weapons function. Less stringent protection systems can be bypassed in relatively short periods of time, or by disassembling one weapon to learn how to bypass the security systems on the others.

The Future of Iraq's Nuclear Weapons Effort

As for the future, U.N. Coalition attacks destroyed many of Iraq's nuclear facilities during the Gulf War, and the deployment of U.N. inspection teams by the U.N. Special Commission (UNSCOM) that was created to implement the terms of the 1991 cease-fire in the Gulf War found and destroyed many others.⁴⁸⁷ The IAEA has removed the enriched material from the two small research reactors still operating at Tuwaitha, and the U.N. bombing and efforts of the U.N. Special Commission (UNSCOM) have destroyed facilities for plutonium production, uranium production, hexafluoride conversion, and uranium mining and milling.⁴⁸⁸

While some experts have attacked what they feel are failures by the U.N. and IAEA, these attacks seem exaggerated. The U.N. Special Commission (UNSCOM) and IAEA are far from perfect, but most of Iraq's equipment and stockpiles for producing nuclear weapons seem to have been destroyed.⁴⁸⁹ The only major uncertainty is whether Iraq had facilities for the production of plutonium -- an underground reactor -- that it somehow managed to hide. This is possible, but does not seem likely.

In the long run, however, the combination of wartime bombing and the post-war U.N. inspection and dismantling effort cannot deny Iraq the ability to take advantage of the technology it has acquired from two decades of nuclear weapons development efforts. As the U.S. Director of Central Intelligence, Robert Gates noted in testimony before Congress, "...Iraq will remain a primary proliferation threat at least as long as Saddam Hussein remains in power....The cadre of scientists and engineers trained for these programs will be able to reconstitute any dormant program quickly."⁴⁹⁰ Nevertheless, the U.N. attempt does confront

Iraq with a massive problem in investment and in re-acquiring the complex mix of equipment and facilities it had before the Gulf War.

If the U.N. sanctions are fully enforced, it will probably be at least five to eight years after U.N. inspection finally ends before Iraq's nuclear efforts can recover -- and much will depend on whether the U.N. does succeed in making Iraq fully accept U.N. Security Council Resolutions 688 and 715, and on how well the U.N. Special Commission is then able to enforce such resolutions. If the U.N. shows firm resolve, it could well be several years before Iraq can deploy more than a few nuclear bombs or effective warheads for its missiles. This would not, however, prevent Iraq from creating the kind of "nuclear ambiguity" that is already present in India and Pakistan. Iraq may well have a credible enough potential to possess a bomb to influence the regional balances years before it has an effective device. On the one hand this will increase its political and strategic leverage. On the other hand, such ambiguity could make Iraq a high priority target and lead to preemptive attacks by a state like Israel.

Iraq now does seem likely to lag significantly behind Iran in acquiring nuclear weapons. Even the future prospect of Iraqi weapons, however, gives Iraq a major increase in its ability to intimidate its neighbors. No southern Gulf nation, or other neighbor, can ignore the risk of an attack on a major city. All of Iraq's neighboring states are dependent on a single capital for much of their economy and most of their political structure, and they are certain to react to Iraqi pressure even if Iraq only has a high probability of possessing a few weapons. When Iraq does acquire nuclear warheads, it is also likely to have roughly the same ballistic missile, cruise missile, and long-range strike aircraft capability as Iran, and it will pose a major military threat to other nations in the region -- including Israel.

Such capabilities raise major mid-term challenges in terms of deterrence, defense, retaliation, and arms control as they do in the case of Iran. Missile defense, while possible, seems unlikely to be either leak proof or the kind of confidence builder that will substitute for retaliation. Once again, this raises the need for either effective arms control based on full and reliable inspection, or the need for the U.S. to retain a superior capability for theater nuclear retaliation.

The War Fighting Impact of Iraq's Weapons of Mass Destruction⁴⁹¹

Iraq's future war fighting capabilities with weapons of mass destruction are likely to evolve in ways that are similar to those of Iran, but with some important strategic and political differences. Iraq has already set an example that other Third World countries have followed. It has pioneered in the use of long-range missiles and modern chemical weapons in combat. At some point in the near future, it will recover the ability to fire Scuds with chemical warheads, and at some point in the near-term, it will recover the ability to use aircraft and artillery to deliver large volumes of chemical bombs and ordnance.

As is the case with Iran, Iraq's chemical weapons capability already enhances its ability to intimidate and attack its neighbors. This capability does, however, have severe limits. It has been sharply reduced by the U.N.. Iran is now well equipped to retaliate, and the southern Gulf states and Israel have already lived through the threat of Iraqi missile attacks using chemical weapons. While the southern Gulf states will not discount the Iraqi chemical threat -- and may be willing to shift towards the Iraqi position in some cases -- they are unlikely to sacrifice key national interests for this purpose. They are likely to continue to resist Iraq in actual war fighting as long as the U.S. and the West take immediate steps to strengthen their active and passive defenses, and show that they will decisively retaliate.

Iraq is unlikely to risk Israeli retaliation by using chemical weapons, but it is impossible to dismiss a crisis or conflict where Iraq again attempted to use Israel to try to destabilize a coalition between the West and southern Gulf or to try to influence public opinion. There will always be a risk that Iraq will escalate to the use of chemical or other weapons of mass destruction in such cases, particularly if the regime believes that this would aid its interests, or serve as a form of revenge or deterrent to Western action. Iraq's present leadership may well be willing to take serious risks if they perceive such action as serving their interests, even if this means damage to Iraqi civilians or to the Iraqi economy.

The risk Iraq will use biological warfare will be somewhat similar, at least in the near-term. Like Iran, Iraq probably already has the ability to deploy biological bombs, and may well be able to produce a significant amount of biological agents with only a limited risk of detection by the U.N.. It is doubtful, however, that Iraq as yet has highly lethal storable biological agents, or can exploit the potential of biological warfare to achieve lethality far greater than those of chemical weapons, and even nuclear weapons.

Iraq might, however, initiate the use of less lethal biological warfare in unconventional attacks against its neighbors, or even Western states. A wide range of possible escalation is possible. Iraq might conduct a highly visible demonstration of a

biological warfare test to aid in political intimidation or blackmail. It might escalate to the use of biological weapons in an effort to put military pressure on a neighbor to limit Western intervention. It might seek to use large scale biological attacks to halt a Western counter-attack or to try to erode the political support for Western intervention. It again might strike at Israel, and it is at least possible that it might covertly deploy and use biological agents in Europe or the U.S.

Biological warfare also lends itself to indirect, unattributable, or delayed attacks. Under some circumstances, Iraq might be able to conduct an attack where it could at least preserve plausible deniability, or blame the attack on third parties like Iran or a terrorist movement. Delayed or low lethality attacks also present serious problems in terms of structuring retaliation. Depending on the context of the crisis or conflict, world opinion may or may not support the scale of retaliation necessary to deter Iraq's regime. It also is impossible to dismiss the risk of catastrophic or critical damage to a neighboring state, or Western military forces. Much will depend on prevention, early detection, and medical treatment. Once again, all of Iraq's neighbors are "one bomb states" in the sense they would be highly vulnerable to the political and economic impact of even one successful major attack on their capital or a large population center.

Iraq might use biological agents to attempt to contaminate a key oil or water facility, or even as a barrier defense. Agents like anthrax, for example, are capable of long-term contamination and even if they have low-to-moderate lethality, decontamination could be time consuming, require troops to wear protection gear, and present major psychological problems in terms of the willingness of civilian to return to any facility that had been attacked -- decontaminated or not.

There are no rules that prevent Iraq from using mixes of chemical and biological weapons, or "cocktails" that mix the use of different chemical and/or biological agents at the same time. Iraq has already used mixes of mustard gas and nerve gas on its attacks on Iranian troops in 1987 and 1988, and it is very unlikely that Iraqi planners see major political and military barriers to combining different types of weapons of mass destruction. They are far more likely to see all such weapons as extensions of conventional war fighting means whose use is deterred -- to the extent it is deterred at all -- by the risk of political costs or military retaliation.

All of these problems will grow in direct proportion to Iraq's ability to develop and weaponize highly lethal agents that can be delivered by strike aircraft or long-range missiles, or which are so lethal that covert use could provide high death rates even in city sized areas. One key problem in biological warfare is that potential lethality is so great relative to the

probable state of the art in Iraq, and the technology to increase lethality is becoming so readily available, that it is virtually impossible to characterize future threats.

As is the case of Iran, efforts to deny Iraq nuclear capability have probably already channeled Iraqi research and development efforts into an even more serious effort to create biological weapons that can act as a substitute for nuclear weapons. This may be the almost inevitable result of the U.N.'s relative success in denying Iraq access to chemical and nuclear weapons and technology. While there is no way to predict when Iraq's efforts to acquire such biological weapons will be successful, Iraq should have biological agents with lethalties approaching those of very small nuclear weapons at some point in the next five to ten years unless it somehow comes under constant inspection by a new control regime and is subject to draconian international controls on dual-use technology,

As such capabilities develop, Iraq may become more willing to take two kinds of risks that would be rejected by the regimes of most other countries. One such risk is to launch an all-out attack on a neighboring state, even if this means increasing the risk of international retaliation. The idea of a single decisive strike, and then holding world opinion at bay, has already failed in Iraq's attacks on Iran and Kuwait, but Iraq's leaders may see this failure as the result of a lack of adequate means, rather than as the result of an unworkable strategy. The other such risk is to strike out in revenge in the face of a major defeat or an imminent loss of power. The Iraqi equivalent of a "doomsday" weapon is scarcely probable, but is dangerous to dismiss.

Iraq will probably need 5 to 10 years to acquire nuclear weapons once U.N. controls are lifted, but its basic calculus in using for intimidation or war fighting purposes nuclear weapons will probably be similar to its calculations in using highly lethal biological agents. The fundamental difference may lie in its perception of whether it faces an opponent with the determination to launch nuclear strikes in retaliation. It seems doubtful that Iraq will see conventional attacks -- no matter how effective they may be in economic terms -- as an adequate deterrent.

Like Iran, a nuclear armed Iraq is also likely to try to exploit the vulnerability and fears of its neighbors, and of the U.S. and any other Western country that would deploy military forces into the region. Crossing the nuclear threshold, will allow Iraq to pose a kind of threat is likely to be perceived as fundamentally different in character by all of its potential enemies, and to raise the stakes to the point where at least some states may no longer be willing to take the risk of denying Iraq political or military success. It also will greatly increase the cost -- if not the risk -- of sudden escalation if the regime feels it must take a decisive risk or it is directly threatened.

These risks should not be exaggerated or turned from potential threats into probabilities. Iraqi behavior is not suicidal in character, and the Iraqi regime does seem sufficiently concerned with the ultimate future of Iraq to show considerable caution under most circumstances. Iraq may still experience a change in regime, and will not acquire the kinds of "worst case" capabilities just described for several years. At the same time, Iraq is probably far more risk prone than Iran and most regimes in the Middle East. Further, it is extremely dangerous to apply the standard of the "peacetime rational bargainer" to a crisis or conflict whose nature is currently completely unpredictable, where the values and perceptions of the Iraqi leadership cannot be known, and where the process of escalation may greatly increase the real or perceived need for risk taking.

At a minimum, the threat of Iraq's present and potential capabilities to use weapons of mass destruction will have a significant impact on the region and the southern Gulf. Limited as these capabilities may be, they offer Iraq a partial compensation for the damage the Gulf War did to its conventional forces. The longer run threat may be far more significant. The U.N. inspection and destruction efforts may delay and reduce Iraq's capabilities to use weapons of mass destruction for some time to come, but Rolf Ekeus, the executive chairman of the U.N. Special Commission has, warned that such a monitoring effort will involve 100 "critical sites" and more than 1,000 establishments capable of producing components for weapons of mass destruction -- including civilian facilities such as pharmaceutical plants and breweries.⁴⁹²

Even if Iraq does accept a comprehensive U.N. inspection effort, it seems likely that Iraq will eventually be able to either break free of the present U.N. controls, and deploy a significant covert capability to deliver chemical and biological weapons. Such an Iraqi capability will not offset all of the West's military advantages, but it confront the U.S., other Western power projection forces, and their southern Gulf allies, with the risk of chemical and biological attack. Iraq's weapons of mass destruction will also raise the practical war fighting problem that the West has limited hope of being able to preempt or quickly destroy Iraqi delivery capabilities if Iraq is given the opportunity to deploy and conceal a mix of ballistic and cruise missiles or use unconventional delivery systems. Iraq may be able to inflict significant damage on both military and civilian targets before its attack capabilities can be suppressed. Once again, the West must be able to both deter/defend with a capability for massive conventional retaliation and retain the option of retaliation with weapons of mass destruction of its own.

VII. Dealing With The Threat From Iraq

Prophecy is a dangerous game at any time, and is virtually impossible in the case of Iraq. There is no way to predict how long Saddam Hussein and the Ba'ath regime will last, or whether any successor government will ultimately prove less authoritarian or aggressive. The future unity and resolve of the U.N. Coalition is uncertain, and there are limits to how long and how thoroughly the current embargo and sanctions can be applied.

In the near-term, Iraq seems likely to limit itself to internal, low level, or unconventional conflicts. There is a very real risk that Kurdish and Shi'ite separatism could provoke some form of Iraqi civil war, but it is a war the Ba'ath regime would quickly win unless the U.N. intervenes. The risk of new fighting between Iraq and its Kurds is particularly high. The Ba'ath elite is almost certain to make every effort to undermine the Kurdish enclave, and to use force the moment it feels it is safe to do so. It will probably have the support of most Iraqi military officers. Turkey's confrontation with its own Kurds, and Iran's support of Iraqi Shi'ites, are other major wild cards in the equation. Turkey may well reach the point where it fears Kurdish separatism more than Iraq.

Iraq's Shi'ites are now under tight government control, and many are Iraqi nationalists. A new uprising seems unlikely, but it might still occur. If it does, such an uprising seems far more likely to lead to bloody repression than partition of the country or any lasting alignment between Iraqi Shi'ites and Iran. Other outcomes are possible: A major uprising might create a significant pro-Iranian Shi'ite resistance in Iraq, it might create a pro-Iranian Shi'ite enclave similar to the Kurdish enclave, or even give Iran part of Iraq's territory.

What currently seems far more likely, however, is that the Ba'ath regime will systematically eliminate the last traces of Shi'ite opposition in the marshes, and defeat the Kurds by a mixture of political and economic action, low level military action, and military intimidation. Such an Iraqi victory over the Kurds, and final elimination of the Shi'ite resistance, could increase tension with Iran and Turkey, and seriously undermine the credibility of Western military capabilities.

Such a victory would also allow Iraq to shift from a focus on internal issues to revenge and efforts at intimidation. Iraq's current regime is almost certain to see reparations, the threat of war crimes trials, and competition for oil quotas and revenues as issues that merit at least the tacit threat of the use of military force. Active efforts at revenge and intimidation are possible -- perhaps likely. At least some border incidents with Iran, Saudi Arabia, and Kuwait are likely, and so is the use of terrorism and unconventional warfare

against leaders or elites which Saddam Hussein and the Ba'ath see as responsible for Iraq's defeat, continued sanctions or reparation, or as placing limits on the reassertion of Iraqi power in the region.

Even if Iraq does not force another military confrontation with the U.N. -- and this seems as likely as not -- Iraq will remain a major threat to regional peace. Iraq not only retains a significant capability to build weapons of mass destruction, its overall mix of conventional forces is still formidable by regional standards. Iraq's forces are still large enough to pose a major threat to Kuwait and Saudi Arabia if they could not obtain American aid. It has enough conventional forces to enable Iraq to defend against any attack by Iran, and its forces should be fully capable of dealing with any of the various Kurdish or Shi'ite militias that are internal threats to Saddam Hussein's power as well as suppressing Iraq's Kurdish and Shi'ite regions by force.

Iraq has less ability to attack its neighbors. It has lost much of its pre-war offensive capability. It cannot use its present forces in a sustained conflict without major resupply of munitions and spare parts, and its forces will continue to deteriorate with time. Iraq not only is currently limited in military power, the U.N. embargo on arms and military technology ensures that it will slowly and steadily decline to a limited defensive capability. This decline in Iraq's military forces could only be threatening to regional stability if Iran achieves the major arms orders it is seeking, and gains a decisive edge over Iraq.

The mid and long-term prospects for conflict also depend heavily on Iraq's regime and access to new supplies of conventional weapons and the technology to make weapons of mass destruction. It seems likely that Iraq will be a revanchist state as long as it is under its present Ba'athist regime or comes under the control of a hard-line military officer. The issue is not really whether Saddam survives, but the future character of the state. If any hard-line regime does survive, and Iraq can obtain significant flows of arms and technology, it is likely to be exceedingly dangerous. It is certain to make growing use of the politics of intimidation and it may reach the point of risk taking and significant conflict.

There is every reason to enforce all of the U.N. Security Council Resolutions that deny Iraq arms imports, as well as deny it imports of dual-use technology it can use for weapons of mass destruction. Iraq has played the role of an aggressor or destabilizing state for virtually its entire post-colonial existence. It retains enough military capability in spite of the Gulf War to threaten its southern neighbors if they do not receive outside support, and the technical skills and at least some of the equipment to manufacture and deliver weapons of mass destruction. No case can be made for even limited arms transfers unless a more democratic, stable, and ethnically balanced government comes to power in the future.

What is far less clear, however, is that the U.N. has much to gain from economic measures whose net impact is to punish the Iraqi people, or from trying to enforce peace terms that call for reparations and war crimes trials. Such measures unquestionably weaken Saddam Hussein and Iraq's current ruling elite in an economic sense, but they have a high humanitarian cost, and it is far from clear whether they will force a change in Iraq's government. They almost certainly are making Iraq's population more hostile to the West and other moderate Arab states, and their long-term cost may well exceed any short-term benefits.

The answer, however, is not to simply lift the sanctions. It is certain that any peace between Iraq and Kuwait will not be an easy one. The U.N. should not only insist that Iraq accept the U.N. Security Council resolutions that will prevent Iraq from rapidly recovering its capability to deliver weapons of mass destruction, the U.N. should insist on obtaining firm Iraqi recognition of Kuwait's sovereignty and new border. Similarly, the U.N. needs to press for a clear autonomy arrangement that protects Iraq's Kurds. Trading Iraqi agreement on the Kuwait border issue and acceptance of Kurdish autonomy for an end to economic sanctions, an end to the threat of war crimes trials, and more realistic proposals regarding reparations and debt repayments is one alternative. It seems likely to produce far more mid and long-term stability in the Gulf than continuing to try to win a far more sweeping victory after the Gulf War than the U.N. chose to win during it.

The ultimate answer to dealing with Iraq, however, is a continued de facto military alliance between the West and southern Gulf states. No deal with Iraq is likely to last longer than the West's military presence in the Gulf, or be any stronger than a combination of southern Gulf military forces and the West's power projection capabilities. Diplomacy will at best be an extension of force by other means. As is the case with Iran, the threat from Iraq can ultimately only be contained or countered by war fighting capability.

³⁰⁸ U.S. Federal Register, Volume 56, Number 64, p. 13584; London Financial Times, April 2, 1991, p. 1; London Times, April 3, 1991, p. 2; ; Kenneth Katzman, "Iraq's Campaign to Acquire and Develop High technology," Congressional Research Service, CRS-92-611F, August 3, 1991

³⁰⁹ Washington Post, November 27, 1997, p. A-20.

³¹⁰ London Financial Times, July 26, 1989, p. 20; Jane's Defense Weekly, May 13, 1989, p. 837; April 22, 1989, p. 687, August 12, 1989, p. 255, September 30, 1989, p. 674, Defense News, May 8, 1989, p. 6; International Defense Review, 6/189, pp. 835-841.

³¹¹ "U.S. Reasserts Aim to Keep Oil Flowing From Persian Gulf," Washington Times (February 22, 1984),

p. A-1.

³¹² "Iraqis Fire Missiles on Iranian Cities," Chicago Tribune (February 25, 1984), p. 20; Washington Post, May 11, 1988, p. A-1.

³¹³ New York Times, May 1, 1988, p. 1; Los Angeles Times, May 21, 1988, p. 18; Washington Post, May 11, 1988, p. A-1.

³¹⁴ In spite of the knowledge gained during the Gulf War, sources still differ on other aspects of the performance of this system. According to some reports, the improved Iraqi Scuds have a CEP of 1,300 meters versus 1,000 meters for the Scud B, and carry only 600 kilograms versus 1,000 kilograms for the Scud B. According to other reports, Iraq has obtained Scud Ds from the USSR, although this seems unlikely. The Scud Ds are substantially more accurate than the Scud C, and can use minelet and submunition payloads, but there is no evidence the USSR has sold such systems to Third World states. Some reports indicate that Iraq has Soviet-made Scud C missiles with strap on boosters. This seems doubtful because the missiles Iran recovered did not have such boosters, only a smaller warhead. David C. Isby, Weapons and Tactics of the Soviet Army, Fully Revised Edition, London, Jane's, 1988, pp. 296-301

³¹⁵ Working paper issued by the Israeli Embassy in Washington, April, 1990. No author, title, or publisher listed. Also see Duncan Lennox, "Iraq-Ballistic Missiles", Current News, Supplement, Department of Defense, October 11, 1990, pp. B-4 to B-6; Washington Post, October 10, 1990, p. 19; Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, pp. II-330 to II-331; San Diego Navy Dispatch, September 8, 1990, p. 26; DAH-90, December 1989, p. 30.

³¹⁶ Baghdad has 23% of Iraq's population and is only 80 miles from the border. Tehran is about 290 miles from the front lines.

³¹⁷ Michael Eisenstadt, Like a Phoenix from the Ashes, Washington, Washington Institute Policy Paper No. 36, 1993, p. 36.

³¹⁸ Husayn is the name of grandson of Muhammad and the son of Ali. Ali was martyred in An Najaf and Husayn in Karbala, both in Iraq. Washington Post, May 11, 1988, p. A-1; Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 13-15. Work done by Dick Pawloski of General Dynamics describes the systems as follows:

Alert State and Deployment:

<u>State</u>	<u>Warhead</u>	<u>Missile</u>	<u>TEL</u>
6	in storage	in storage	available
5	in storage	sys/comp cks	available
4	attached	fueled	available
3	attached	put on TEL	move to site
2	attached	erected	set up

1 fused launched crew dispersed

All of the Scuds are liquid fueled and it takes a trained team around one hour to fuel and position the missile TEL (transporter-erector-launcher). It would take another hour to reload the launcher and an additional hour to prepare it for launching, not counting driving time to and from the reload site. A chemical warhead would also be "filled" with the VX Agent. These warheads utilize pre-mixed agents that require crews in MOP gear to fill them. The binary forms are not considered feasible for rocket employment at this time.

The "Al-Hussein", which utilizes a reduced payload package (985 to 190 kg) to effect a 100% growth in range to 600 km (328 NM). The warhead inventory which comprises nuclear, high-explosive, ICM Bomblets, chemical (985 kg with 555 kg active VX), or fuel-air-explosive (FAE).

Iraq's 48 ton, three-stage, "Tamuz-1" heavy duty rocket is supposed to have put up a satellite and its "Abbas" two-stage 2000 km (1100 NM) SSM has been test fired. These advanced rockets could place Iraq into the ICBM club of the superpowers. There is another rocket project, the "Condor II", that was being done with the cooperation of Egypt and Argentina. Fortunately, it has been plagued with technical problems.

³¹⁹ Martin Navias, "Ballistic Missile Proliferation in the Middle East," *Survival*, May/June 1989, p. 228; Warren W. Lenhard and Todd Masse, "Persian Gulf War: Iraqi Scud Ballistic Missile Systems," Washington, Congressional Research Service 71-173F. February 14, 1991, p. CRS-3; Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-19.

³²⁰ The USSR claimed that none of the Scuds it sold to Iraq had the range to reach Teheran. Iran claims to have recovered parts showing the Scuds used in the attacks were of recent Soviet manufacture. Some sources claim that Egypt, Italy, France, the FRG, PRC, and/or USSR helped the Iraqis add boosters or modify the missiles to use more of their fuel and/or a smaller warhead.

³²¹ FBIS, Middle East, April 25, 1988, p. 1; Duncan Lennox, "Iraq-Ballistic Missiles", Current News, Supplement, Department of Defense, October 11, 1990, pp. B-4 to B-6.

³²² Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18; Defense and Foreign Affairs Weekly, May 8-14, 1989, pp. 3 and 6. Iraq's Minister of Industry and Military Industrialization, Husayn Kamil, has denied Iraq is cooperating in missile development with any foreign country. Jane's Defense Weekly, May 13, 1989, p. 843.

³²³ New York Times, November 12, 1991, p. A-3; Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18.

³²⁴ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18; New York Times, September 7, 1989, p. A-9; New York Times, March 30, 1990, p. 6, April 3, 1990, p. 1, November 12, 1991, p. A-3; Christian Science Monitor, January 23, 1992, p. 1; The Atlanta Constitution, January 16, 1992, p. 1

³²⁵ For a good summary report, see Jane's Defense Weekly, February 17, 1990, p. 295. Also see Financial

Times, November 21, 1989, p. 1; Washington Post, September 20, 1989.

³²⁶ Flight International, May 13, 1989, p. 20; Wall Street Journal, August 30, 1990.

³²⁷ William Lowther Iraq and the Supergun, London, Pan, 1992, especially pages 210-215.

³²⁸ Some sources indicate that the booster is called the al-Abbid or Worshipper.

³²⁹ The Middle East, November, 1989, p. 19; William Lowther Iraq and the Supergun, London, Pan, 1992, pp. 257-258.

³³⁰ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18; New York Times, September 7, 1989, p. A-9.

³³¹ Duncan Lennox, "Iraq-Ballistic Missiles", Current News, Supplement, Department of Defense, October 11, 1990, pp. B-4 to B-6.

³³² New York Times, December 5, 1989; Washington Post, December 9, 1989; Aviation Week, December 11, 1989, p. 31; Defense Daily, December 12, 1989, p. 381; Financial Times, December 20, 1989, p; FBIS-WES, December 8, 1989, p. 23; Jane's Defense Weekly, December 23, 1989, pp. 1371-1372.

³³³ Reuters, October 4, 1991, AM Cycle.

³³⁴ Working paper by Dick Pawloski.

³³⁵ Considerable debate has taken place since the war as to whether British officials knew about the gun much earlier and could have prevented earlier deliveries of equipment to Iraq. Washington Post, January 16, 1992, p. 11; London Financial Times, January 22, 1992, p. 6.

³³⁶ Project Harp had tested a gun based on combining two 16" guns bored out to a caliber of 16.69 inches with a total caliber length of L/86. This project demonstrated that such a device could launch 185 pound payloads up to altitudes of 118 miles (200 kilometers).³³⁶ Bull had claimed that such a device using a solid propellant rocket could deliver a 272 kilogram payload to ranges of 1,150 miles (1,852 kilometers), and 90 kilograms to 2,000 miles (3,200) kilometers. In addition, to helping Israel develop 175mm guns rounds that reached ranges of 40 kilometers, Bull and SRC had previously helped Iraq develop its own Majnoon 155mm and Al Faw 210mm artillery weapons. Jane's Defense Weekly, April 28, 1990, pp. 770-771, June 2, 1990, p. 1063; Washington Post, April 19, 1990, p. A-37; Economist, May 5, 1990, p. 99; Aviation Week, May 7, 1990, p. 88; Nature, April 26, 1990, p. 811.

³³⁷ Space Research Corporation had also done extensive work for Israel. Other firms involved may have included Societa delle Funcine, Firpas SrL and Italian Technology Innovation SrL of Italy; Amalgamated Trading Industries of Belgium; Advanced Technology Institute of Athens; PRB of Belgium, and Astra Defense Systems of the U.K. It is uncertain how many of these firms were knowingly involved, if they were involved at all. . Jane's Defense Weekly, April 28, 1990, pp. 770-771; Washington Post, April 19, 1990, p. A-37; London Sunday Times, April 22, 1990, p. 1

³³⁸ William Lowther Iraq and the Supergun, London, Pan, 1992, pp. 226.

³³⁹ The gun was aimed in the general direction of Israel. Jane's Defense Weekly, April 24, 1990, November

24, 1990, September 14, 1991, pp. 458-459; Defense News, November 11, 1991, p. 4; U.S. News and World Report, November 25, 1991, p. 36; Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18; New York Times, September 7, 1989, p. A-9.

³⁴⁰ Some sources estimate a barrel length of 153-160 meters. Nature, April 26, 1990, p. 811; International Defense Review, 5/1990. p. 481; Financial Times, April 18, 1990, p. 22, May 2, 1990, p. 18; The Middle East, March, 1990, pp. 17-18.

³⁴¹ Space Research Corporation had also done extensive work for Israel. Other firms involved may have included Societa delle Funcine, Firpas SrL and Italian Technology Innovation SrL of Italy; Amalgamated Trading Industries of Belgium; Advanced Technology Institute of Athens; PRB of Belgium, and Astra Defense Systems of the U.K. It is uncertain how many of these firms were knowingly involved, if they were involved at all. . Jane's Defense Weekly, April 28, 1990, pp. 770-771; Washington Post, April 19, 1990, p. A-37; London Sunday Times, April 22, 1990, p. 1

³⁴² London Financial Times, February 20, 1992, p. 8, February 28, 1992, p. 6. A U.S. firm called Kennametal, Inc. of Pittsburgh has been accused of selling equipment that might have been used in the supergun effort, but the evidence is ambiguous. The Philadelphia Inquirer, February 18, 1992, p. 1; Wall Street Journal, January 31, 1992, p.3.

³⁴³ Jane's Defense Weekly, September 14, 1991, pp. 458-459; Defense News, November 11, 1991, p. 4; Philadelphia Inquirer, October 9, 1991, p. 12.

³⁴⁴ Philadelphia Inquirer, October 9, 1991, p. 12; U.S. News and World Report, November 25, 1991, p. 36.

³⁴⁵ See William Lowther's Iraq and the Supergun, London, Pan, 1992, especially pages 226-227.

³⁴⁶ Space Research Corporation had also done extensive work for Israel. Other firms involved may have included Societa delle Funcine, Firpas SrL and Italian Technology Innovation SrL of Italy; Amalgamated Trading Industries of Belgium; Advanced Technology Institute of Athens; PRB of Belgium, and Astra Defense Systems of the U.K. It is uncertain how many of these firms were knowingly involved, if they were involved at all. . Jane's Defense Weekly, April 28, 1990, pp. 770-771; Washington Post, April 19, 1990, p. A-37; London Sunday Times, April 22, 1990, p. 1

³⁴⁷ Washington Times, March 29, 1990, pp. A-1 and A-8; April 29, 1990; Washington Post, April 30, 1990; Jane's Defense Weekly, October 29, 1988, p. 1045; New York Times, March 30, 1990, p. A-6.

³⁴⁸ U.S. Navy working paper, August, 1990. The sites were Wadi al Jabaryah, Luadl or Ratqa, H-2, Wadi Amil, Ishuayb al Awaj, Qasr Amij East, Qasr Amij West, Wadi Hawran, and Zawr Hawran.

³⁴⁹ New York Times, April 24, 1990, p. 13; Washington Times, May 30, 1990, July 10, 1990.

³⁵⁰ Washington Post, October 10, 1990, p. 19; Financial Times (London), October 10, 1990, p. 7.

³⁵¹ See the deliberate furor Saddam Hussein created over the fixed sites in March, 1990. New York Times, March 30, 1990, p. 6.

³⁵² U.N. Press Release, IK/79, December 16, 1991; U.N. Press Release IK/128, November 5, 1992, pp. 1-2;

Michael Eisenstadt, Like A Phoenix from the Ashes, Washington, Washington Institute Policy Paper No. 36, p. 36.

³⁵³ The U.N. has only had formal acknowledgment from Iraq of 10 Soviet MAZ-543, six al-Nida, and three al-Walid launchers, and 11 decoy launchers. Michael Eisenstadt, Like A Phoenix from the Ashes, Washington, Washington Institute Policy Paper No. 36, p. 36.

³⁵⁴ Duncan Lennox, "Iraq-Ballistic Missiles", Current News, Supplement, Department of Defense, October 11, 1990, pp. B-4 to B-6. Some sources claim Iraq had up to 100-225 home-made launchers by the time of the war, and that the U.S. firm of Terex in Bridgeport, Connecticut, assisted Iraq in making these units. New York Times, January 26, 1992, p. A-12. In practice, Iraq seems to have deployed only a about six al-Nida TELs, three Al-Walid TELs, and nine decoy launchers. Michael Eisenstadt, Like A Phoenix from the Ashes, Washington, Washington Institute Policy Paper No. 36, p. 36; U.N. Press Release, IK/79, December 16, 1991; U.N. Press Release IK/128, November 5, 1992, pp. 1-2.

³⁵⁵ Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, p. II-332, UK Recognition Journal, October, 1988, p. 312.

³⁵⁶ These statistics are taken from a U.S. Department of Defense background briefing dated March, 1991.

³⁵⁷ There is some debate about this. Czech anti-chemical warfare units in the Gulf claim to have detected traces of small amounts of Sarin. This has led to speculation that the Iraqis may have had a warhead or bomb explode accidentally. Washington Post, November 11, 1993.

³⁵⁸ New York Times, November 12, 1991, p. A-3; Christian Science Monitor, January 23, 1992, p. 1.

³⁵⁹ Washington Post, July 26, 1991, p. A-1; "Ambassador Rolf Ekrus, "Unearthing Iraq's Arsenal," Arms Control Today, April 1992, pp. 6-9.

³⁶⁰ The UN refused to name the facilities at the time of this declaration because it feared this would allow Iraqi to move some of the equipment and missiles in them. Washington Post, February 14, 1992, p. A-33.

³⁶¹ Washington Post, February 14, 1992, p. A-33; Washington Post, January 15, 1992, p. A-18.

³⁶² Christian Science Monitor, January 23, 1992, p. 1.

³⁶³ The Atlanta Constitution, January 16, 1992, p. 1; New York Times, February 28, 1992, p. A-28, November 5, 1992, p. A-10; Washington Times, February 11, 1992, p.1, November 6, 1992, p. A-7; Washington Post, January 27, 1993, p. A-16, July 7, 1993, p. A-28; Philadelphia Inquirer, March 16, 1993, p. E-1; Arms Control Today, December, 1992, p. 24.

³⁶⁴ Washington Post, January 15, 1992, p. A-18; Washington Times, September 12, 1991, p. A8; March 5, 1992, p. 1. U.S. News and World Report published an article claiming that Iraq might have an underground factory and some 800 missiles on February 10, 1992 (p.22). General Colin Powell later indicated that he had seen no evidence of any underground facility and that Iraq's maximum holding might be about 250 missiles. Albany Times Union, February 5, 1992, p. 7.

³⁶⁵ New York Times, February 28, 1992, p. 28; Washington Times, February 11, 1992, p.1, November 6

,1992, p. A-7.

³⁶⁶ Michael Eisenstadt, Like A Phoenix from the Ashes, Washington, Washington Institute Policy Paper No. 36, pp. 36-37.

³⁶⁷ The technical content of this discussion is adapted in part from the author's discussion of the technical aspects of such weapons in After the Storm: The Changing Military Balance in the Middle East, Boulder, Westview, 1993; working material on biological weapons prepared for the United Nations, and from Office of Technology Assessment, Proliferation of Weapons of Mass Destruction: Assessing the Risks, United States Congress OTA-ISC-559, Washington, D.C., August, 1993; Kenneth R. Timmerman, Weapons of Mass Destruction: The Cases of Iran, Syria, and Libya, Simon Wiesenthal Center, Los Angeles, August, 1992; Dr. Robert A. Nagler, Ballistic Missile Proliferation: An Emerging Threat; Systems Planning Corporation, Arlington, 1992; and translations of unclassified documents on proliferation by the Russian Foreign Intelligence Bureau provide to the author by the staff of the Government Operations Committee of the U.S. Senate.

³⁶⁸ Michael Eisenstadt, Like A Phoenix from the Ashes, Washington, Washington Institute Policy Paper No. 36, p. 37.

³⁶⁹ Jane's Defense Weekly, 30 January 1993, pp. 20-21; Defense Electronics and Computing, IDR press, September 1992, pp. 115-120, International Defense Review, May, 1992, pp. 413-415; Jane's Remotely Piloted Vehicles, 1991-1992; Keith Munson, World Unmanned Aircraft, London, Jane's 1988; Air Force Magazine, March, 1992, pp. 94-99, May, 1992, p. 155.

³⁷⁰ Iran claimed the Iraq used nerve and phosgene gas delivered by FROG-7s and BM-21s, and produced hundreds of killed and thousands of wounded as early as the Iraqi attack on Dezful in mid-1981. These reports do not seem true. Claims of the use of mycotoxins seem to reflect the results of poor sanitation conditions in the Iranian forces. Col., H.N., Commander of the IDF NBC Center, Ma'arakhot, No. 296, February, 1983; Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 7; Edgar O' Ballance, The Gulf War, London, Brassey's Defense Publishers, 1988, p. 77; Anthony H. Cordesman, Lessons of Modern Wars -- Volume II: The Iran-Iraq War, Boulder, Westview, 1990, pp. 122-123.

³⁷¹ This is a small amount. About 15-20 tons of a nerve agent like Tabun are need to cover a single square kilometer.

³⁷² Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, p. 11.

³⁷³ The persistence of chemical agents is dependent on wind and temperature, and whether they are disperse as liquids or aerosols. Gases tend to disperse quickly in very hot weather and to persist far longer in cold weather. It is important to note that gases that may disperse in minutes under some conditions take days to

disperse under others, and that persistent gases that last days or weeks in hot weather can last up to three times longer in cold weather.

³⁷⁴ Unpublished "Statement of the Honorable William H. Webster, Director, Central Intelligence Agency, Before the Committee on Governmental Affairs, Hearings on Global Spread of Chemical and Biological Weapons", February 9, 1989; Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 8; Anthony H. Cordesman, Lessons of Modern Wars -- Volume II: The Iran-Iraq War, Boulder, Westview, 1990; W. Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989; New York Times, March 27, 1984; Wall Street Journal, October 29, 1991, p. 24.

³⁷⁵ Jane's Defense Weekly, January 9, 1988, p. 3; February 27, 1988, p. 336.

³⁷⁶ At least four batches of chemicals were bought in the United Kingdom (London Financial Times, November 5, 1991, p. 9.) For general sources for this analysis see unpublished "Statement of the Honorable William H. Webster, Director, Central Intelligence Agency, Before the Committee on Governmental Affairs, Hearings on Global Spread of Chemical and Biological Weapons", February 9, 1989; Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 8; Anthony H. Cordesman, Lessons of Modern Wars -- Volume II: The Iran-Iraq War, Boulder, Westview, 1990; W. Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989.

³⁷⁷ Iraq also may have established another plant near Karbala to produce nerve gas. Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 8; Anthony H. Cordesman, Lessons of Modern Wars -- Volume II: The Iran-Iraq War, Boulder, Westview, 1990, pp. 510-512; W. Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, pp. 11-17.

³⁷⁸ Christian Science Monitor, January 23, 1992, p. 1; Terry J. Gander, "Iraq -- the Chemical Arsenal," Jane's Intelligence Weekly, pp. 413-415; Steven R. Bowman, "Iraqi Chemical Weapons Capabilities," Washington, Congressional Research Service 93-292F, February 24, 1993.

³⁷⁹ Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 8.

³⁸⁰ Seth Carus, "Chemical Weapons in the Middle East," Policy Focus, Number Nine, Washington Institute for Near East Policy, December, 1988, p. 4; "Iraq's Scare Tactic," Newsweek, August 2, 1982; Washington Post, April 5, 1988, p. A-1.

³⁸¹ Terry J. Gander, "Iraq -- the Chemical Arsenal," Jane's Intelligence Weekly, pp. 413-415; Steven R. Bowman, "Iraqi Chemical Weapons Capabilities," Washington, Congressional Research Service 93-292F, February 24, 1993; Peter Dunn, "The Chemical War: Journey to Iran," NBC Defense & Technology International, pp. 28-37; Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, pp. 22-23; Foreign Report, March 31, 1988, p. 12; and "Iran Keep Chemical Options Open", pp. 12-14. Jane's Defense Weekly, January 9, 1988, p. 3; February 27, 1988, p. 336. The Austrian firms seems to have included Neuberger Holz und Kunststoffindustrie and Lenhardt Metallbau under Dachdecker. Five West German firms seem to have been involved, including WTB (Walter Thosti Boswau), Infracplan, and Karl Kolb.

³⁸² Nerve gases are more complex to manufacture than Mustard Gas. There are more ways to manufacture nerve gases than mustard gas, and many types of chemicals that can be used, but sales of most of these chemicals -- such as pinacolyl alcohol, potassium fluoride, phosphorous oxychloride, phosphorous trichloride, and trimethyl phosphite -- are easy to track and many have only limited commercial applications. Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 8; Anthony H. Cordesman, Lessons of Modern Wars -- Volume II: The Iran-Iraq War, Boulder, Westview, 1990, pp. 510-512; W. Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, pp. 11-17.

³⁸³ Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 8; Anthony H. Cordesman, Lessons of Modern Wars -- Volume II: The Iran-Iraq War, Boulder, Westview, 1990, pp. 510-512; W. Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, pp. 11-17.

³⁸⁴ It takes 0.45 tons of ethylene oxide to make 1.0 tons of Thiodiglycol. Carus, p. 15.

³⁸⁵ Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, pp. 9-10.

³⁸⁶ "Iraq's Scare Tactic," Newsweek, August 2, 1982; Washington Post, April 5, 1988, p. A-1.

³⁸⁷ "Iraq's Scare Tactic," Newsweek, August 2, 1982; Washington Post, April 5, 1988, p. A-1; Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, pp. 7-9; Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 9.

³⁸⁸ "Iraq's Scare Tactic," Newsweek, August 2, 1982; Washington Post, April 5, 1988, p. A-1; Seth Carus,

The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, pp. 7-9.

³⁸⁹ Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, p. II-325.

³⁹⁰ It later became clear that Iraq had imported large amounts of Thiodiglycol (whose main civil use is keeping the ink running in ball point pens) and thionyl chloride from Britain , The Independent, July 28, 1991, p. 2. Peter Dunn, "The Chemical War: Journey to Iran", NBC Defense & Technology International, pp. 28-37 and "Iran Keeps Chemical Options Open", pp. 12-14.

³⁹¹ Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, p. 22; Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, pp. II-375.

³⁹² The priority Iraq gave to chemical and biological weapons is illustrated by the fact that Hussein Kamil -- Saddam Hussein's son-in-law and cousin -- headed the Ministry of Industry and Military Industries during most of this period. The Ministry of Industry and Military Industries is the branch of the Iraqi government which is responsible for the production of chemical and biological weapons. Michael Eisenstadt, "The Sword of the Arabs:" Iraq's Strategic Weapons, Washington, Washington Institute for Near East Policy, Policy Paper 21, September, 1990, p. 7. W. Seth Carus, "Chemical Weapons in the Middle East," Policy Focus, Number Nine, Washington Institute for Near East Policy, December, 1988, p. 4; "Iraq's Scare Tactic," Newsweek, August 2, 1982; Washington Post, April 5, 1988, p. A-1; Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, pp. II-325 and II-334; Jane's Soviet Intelligence Review, June, 1989, p. 256; Foreign Report, March 31, 1988, p. 1.

³⁹³ Washington Post, April 30, 1993, p. A-45; Christian Science Monitor, January 25, 1993, p. 18; Financial Times, April 2, 1992, p. 3, April 30, 1993, p. 5; The Economist, February 6, 1993, pp. 49-50; New York Times, June 26, 1993, p. A-19; Los Angeles Times, July 20, 1992, p. C2; Chemical and Engineering News, May 3, 1993, pp. 8-9.

³⁹⁴ New York Times, April 3, 1990, p. 1

³⁹⁵ The U.N. did not find signs of the use of chemical weapons during its inspection of the marsh areas in November, 1993, but referred soil samples to experts. Washington Post, November 24, 1993, p. A-12; Jane's Defense Weekly, January 9, 1988, and January 28, 1989; Der Spiegel, January 23, 1989; Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 10; Baghdad Domestic Service, April 2, 1990.

³⁹⁶ Michael Eisenstadt, "The Sword of the Arabs:" Iraq's Strategic Weapons, Washington, Washington

Institute for Near East Policy, Policy Paper 21, September, 1990, p. 7. W. Seth Carus, "Chemical Weapons in the Middle East," Policy Focus, Number Nine, Washington Institute for Near East Policy, December, 1988, p. 4; "Iraq's Scare Tactic," Newsweek, August 2, 1982; Washington Post, April 5, 1988, p. A-1; Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, pp. II-325 and II-334; Jane's Soviet Intelligence Review, June, 1989, p. 256; Foreign Report, March 31, 1988, p. 1; New York Times, November 12, 1991.

³⁹⁷ Dick Palowski, Changes in Threat Air Combat Doctrine and Force Structure, 24th Edition, Fort Worth, General Dynamics DWIC-01, February, 1992, pp. II-326 to II-327.

³⁹⁸ Washington Post, November 11, 1993.

³⁹⁹ The author visited many Iraqi positions the week after the war with senior Saudi officers. At several field headquarters positions, we found orders and instructions for the use of chemical weapons.

⁴⁰⁰ Terry J. Gander, "Iraq -- the Chemical Arsenal," Jane's Intelligence Weekly, pp. 413-415; Steven R. Bowman, "Iraqi Chemical Weapons Capabilities," Washington, Congressional Research Service 93-292F, February 24, 1993.

⁴⁰¹ Washington Post, July 26, 1991, p. A-1.

⁴⁰² New York Times, July 31, 1991, p. A-1, November 12, 1991, p. A-3; Christian Science Monitor, January 23, 1992, p. 1; Associate Press, December 12, 1991, PM cycle. Terry J. Gander, "Iraq -- the Chemical Arsenal," Jane's Intelligence Weekly, pp. 413-415; Steven R. Bowman, "Iraqi Chemical Weapons Capabilities," Washington, Congressional Research Service 93-292F, February 24, 1993.

⁴⁰³ Terry J. Gander, "Iraq -- the Chemical Arsenal," Jane's Intelligence Weekly, pp. 413-415.

⁴⁰⁴ Baltimore Sun, November 3, 1991, p. 16A; New York Times, November 12, 1991, p. A-3; Jane's Defense Weekly, December 14, 1991, pp. 1144-1145; Associate Press, December 12, 1991, PM cycle; London Times, March 4, 1992, p. 10; Christian Science Monitor, January 23, 1992, p. 1.

⁴⁰⁵ New York Times, November 12, 1991, p. A3; Christian Science Monitor, January 23, 1992, p. 1; Jane's Defense Weekly, December 14, 1991, pp. 1144-1145; Associate Press, December 12, 1991, PM cycle.

⁴⁰⁶ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18; "Ambassador Rolf Ekruš, "Unearthing Iraq's Arsenal," Arms Control Today, April 1992, pp. 6-9; Christian Science Monitor, January 23, 1992, p. 1; The Atlanta Constitution, January 16, 1992, p. 1.; Jane's Defense Weekly, December 14, 1991, pp. 1144-1145; Associate Press, December 12, 1991, PM cycle. The UN found nearly 100 metal working machines for chemical weapons at the plant during a raid on November 20, 1991.

⁴⁰⁷ The technical content of this discussion is adapted in part from the author's discussion of the technical aspects of such weapons in After the Storm: The Changing Military Balance in the Middle East, Boulder, Westview, 1993; working material on biological weapons prepared for the United Nations, and from Office of Technology Assessment, Proliferation of Weapons of Mass Destruction: Assessing the Risks, United

States Congress OTA-ISC-559, Washington, D.C., August, 1993; Kenneth R. Timmerman, Weapons of Mass Destruction: The Cases of Iran, Syria, and Libya, Simon Wiesenthal Center, Los Angeles, August, 1992; Dr. Robert A. Nagler, Ballistic Missile Proliferation: An Emerging Threat; Systems Planning Corporation, Arlington, 1992; and translations of unclassified documents on proliferation by the Russian Foreign Intelligence Bureau provide to the author by the staff of the Government Operations Committee of the U.S. Senate.

⁴⁰⁸ Many sources classify mycotoxins as chemical poisons. Unfortunately, mycotoxins have become one of those weapons that are popular with journalists or propagandists seeking to sensationalize a given conflict, and countries are often accused of using mycotoxins in cases where ambiguous symptoms are present. Iran has also been accused of producing and using mycotoxins.

⁴⁰⁹ Task Force on Terrorism and Unconventional Warfare, Chemical Weapons in The Third World: 2. Iraq's Expanding Chemical Arsenal, House Republican Research Committee, U.S. House of Representatives, May 29, 1990, p. 12; Wiener Zeitung, June 25, 1989.

⁴¹⁰ Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, pp. 29-35.

⁴¹¹ For a range of sources on Iraqi capabilities, see New York Times, December 30, 1992; Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-19; Andrew Terril, "Chemical Weapons in the Gulf War," Strategic Review, Spring, 1986; Washington Times, January 19, 1989, p. A-6; January 27, 1989, p. A-2; Baltimore Sun, August 19, 1990, p. 5E; Leonard Spector, Proliferation Today, New York, Vintage Books, 1984; Arms Control Today, April, 1992, pp. 7-8.

⁴¹² For sample reporting, see Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18; Washington Post, January 26, 1989, p. A-16; New York Times, January 18, 1989, p. A-7; Reuters, January 17, 1989. A West German official, Friedhelm Ost, stated in early 1989, that Iraq was developing biological weapons research and might already have started the production of biological agents, and the U.S. Director of Central Intelligence, Judge Webster, publicly announced in October, 1990, that Iraq was producing biological weapons. Washington Times, January 27, 1989, p. 2; Wall Street Journal, January 23, 1989, p. A-11.

⁴¹³ Department of Defense, Conduct of the Persian Gulf War: Final Report, Department of Defense, April, 1992, pp. 16-18

⁴¹⁴ Washington Times, January 19, 1989, p. A-8.

⁴¹⁵ Baltimore Sun, August 19, 1990, p. 5-E; Government of Canada, "Collateral Analysis and Verification of Biological and Toxin Research in Iraq," October, 1991; Michael Eisenstadt, Like a Phoenix from the Ashes, Washington, Washington Institute Policy Papers No. 36, pp. 31-34; U.N. Special Commission, Report of the Executive Chairman, S/23165, October 25, 1991; U.N. Press Release IK/46, August 14, 1991, p. 1; U.N. Press Release IK/69, October 31, 1991, p. 2; Eliot Cohen, Gulf War Air Power Survey, Washington, U.S.

Air Force, 1993, p. 82.

⁴¹⁶ Government of Canada, "Collateral Analysis and Verification of Biological and Toxin Research in Iraq," October, 1991; Michael Eisenstadt, Like a Phoenix from the Ashes, Washington, Washington Institute Policy Papers No. 36, pp. 31-34; U.N. Special Commission, Report of the Executive Chairman, S/23165, October 25, 1991; U.N. Press Release IK/46, August 14, 1991, p. 1; U.N. Press Release IK/69, October 31, 1991, p. 2; Eliot Cohen, Gulf War Air Power Survey, Washington, U.S. Air Force, 1993, p. 82.

⁴¹⁷ Government of Canada, "Collateral Analysis and Verification of Biological and Toxin Research in Iraq," October, 1991; Michael Eisenstadt, Like a Phoenix from the Ashes, Washington, Washington Institute Policy Papers No. 36, pp. 31-34; U.N. Special Commission, Report of the Executive Chairman, S/23165, October 25, 1991; U.N. Press Release IK/46, August 14, 1991, p. 1; U.N. Press Release IK/69, October 31, 1991, p. 2; Eliot Cohen, Gulf War Air Power Survey, Washington, U.S. Air Force, 1993, p. 82.

⁴¹⁸ Middle East Economic Digest, June 27, 1987, p. 16, August 29, 1987, p. 10; June 10, 1988, p. 9, June 24, 1988, p. 9, October 14, 1988, p. 20, February 10, 1989, p. 15; Seth Carus, The Genie Unleashed: Iraq's Chemical and Biological Weapons Production, Washington, Washington Institute Policy Papers, No. 14., 1989, pp. 33-35.

⁴¹⁹ FBIS, Daily Report, Western Europe, January 23, 1989, p. 11, January 25, 1989, p. 8, and February 6, 1989, p. 9; Der Spiegel, January 23, 1989, pp. 16-27.

⁴²⁰ FBIS, Daily Report, Western Europe, January 30, 1989, pp. 9-10, Wall Street Journal, February 1, 1989, p. A-11.

⁴²¹ Listed in Senate Foreign Relations Committee, Republican Staff, "Weapons Sales to Iraq," Working Paper, October 17, 1990.

⁴²² Jane's Defense Weekly, September 14, 1991, p. 471.

⁴²³ Jane's Defense Weekly, September 14, 1991, p. 471.

⁴²⁴ The Atlanta Constitution, January 16, 1992, p. 1.

⁴²⁵ The technical content of this discussion is adapted in part from the author's discussion of the technical aspects of such weapons in After the Storm: The Changing Military Balance in the Middle East, Boulder, Westview, 1993; working material on biological weapons prepared for the United Nations, and from Office of Technology Assessment, Proliferation of Weapons of Mass Destruction: Assessing the Risks, United States Congress OTA-ISC-559, Washington, D.C., August, 1993; Kenneth R. Timmerman, Weapons of Mass Destruction: The Cases of Iran, Syria, and Libya, Simon Wiesenthal Center, Los Angeles, August, 1992; Dr. Robert A. Nagler, Ballistic Missile Proliferation: An Emerging Threat; Systems Planning Corporation, Arlington, 1992; and translations of unclassified documents on proliferation by the Russian Foreign Intelligence Bureau provide to the author by the staff of the Government Operations Committee of the U.S. Senate.

⁴²⁶ Iraq's President Saddam Hussein repeated this denial on July 10, 1990. He stated that, "We do not have

nuclear weapons." He also went on to say, however, that, "...we would see no problem in a Western nation helping us to develop nuclear arms to help compensate for those owned by Israel." French TF1 Television network release, July 9, 1990; Washington Times, July 19, 1990, p. 2.

⁴²⁷ Based on work by Leonard Spector and Atomic Energy Commission of Iraq, Annual Report for 1988, Baghdad, Iraq Atomic Energy Commission, 1989, p. 94.

⁴²⁸ Leonard S. Spector, The Undeclared Bomb, Ballinger, New York, 1988; Leonard S. Spector and Jacqueline R. Smith, Nuclear Exports: The Challenge of Control, Carnegie Endowment for Peace, Washington, April, 1990, pp. 21-26; New York Times, March 18, 1980; Energy Daily, October 2, 1980; and Dr. Michael Brenner, "Iran as a Nuclear Power in the Middle East," SAI, December 14, 1989, Appendix B.

⁴²⁹ The IAEA estimates that it takes 55 pounds (25 kilograms) of highly enriched uranium to make a nuclear weapon.

⁴³⁰ See Leonard S. Spector, The Undeclared Bomb, Ballinger, New York, 1988; Leonard S. Spector and Jacqueline R. Smith, Nuclear Exports: The Challenge of Control, Carnegie Endowment for Peace, Washington, April, 1990, pp. 21-26; Jed Snyder, "The Non-Proliferation Regime: Managing the Impending Crisis," Journal of Strategic Studies, December, 1985, p. 11; Shyam Bhatia, Nuclear Rivals in the Middle East, London, Routledge Paul, 1988, p. 85.

⁴³¹ Half of the 55 pounds would have been in the core of Osirak and unusable for weapons purposes, and the rest would have been irradiated in the nearby Isis reactor, both of which would have been subject to IAEA inspection. Based on work by Leonard Spector.

⁴³² United Nations Security Council, Report on the Eighth IAEA Inspection in Iraq Under Security Council Resolution 687, 11-18 November, 1991, New York, United Nations, S/23283 (English), pp. 21-23 and Annex 2.

⁴³³ Leonard Spector, The New Nuclear Nations, New York, Vintage, 1985, pp. 165-166; Energy Daily, October 2, 1980, p. 1.

⁴³⁴ For an excellent history of Iraq's nuclear weapons effort prior to 1983, see Jed C. Snyder, "The Road to Osirak: Baghdad's Quest for the Bomb," Middle East Journal, No. 37, Autumn 1983, pp. 565-594. Also see Leonard Spector, The New Nuclear Nations, New York, Vintage, 1985, pp. 65-67.

⁴³⁵ Leonard Spector, Proliferation Today, New York, Vintage Books, 1984, pp. 175-178.

⁴³⁶ Shyam Bhatia, Nuclear Rivals in the Middle East, London, Routledge Paul, 1988, p. 85.

⁴³⁷ See Andrew T. Parasiliti, "Iraq, Nuclear Weapons, and the Middle East", The Middle East Institute, December 14, 1989, p. 3.

⁴³⁸ Working papers by Leonard Spector, Journal do Brazil, May 22, 1988; William H. Webster, Director of Central Intelligence, "Testimony Before the Committee on Governmental Affairs," U.S. Senate, May 18, 1989; Washington Post, September 29, 1989; Mideast Markets, June 12, 1989, p. 10, September 18, 1989, p. 11; October 16, 1989; Financial Times Mid-East Market, December 12, 1989; Arms Control Today, April,

1990, p. 27; The Middle East, May, 1990, pp. 11-14; Nucleonics Week, May 29, 1986, p. 6; Defense News, May 8, 1989; Nuclear Engineering International, December, 1988, p. 5.

⁴³⁹ The \$10 billion dollar figure is a UN staff estimate. See New York Times, October 14, 1991, p. A-6.

⁴⁴⁰ IAEA comments on CRS-93 323F, Fax by IAEA UNSC 687 Action Team, June 23, 1993.

⁴⁴¹ Sources for this list and the following discussion include: IAEA Comments on CRS 93-323F, June 23, 1993, fax by UNSC 687 Action Team; J. Davis and D. Kay, "Iraq's Secret Nuclear Weapons Program," Physics Today, July, 1992; D. Albright and M. Hibbs, "Iraq's Shop Till You Drop Nuclear Program," Bulletin of the Atomic Scientists, April, 1992; D. Albright and M. Hibbs, "Iraq's Nuclear Hide and Seek," Bulletin of the Atomic Scientists, September, 1991; D. Albright and M. Hibbs, "Iraq's Quest for the Nuclear Grail: What Can We Learn?," Arms Control Today, July/August, 1992, pp. 7-8; Washington Post, October 13, 1991, p. A-1; Newsweek, October 7, 1991, pp. 28-33; U.S. News and World Report, November 25, 1991, pp. 34-40; Chicago Tribune, October 6, 1991, p. I-28; United Nations Security Council, Report on the First and Second IAEA Inspection in Iraq Under Security Council Resolution 687, 15 July, 1991, New York, United Nations, S/22788 (English); Report on the Third IAEA Inspection in Iraq Under Security Council Resolution 687, 25 July, 1991, New York, United Nations, S/23283 (English); Report on the Fourth IAEA Inspection in Iraq Under Security Council Resolution 687, 28 August, 1991, New York, United Nations, S/22986 (English); Report on the Fifth IAEA Inspection in Iraq Under Security Council Resolution 687, 4 October, 1991, New York, United Nations, S/23112 (English); Report on the Seventh IAEA Inspection in Iraq Under Security Council Resolution 687, 6 October, 1991, New York, United Nations, S/23122 (English); Report on the Seventh IAEA Inspection in Iraq Under Security Council Resolution 687, 14 November, 1991, New York, United Nations, S/23215 (English); Report on the Eighth IAEA Inspection in Iraq Under Security Council Resolution 687, 11-18 November, 1991, New York, United Nations, S/23283 (English); Report on the Ninth IAEA Inspection in Iraq Under Security Council Resolution 687, 30 January 1992, New York, United Nations, S/23505 (English); Milhollin, Gary, "The Iraqi Bomb," New Yorker, February p.47-55. David Albright and Mark Hibbs, "Supplier-spotting," Bulletin of the Atomic Scientists, January/February, 1993, pp. 8-9; Tim Ripley, "Iraq's Nuclear Weapons Program," Jane's Intelligence Review, December, 1992, pp. 554-558. Lawrence Scheinman, "Lessons From Post-War Iraq for the International Full-Scope Safeguard Regime," Arms Control Today, April, 1993, pp. 3-6; Hans Blix, "Verification of Nuclear Nonproliferation: The Lesson of Iraq," The Washington Quarterly, Autumn, 1992, pp. 57.-65; Terry J. Gander, "Iraq -- The Chemical Arsenal," Jane's Intelligence Review, September 1992, pp. 413-415; Maurizio Ziffero, "The IAEA: Neutralizing Iraq's Nuclear Weapons Potential," Arms Control Today, April, 1993, pp. 7-10; Alan George, "Nuclear complicity," The Middle East, March, 1993, pp. 12-13 and "Iraq: Weapons Sanctions Aren't Working," The Middle East, September, 1993, pp. 14-15; Tim Ripley, "Iraq's Nuclear Weapons Program," December, 1992, PP. 544-588; Peter D. Zimmerman, "Iraq's Nuclear Achievements: Components, Sources, and Stature," Congressional Research Service 93-323F, February 18,

1993.

⁴⁴² United Nations Security Council, Report on the Eighth IAEA Inspection in Iraq Under Security Council Resolution 687, 11-18 November, 1991, New York, United Nations, S/23283 (English), p. 14.

⁴⁴³ U.S. News and World Report, November 25, 1991, p. 36.

⁴⁴⁴ United Nations Security Council, Report on the Eighth IAEA Inspection in Iraq Under Security Council Resolution 687, 11-18 November, 1991, New York, United Nations, S/23283 (English), p. 14.

⁴⁴⁵ James Bruce, "Iraq and Iran: Running the Nuclear Technology Race," Jane's Defense Weekly, December 5, 1988, p. 1307; New York Times, July 10, 1992.

⁴⁴⁶ Washington Times, August 29, 1990, p. 8; South, July 1987, pp. 99-100; Stern, April 6, 1989, pp. 214-217; Der Spiegel, December 18-25, 1989, pp. 93-94; Michael Eisenstadt, "The Sword of the Arabs:" Iraq's Strategic Weapons, Washington, Washington Institute for Near East Policy, Policy Paper 21, September, 1990, pp. 11-13.

⁴⁴⁷ Nuclear Fuel, August 5, 1991, Vol. 16, No. 16, p. 14.

⁴⁴⁸ It takes 15 to 25 kilograms to make one relatively simple nuclear weapon. More advanced weapons take substantially less. The IAEA did, however, certify on May 7, 1990, that all such material was still accounted for. Source: IAEA Office, United Nations, New York, New York.

⁴⁴⁹ New York Times, February 13, 1992, p. A-16; Zachary SA. Davis and Warren H. Donnelly, "Iraq and Nuclear Weapons," Congressional Research Service, IB90113, February 13, 1992, p. 3; David Albright and Mark Hibbs, "News that the front page missed, " Bulletin of the Atomic Scientists, October, 1991, pp. 7-9; Peter D. Zimmerman, "Iraq's Nuclear Achievements: Components, Sources, and Stature," Congressional Research Service, 93-323F, February 18, 1993.

⁴⁵⁰ Andrew T. Parasiliti, "Iraq, Nuclear Weapons, and the Middle East", The Middle East Institute, December 14, 1989, pp. 4-5; Mideast Markets, Vol. 16, no. 8, April 17, 1989, p. 15 and vol. 16, no. 9, May 1, 1989, p. 12; Washington Post, March 31, 1989, p. A-1; Report on the Seventh IAEA Inspection in Iraq Under Security Council Resolution 687, 14 November, 1991, New York, United Nations, S/23215 (English), p. 3.

⁴⁵¹ U.S. News and World Report, Vol. 112, January 20, 1992, p. 45; London Financial Times, January 15, 1992, p. 1.

⁴⁵² Maximum ultimate design capability was 2,000 centrifuges per year. Washington Post, May 5, 1989; Rochester Democrat and Chronicle, March 28, 1989; New York Times, January 15, 1992; David Albright and Mark Hibbs, "News that the front page missed, " Bulletin of the Atomic Scientists, October, 1991, pp. 7-9; Report on the Seventh IAEA Inspection in Iraq Under Security Council Resolution 687, 14 November, 1991, New York, United Nations, S/232215 (English), p. 19; David Albright and Mark Hibbs, "Iraq's Shop-Till-You Drop Nuclear Program," Bulletin of the Atomic Scientists, April 1992, pp. 27-37.

⁴⁵³ Gary Milhollin, "Building Saddam Hussein's Bomb," New York Times, March 8, 1992, pp. 30-31.

⁴⁵⁴ H&H was headed by Walter Busse, a former employee of MAN Technologies Ltd. which had built the uranium centrifuge assembly plant at Gronau in West Germany for URENCO. Washington Post, June 4, 1989; Der Spiegel, December 18, 1989; FBIS-Western Europe, December 20, 1989; Nucleonics Week, May 4, 1987, p. 1; Wall Street Journal, October 29, 1991, p. 24.

⁴⁵⁵ Wall Street Journal, October 7, 1991, p. A-10.

⁴⁵⁶ Michael Eisenstadt, "The Sword of the Arabs:" Iraq's Strategic Weapons, Washington, Washington Institute for Near East Policy, Policy Paper 21, September, 1990, pp. 11-13; Rochester Democrat and Chronicle, March 28, 1988, pp. 1A and 10A; Washington Post, May 5, 1989, p. A-24.

⁴⁵⁷ The Middle East, May, 1990, pp. 11-14.

⁴⁵⁸ H&H was headed by Walter Busse, a former employee of MAN Technologies Ltd. which had built the uranium centrifuge assembly plant at Gronau in West Germany for URENCO. It seems to have provided machinery for the production of gas ultracentrifuges. Washington Post, June 4, Los Angeles Times, December 12, 1991, A-9; Associated Press, December 11, 1991 AM cycle. Other firms named at this time included Schenk Werzberg and Machinebau, 1989; Der Spiegel, December 18, 1989; FBIS-Western Europe, December 20, 1989; Nucleonics Week, May 4, 1987, p. 1; Gary Milhollin, "Building Saddam Hussein's Bomb," New York Times, March 8, 1992, pp. 30-31.

⁴⁵⁹ New York Times, January 15, 1992, p. A-1.

⁴⁶⁰ IAEA comments on CRS-93 323F, Fax by IAEA UNSC 687 Action Team, June 23, 1993.

⁴⁶¹ Michael Eisenstadt, "The Sword of the Arabs:" Iraq's Strategic Weapons, Washington, Washington Institute for Near East Policy, Policy Paper 21, September, 1990, p. 15.

⁴⁶² Washington Post, October 5, 1991, p. A-1; Wall Street Journal, October 29, 1991, p. 24.

⁴⁶³ Washington Post, November 2, 1991, p. C-1

⁴⁶⁴ New York Times, January 15, 1992, p. A-1; U.S. News and World Report, Vol. 112, January 20, 1992, p. 45; Star Tribune, November 22, 1991, p. 22A, Christian Science Monitor, October 23, 1991, p. 9.

⁴⁶⁵ U.S. News and World Report, November 25, 1991, p. 36. Vol. 112, January 20, 1992, p. 45; United Nations Security Council, Report on the Eighth IAEA Inspection in Iraq Under Security Council Resolution 687, 11-18 November, 1991, New York, United Nations, S/23283 (English); David Albright and Mark Hibbs, "Iraq's Shop-Till-You Drop Nuclear Program," Bulletin of the Atomic Scientists, April 1992, pp. 27-37.

⁴⁶⁶ IAEA comments on CRS-93 323F, Fax by IAEA UNSC 687 Action Team, June 23, 1993.

⁴⁶⁷ Zachary SA. Davis and Warren H. Donnelly, "Iraq and Nuclear Weapons," Congressional Research Service, IB90113, February 13, 1992, p. 3; David Albright and Mark Hibbs, "Iraq and the Bomb: Were They Even Close?," Bulletin of Atomic Scientists, March, 1991, pp. 16-25; David Albright and Mark Hibbs, "Its all over at Al Atheer," Bulletin of Atomic Scientists, June, 1992, pp. 8-10; U.S. Experts Divided on Whether Iraqi Calutrons Procure U-235," Nuclear Fuel, June 24, 1991, pp. 3-4.

⁴⁶⁸ This analysis draws heavily on David Albright and Mark Hibbs, "Iraq and the Bomb: Were They Even Close?", Bulletin of Atomic Scientists, March, 1991, pp. 16-25; U.S. Experts Divided on Whether Iraqi Calutrons Procure U-235," Nuclear Fuel, June 24, 1991, pp. 3-4. IAEA comments on CRS-93 323F, Fax by IAEA UNSC 687 Action Team, June 23, 1993.

⁴⁶⁹ Iraq made this admission to the UN on October 21, 1991. New York Times, October 14, 1991, p. A6, October 20, 1991, IV-5; United Nations Security Council, Report on the Eighth IAEA Inspection in Iraq Under Security Council Resolution 687, 11-18 November, 1991, New York, United Nations, S/23283 (English), p. 9.

⁴⁷⁰ Los Angeles Times, December 12, 1991, p. A-9.

⁴⁷¹ A full description of activities is not included because of their value in nuclear weapons design. United Nations Security Council, Report on the Sixth IAEA Inspection in Iraq Under Security Council Resolution 687, 8 October, 1991, New York, United Nations, S/23122 (English).

⁴⁷² Washington Post, October 5, 1991, p. A-1.

⁴⁷³ Gary Milhollin, "Building Saddam Hussein's Bomb," New York Times, March 8, 1992, pp. 30-31.

⁴⁷⁴ Many of these details are taken from Peter D. Zimmerman, Iraq's Nuclear Achievements: Components, Sources, and Stature, Washington, Congressional Research Service, 93-323F, February 18, 1993.

⁴⁷⁵ The Middle East, May, 1990, pp. 11-14.

⁴⁷⁶ U.S. News and World Report, November 25, 1991, p. 36; United Nations Security Council, Report on the Eighth IAEA Inspection in Iraq Under Security Council Resolution 687, 11-18 November, 1991, New York, United Nations, S/23283 (English), p. 29.

⁴⁷⁷ The "sting" operation is a good example of what happens when a company that is concerned with proliferation takes immediate action to contact the officials in the country involved. A U.S. Company called CSI Technologies of San Marcos, California, immediately contacted U.S. Customs officials when it was contacted by Euromac, the Iraqi front organization, located in Thames Ditton, near London. U.S. officials contacted British officials, and they worked together to set up a series of meetings, some of which were televised, and to make the intercept and arrests at Heathrow Airport. Ironically, Euromac was registered as a "general grocers and provision merchant". It is also unclear that the Iraqi fully understood what they were ordering. Maxwell Laboratories of San Diego had been delivering other types of capacitors to Iraq, and had delivered 518 slow speed capacitors to Iraq. Iraq then order 185 high speed capacitors. Maxwell Laboratories notified Customs, and halted the shipment at Customs' request. The new type of capacitor, however, was still unsuitable for nuclear weapons. Andrew T. Parasiliti, "Iraq, Nuclear Weapons, and the Middle East", The Middle East Institute, December 14, 1989, pp. 4-5; Mideast Markets, Vol. 16, no. 8, April 17, 1989, p. 15 and vol. 16, no. 9, May 1, 1989, p. 12; Washington Post, March 31, 1989, p. A-1; Los Angeles Times, March 30, 1990; Washington Post, March 31, 1990, p. 2.

⁴⁷⁸ The core of a nuclear bomb consists of fissile material, a layer of outer explosives, and a firing circuit

connected to all parts of the out high explosive cover to detonate all of it at exactly the same moment and achieve maximum compression at the precise instant high energy neutrons are being injected into the compressed fissile core. Washington Times, March 28, 29, 30, 1990; Washington Post, March 28, 29, 30, 1990; New York Times, March 28, 29, 30, 1990;

⁴⁷⁹ United Nations Security Council, Report on the Eighth IAEA Inspection in Iraq Under Security Council Resolution 687, 11-18 November, 1991, New York, United Nations, S/23283 (English). pp. 14-15, 29; Gary Milhollin, "Building Saddam Hussein's Bomb," New York Times, March 8, 1992, pp. 30-31; Report on the Seventh IAEA Inspection in Iraq Under Security Council Resolution 687, 14 November, 1991, New York, United Nations, S/232215 (English), p. 30.

⁴⁸⁰ U.S. News and World Report, November 25, 1991, p. 36. This same article named a number of possible U.S. supplies, including Honeywell (computers), Canberra Industries, Inc. (computer equipment to measure neutrons and for design specifications, Carl Zeiss (computer equipment to process photographic data), Databit, inc. (computer data transmission and circuit switches), Forney International (computer equipment for power stations), Hewlett-Packard (optical fiber cables, computers, frequency synthesizers, precision electronic and photo equipment), Perkin-Elmer (computers, precision electronic, and photo equipment, Sackman Associates (computers, electronic assemblies, and photo equipment), and Westinghouse Electric (computer hardware and software for the Iraqi electric system). Many of these supplies almost certainly had little or nothing to do with the Iraqi nuclear effort.

⁴⁸¹ Zachary S. Davis and Warren H. Donnelly, "Iraq and Nuclear Weapons," Congressional Research Service, IB90113, February 13, 1992, p. 4; Washington Post, October 9, 1991, p. A-17.

⁴⁸² Report to the UN Security Council on October 8, 1991; USA Today, October 10, 1991, p. 6.

⁴⁸³ Gary Milhollin, "Building Saddam Hussein's Bomb," New York Times, March 8, 1992, pp. 30-31.

⁴⁸⁴ New York Times, May 20, 1992.

⁴⁸⁵ Gary Milhollin, "Building Saddam Hussein's Bomb," New York Times, March 8, 1992, pp. 30-31.

⁴⁸⁶ The problem of height of burst is critical because it determines the fall out effects of a weapon, and the relative importance of blast, radiation, and thermal energy affecting a given target. Fusing is not necessarily different from the fusing needed for ordinary bombs, but the fusing on ordinary bombs often fails to function properly.

⁴⁸⁷ Nucleonics Week, January 24, 1991.

⁴⁸⁸ Zachary S. Davis and Warren H. Donnelly, "Iraq and Nuclear Weapons," Congressional Research Service, IB90113, February 13, 1992, p. 6.

⁴⁸⁹ Tim Ripley, "Iraq's Nuclear Weapons Program," Jane's Defense Weekly, December, 1992, pp. 554-555; Gary Milhollin, "The New Arms Race," The New Yorker, February 1, 1993; J. Davis and D. Kay, "Iraq's Secret Nuclear Weapons Program," Physics Today, July, 1992; Diana Edensword and Gary Milhollin, "Iraq's Bomb - An Update," New York Times, April 26, 1993, p. A-17; New York Times, May 7, 1993, p. A-

30; Daniel Schwammenthal, "How the IAEA Assist Iraq," Defense Media Review, March, 1993, pp. 5-9; Washington Post, December 16, 1992, p. A-6.

⁴⁹⁰ The Atlanta Constitution, January 16, 1992; "Ambassador Rolf Ekrus, "Unearthing Iraq's Arsenal," Arms Control Today, April 1992, pp. 6-9.

⁴⁹¹ The technical content of this discussion is adapted in part from the author's discussion of the technical aspects of such weapons in After the Storm: The Changing Military Balance in the Middle East, Boulder, Westview, 1993; working material on biological weapons prepared for the United Nations, and from Office of Technology Assessment, Proliferation of Weapons of Mass Destruction: Assessing the Risks, United States Congress OTA-ISC-559, Washington, D.C., August, 1993; Kenneth R. Timmerman, Weapons of Mass Destruction: The Cases of Iran, Syria, and Libya, Simon Wiesenthal Center, Los Angeles, August, 1992; Dr. Robert A. Nagler, Ballistic Missile Proliferation: An Emerging Threat; Systems Planning Corporation, Arlington, 1992; and translations of unclassified documents on proliferation by the Russian Foreign Intelligence Bureau provide to the author by the staff of the Government Operations Committee of the U.S. Senate.

⁴⁹² Washington Times, December 3, 1993, p. A-15; Christian Science Monitor, December 3, 1993, p. 6.