

Iran

Nuclear Weapon Capability

Iran currently has no nuclear weapon capability, but it is known to be pursuing a nuclear weapon option. The intelligence services of Germany, Israel, the United Kingdom, and the United States have confirmed the existence of a long-term program to manufacture nuclear weapons.¹ The U.S. Department of Defense cites Iran as “one of the countries most active in seeking to acquire NBC [nuclear-, biological-, chemical-] and missile-related technologies.”² Iran has the basic nuclear technology and infrastructure to build a bomb, and “Iran’s success in achieving a nuclear capability will depend, to a large extent, on the supply policies of Russia and China or on Iran’s successful illicit acquisition of adequate quantities of weapons-usable fissile material.”³

Missile Capability

Iran possesses about 300 Scud-Bs with a 300-kilometer range and 1,000-kilogram payload, and approximately 100 Scud-Cs with a 500-kilometer range.⁴ Having received North Korean assistance, Iran is now manufacturing Scuds.⁵ The country also has 200 Chinese-supplied CSS-8 missiles with an estimated range of 150 kilometers and a payload of 190 kilograms, purchased in late 1989.⁶ The short-range series is developed and manufactured primarily as a counterweight against Iraq. Iran has tested the medium-range Shahab III, a derivative of the North Korean No Dong, with a range of 1,300 kilometers and a payload of about 750 kilograms. United States officials assess that Tehran could have the Shahab III on “emergency operational status.”⁷ This MRBM can reach Israel, although it requires further testing in order to be considered a “reliable threat.”⁸ The country is also reportedly developing the Shahab IV, with a range of 2,000 kilometers and payload of 1,000 kilograms.⁹

Biological and Chemical Weapon Capability

Although Iran is a member of the Biological Weapons Convention, U.S. intelligence reports claim that Iran currently maintains an offensive biological weapon program. The Iranian program is believed to include active research and development, agent production, and weaponization.¹⁰

In May 1998, after acceding to the Chemical Weapons Convention, Tehran acknowledged past Iranian involvement in chemical weapon development and production. Like the Iranian BW program, the chemical weapon program

began in the 1980s during the war with Iraq. Iranian officials claimed that the Iranian CW program was dismantled at the war's end. United States threat assessments, however, contend that Iran's chemical weapon program remains intact. It is believed that Iran possesses a stockpile of weaponized blood gases and blister and pulmonary agents.

Strategic Context

Iran's experience during the Iran–Iraq War in the 1980s has driven the country's pursuit of weapons of mass destruction. During the war, Iraq used chemical weapons against poorly protected Iranian forces with devastating effect. Iraq's bombardment of Tehran with conventionally armed, extended-range Scud missiles during the spring 1988 War of the Cities was an important factor in leading Iran to accept a cease-fire in October of that year. With the West's conspicuous silence over Saddam Hussein's use of chemical weapons against Iran, the leaders in Tehran decided that acquiring those weapons was the only means of ensuring self-defense. Shortly after the cease-fire, Akbar Hashemi-Rafsanjani, then–speaker of the Iranian parliament and commander-in-chief of Iran's armed forces and later Iran's president, declared:

With regard to chemical, bacteriological, and radiological weapons training, it was made very clear during the war that these weapons are very decisive. It was also made clear that the moral teachings of the world are not very effective when war reaches a serious stage and the world does not respect its own resolutions and closes its eyes to the violations and all the aggressions which are committed in the battlefield. *We should fully equip ourselves both in the offensive and defensive use of chemical, bacteriological, and radiological weapons.* From now on you should make use of the opportunity and perform this task. (emphasis added)¹¹

As Iran looks around its extended neighborhood, it sees Israel, India, and Pakistan with advanced nuclear weapons; inspection-free Iraq; growing ties between Israel and Turkey; an unfriendly, nuclear-armed U.S. Navy; Gulf Arab states that spend vast amounts of money on state-of-the-art, high-tech weaponry and, until recently, a hostile Afghanistan. United States sanctions have helped to diminish Tehran's conventional capabilities and have likely worked toward reaffirming Tehran's belief in the utility of unconventional weapons.¹² Some Iranian leaders have come to see weapons of mass destruction and ballistic and cruise missiles together as their ultimate allies. From Iran's perspective, nuclear weapons may make strategic sense. Iran may well want to maintain a nuclear option, regardless of whether conservatives or moderates are in control in Tehran. Indeed, neither Iran's development of weapons of mass destruction nor its ballistic missile program has abated since Mohammed Khatami was elected president.¹³

Overtly pursuing the nuclear option would of course violate Iran's treaty obligations under the NPT, coming at great political and economic cost. Since President Khatami came to power, Iran has had considerable success in dimin-

ishing its isolation and improving relations with much of the world, including its Arab Gulf neighbors and potentially with the United States. Withdrawing from the NPT and manufacturing a bomb would undermine all those successes. Yet as Saddam Hussein tries to reconstitute Iraq's weapons of mass destruction, including its nuclear program, Iran will feel compelled to match Iraq's progress, despite being a member of the NPT. The absence of weapon inspectors in Iraq since December 1998 is undoubtedly a key Iranian security concern. A nuclear-armed Iraq could drive Iran toward withdrawing from the NPT and declaring an openly nuclear stance.¹⁴

On the other side of the spectrum, rapprochement with the United States would probably provide Iran with some space to reconsider exercising its nuclear weapon option.¹⁵ The May 1997 elections that brought President Khatami to power appear to make improved relations with the United States a possibility. While conservatives in Iran continue to resist this possibility, events after September 11, 2001, have seemed to accelerate improved relations. President Bush's "axis of evil" speech ended that process. Moreover, Iran's continued opposition to the Middle East peace process and its support of groups like Hamas will continue to obstruct better U.S.–Iranian relations.

Nuclear Analysis

Estimates about when Iran might acquire nuclear weapons have constantly been pushed back. In 1992–1993, U.S. and Israeli officials had estimated that Iran might have a nuclear bomb by 2000–2002. By 1995, the United States and Israel had readjusted the period to "7–15 years." This "reasonable estimate," in then–Defense Secretary William Perry's words, was based on evidence that Iran had revived its nuclear program in the mid-1980s and that following the Gulf War (which revealed the alarming progress of Saddam Hussein's nuclear program), Iran had launched a comprehensive nuclear program with weapon potential.¹⁶ In March 1997, John Holum, at that time the director of the Arms Control and Disarmament Agency, testified before Congress that Iran remained eight to ten years away from acquiring nuclear weapons, which was virtually the same assessment that U.S. officials had given two years earlier. Queried as to whether this meant that Iran's nuclear program was making little progress, Holum replied: "I think they have slipped rather than gained on the timetable. That is my current recollection. I may also want to give you a classified response."¹⁷ According to U.S. assessments, Iran could produce a nuclear weapon in seven to nine years, while Israel estimates that Iran could have the bomb in five to seven years.¹⁸ The uncertainty involved is reflected in the U.S. Defense Department decision not to put a time frame on Iran's nuclear capabilities in its 2001 report.¹⁹

Iran has regularly objected to U.S. efforts to impose a nuclear embargo and to press Russia not to supply Iran with nuclear weapons, arguing that as a member of the NPT it has treaty rights "to develop research, production and use of nuclear energy for peaceful purposes." In 1991, in an effort to dispel recurring suspicions about its nuclear program, Iran agreed that, in addition to permit-

ting routine IAEA inspections on all nuclear activities as required by the NPT, it would also allow the IAEA to visit any location within the country to check for undeclared nuclear activities. The agency has made two such special visits. A February 1992 visit observed several locations not on Iran's list of declared nuclear sites but found no violations of the NPT. In a follow-up visit in November 1993, IAEA officials viewed facilities in Esfahan, Karaj, and Tehran, but again found no violations of the pact.²⁰ Nevertheless, the outcomes of the visits have not allayed U.S. concerns.

The revolutionary Islamic regime of Ayatollah Khomeini that came to power in Iran in 1979 inherited two partially completed, German-supplied nuclear power reactors at Bushehr. Khomeini froze construction of these reactors immediately after coming to power.²¹ The structures were severely damaged by Iraqi bombing during the 1980–1988 Iran–Iraq War. In 1991 then-President Hashemi Rafsanjani expressed Iran's determination to complete construction of the reactors, but Germany refused to repair or finish the plants because of Iran's apparent interest in nuclear weapons. Iran sought assistance for the task, including from China and Brazil. Finally, in 1995, Tehran signed an \$800 million deal with Moscow to finish the first of the two units by 2001.²² Under the contract, Russia is also to provide low-enriched uranium fuel for a period of ten years, starting in 2001, at an annual cost of \$30 million, as well as technical training. In the course of consultation with the United States, however, Russia has dropped its previously contemplated plan to assist Iran in uranium enrichment.

Russia's assistance with the Bushehr nuclear plant is important to Iran's weapon program, although the extent to which that is true is debatable. Its pressurized-water-power reactors are particularly unsuitable to produce weapons-grade material.²³ The 1,000-megawatt nuclear power reactor is under IAEA safeguards and is similar to the light-water reactor supplied by the United States to North Korea under the terms of the Agreed Framework. Bushehr's benefits to Iran's nuclear weapon program are likely to be largely indirect. The project will augment Iran's nuclear technology infrastructure, helping Tehran's nuclear weapon research and development.²⁴ Iran will also benefit from the presence of thousands of Russian nuclear scientists who are expected to take part in the Bushehr project.²⁵ Iran might also try to hide illicit transfers of technology and materials in the stream of permitted commerce. Further, Russian "entities" are known to offer nuclear assistance that extends beyond the Bushehr nuclear plant.²⁶

The Khomeini regime also inherited a nuclear research base and continued nuclear research activities. The Tehran Research Center, for example, trained specialists and operated a small U.S.–supplied research reactor, which remained under IAEA safeguards.²⁷ Specialists at the center presumably had access to the research done during the shah's reign, possibly including undeclared nuclear weapon research. In 1984, in the midst of the Iran–Iraq War, Iran opened a new nuclear research center in Esfahan.

By 1992, press reports of Western intelligence findings indicated that Iran had established experimental programs in fissile material production at Sharif University in Tehran and possibly at other locations. These programs reported-

ly included research and development in both centrifuge uranium enrichment and plutonium reprocessing. Iran was said to be supporting those efforts by means of a clandestine procurement network. It was secretly approaching Western European companies to acquire nuclear-related, dual-use technologies and purchasing a number of small companies (particularly in Germany) to serve as export platforms for sensitive equipment to Iran.²⁸

In the spring of 1995 details emerged on Iran's nuclear procurement activities, publicly substantiating suspected efforts to establish a secret gas-centrifuge uranium-enrichment program. Specifically, Western intelligence sources were quoted as stating that, since 1990, Iran had approached German and Swiss firms to purchase balancing machines and diagnostic and monitoring equipment—all dual-use items potentially valuable for laboratory-scale centrifuge development. In addition, Iranian agents were said to have contacted a British company to obtain samarium-cobalt magnetic equipment, potentially useful in the development of centrifuge top bearings.²⁹ Without foreign assistance, Iran is, many believe, at least five to seven years away from acquiring a nuclear device using indigenous nuclear material, and at least six to nine years away from achieving a nuclear weapon design that can fit in the warhead of a long-range missile.³⁰

As noted, Iran continues to remain in good standing with the IAEA, and intelligence agencies have yet to locate a uranium-enrichment plant or a plutonium-reprocessing facility in the country.³¹ Tehran has not, however, signed the IAEA's 93+2 protocol, which calls for more intrusive safeguards. That protocol is a result of the 1990 Persian Gulf War, which revealed the extent to which Iraq, an NPT member, had progressed with its clandestine nuclear weapon program. The development of an indigenous capability to produce fissile material might take from eight to ten years, and several unconfirmed reports reveal that Iran has added a second track to its nuclear weapon program, seeking to purchase nuclear expertise and nuclear weapon material illicitly in the former Soviet Union.³² There have been no reports, however, that Iran succeeded in acquiring whole weapons or nuclear materials on the black market from Russian or other sources. Indeed, there have been no new reported cases involving the smuggling of weapons-usable materials from the former Soviet Union by any party since 1994.³³ On the other hand, hundreds of metric tons of weapons-usable nuclear materials remain poorly secured in Russia and are likely to remain so for many years, despite important U.S.–Russian collaborative efforts to enhance controls over such materials. Thus the potential danger that Iran may be able to obtain the materials will continue.

Most Western nuclear suppliers have adopted, from the regime's earliest days, a U.S.–led embargo on nuclear sales to the Iranian Revolutionary Government. The United States has relied on the Nuclear Suppliers Group to coordinate the Western embargo and has persuaded some states to withhold goods that were regulated under the NSG's core export-control guidelines. NSG rules permit the sale of such items, provided they are subject to IAEA inspection in the recipient state, but Washington has convinced its Western trading partners to adopt the stricter policy in the case of Iran. Russia, though

a member, explicitly rejects the U.S.-initiated ban on major nuclear exports to Iran. Moscow argues that the light-water type of reactor that Russia is supplying, which will be under IAEA inspection, is not a proliferation risk.

United States efforts to curtail foreign nuclear sales to Iran intensified during the Bush administration in the aftermath of the 1991 Gulf War. The Iraq experience led the NSG in April 1992 to extend its controls to nuclear dual-use items, those items with both nuclear and non-nuclear end uses—prohibiting the export of items on the list “when there is unacceptable risk of diversion [to the production of nuclear explosives] or when the transfers are contrary to the objective of averting the proliferation of nuclear weapons.” Once the new NSG rules were adopted, Washington sought agreement from the leading Western members of the group to prohibit all transfers of nuclear dual-use goods to Iran, but only Germany and the United Kingdom complied. An initially unsuccessful, parallel U.S. proposal, launched in 1992, was to curtail Western sales of (non-nuclear) strategic dual-use items to Iran; the initiative took four years to materialize in the form of the Wassenaar Arrangement in 1996.

U.S. Pressure on China and Russia

For a decade starting in the mid-1980s China was a source of significant assistance to Iran’s civil nuclear program.³⁴ It reportedly trained Iranian nuclear technicians and engineers in China under a ten-year agreement for cooperation signed in 1990. China supplied Iran with two “mini” research reactors installed at Esfahan. China also supplied Iran with a calutron, the type of equipment used in Iraq’s EMIS (electromagnetic isotope separation) enrichment program for the separation of weapons-grade uranium. Both countries claim that the aid has been used exclusively for peaceful purposes, in line with Iran’s NPT obligations.

In 1992 Washington persuaded China to postpone the sale to Iran of a plutonium-producing research reactor indefinitely and convinced Argentina not to export supporting fuel-cycle and heavy-water production facilities.³⁵ In March 1992 China agreed to supply two 300-MWe nuclear power reactors to Iran. In the fall of 1995, however, China’s reactor sale to Iran was suspended, ostensibly because of difficulties over site selection, although the underlying cause may have been Iran’s difficulties in obtaining financing. Other factors may also have been involved. Some reports indicated that China suspended or even terminated the deal because of strong U.S. pressure.³⁶ In addition, France, Germany, and Japan apparently had declined to supply China with essential components that it might have needed for the reactors it had offered Iran. It is also possible that Iran lost interest in the arrangement once it was confident that Russia would complete the Bushehr project.

In April 1996 the U.S. Department of Defense still regarded China to be Iran’s main source of nuclear assistance.³⁷ In the U.S.–China summit of October 1997, however, China made a commitment to cancel almost all its existing nuclear assistance to Iran and to provide Iran no new nuclear assistance. By 2001, citing that “China appears to be living up to its 1997 commitments,” the Department of Defense no longer viewed China as Iran’s main

nuclear friend, although Chinese missile assistance for Iran continues to pose a proliferation risk.³⁸ The commitment included a pledge to terminate the sale of a uranium conversion plant to Iran.

During early 1995, Russia proceeded with its contract to help Iran build a nuclear reactor at Bushehr. Tensions rose with Russia when the Clinton administration learned in March–April 1995 that, as part of a secret protocol for the reactor sale contract, Russia had agreed to provide Iran with a gas-centrifuge uranium-enrichment facility. Such a facility, though itself under IAEA inspection and dedicated to the production of low-enriched (non-weapons-grade) uranium, could enable Iran to build and operate a similar plant clandestinely to produce weapons-grade uranium. Other disturbing elements of the protocol were an agreement in principle for Russia to supply a 30–50 MWt light-water research reactor, 2,000 metric tons of natural uranium, and the training of Iranian graduates in the nuclear field in Russia.³⁹

Washington has pressured Russia to halt its work on the Bushehr nuclear reactor but has so far met with little success. United States concerns extend even beyond the Bushehr project, as Russian entities are known to be cooperating with Iran beyond the Bushehr project.⁴⁰ Throughout the 1990s broader national security concerns have made the United States reluctant to cut off aid to Russia as permitted by U.S. legislation. Under President Vladimir Putin's leadership, Russia has pledged to complete construction of the Bushehr plant. Soon after September 11, 2001, Russia and Iran signed an arms agreement that included an air defense system to be built around the Bushehr reactor.⁴¹

While the Bushehr project has continued, it has faced significant delays. Initially, Russian officials had estimated that, once construction had begun in early 1996, it would take 55 to 60 months to build the reactor and load it with fuel. However, by the fall of 1996, the project clearly faced complex engineering problems. Specifically, Russian experts were grappling with the incompatibility of the metallurgical specifications of the equipment supplied by Siemens during the 1970s with those of the components to be fitted in the reactor under the Russia–Iran deal.⁴² Reportedly, in the fall of 1997, while 200 to 300 Russian experts were still in Iran completing an engineering evaluation at the Bushehr installation, none of the components for the reactor's nuclear steam system had yet been delivered. In January 2001, however, Russia announced that the Bushehr project was 90 percent complete and that operation would begin by 2003.⁴³

In addition, Russia's promised sale to Iran of a sizable research reactor, encompassed in the original Bushehr deal, has also faltered. At U.S. urging, Russia refused to provide a heavy-water system—an efficient plutonium producer—as requested by the Iranians. In connection with Russia's reactor sale agreement, the United States was particularly troubled by the arrangements for the disposition of the plutonium-bearing spent fuel from Bushehr. The “take-back” of spent fuel had been a standard feature of Soviet nuclear export agreements. In practice, this means that the plutonium in the spent fuel was returned to the fuel supplier. In Iran's case, spent-fuel returned to Russia could prevent the Iranian diversion of plutonium for weapons. Ultimately, the United

States convinced Russia to stipulate to Iran that spent fuel from the reactor would be returned.⁴⁴

U.S. Sanctions Policy Toward Iran

During the 1980s, the United States imposed a wide range of sanctions on Iran because of its support for international terrorism, its attacks in 1987 on U.S.-flagged Kuwaiti tankers, and other actions that were hostile to U.S. interests. Those sanctions blocked economic and military assistance to Iran, prohibited the importation of Iranian-origin goods, and restricted U.S. contributions to multi-lateral organizations that assist Iran and U.S. Export-Import Bank credits for Iran.

The passage of the 1992 Iran–Iraq Arms Non-Proliferation Act expressly prohibited transfers of nuclear equipment and materials to Iran, as well as exports to Iran of all dual-use commodities and U.S. government and commercial arms sales. The restriction applies both to nuclear dual-use commodities, i.e., those having nuclear and non-nuclear uses and that are regulated internationally by the NSG, and strategic dual-use commodities, i.e., those having military and nonmilitary uses, currently regulated under the Wassenaar Arrangement.

In 1995 and 1996 the United States tightened sanctions on Iran, aiming in part to constrain Tehran's WMD programs.⁴⁵ Legislation adopted in February 1996 provided for U.S. economic assistance to Russia to be made upon presidential determination if Russia had terminated its nuclear-related assistance to Iran.⁴⁶ The legislation permitted the president to waive this restriction at six-month intervals, however, upon a determination that making U.S. funds available to Russia was in the interest of U.S. national security. In the interests of broader relations with Russia, such waivers have been exercised.⁴⁷ In August of 1996, Washington further intensified economic pressure on Iran by imposing secondary sanctions on it and Libya, through the Iran and Libya Sanctions Act of 1996 (ILSA). The law imposes sanctions on foreign enterprises that invest \$20 million or more in the energy sector of Iran or Libya. By the fall of 1997 this legislation faced a serious challenge from French, Malaysian, and Russian oil companies that had signed a deal with Iran to help recover and market oil and natural gas. The Clinton administration backed away from imposing the sanctions because of the economic crisis in East Asia and in Russia in the fall of 1997 and spring of 1998, which placed larger U.S. foreign policy interests at stake. The Bush administration has not been enthusiastic about ILSA, but because of congressional support in the summer of 2001, ILSA was extended for a period of five years.

Missile Analysis

Iran's acquisition of ballistic missiles began in the 1980s when, during the Iran–Iraq War, North Korea provided Iran with around 100 Scud–Bs and with facilities that enabled Iran to produce the Scuds indigenously.⁴⁸ During the early 1990s, Iran sought to acquire ballistic missile capabilities that could be used for

delivering nuclear weapons. It turned to China, Libya, and North Korea for missile systems and related technologies. In the early 1990s Iran reportedly discussed buying the 1,000-kilometer No Dong from North Korea.⁴⁹ On March 6, 1992, the United States imposed sanctions, under the missile non-proliferation provisions of the Arms Export Control and Export Administration Acts, against the Iranian Ministry of Defense and Armed Forces Logistics and against two North Korean entities for engaging in missile proliferation activities.

In June 1995, the press cited U.S. intelligence reports as evidence that “strongly implicate[d]” China in the transfer to Iran of equipment, materials, and scientific know-how that could be used in the manufacture of short-range ballistic missiles such as the Chinese M-9 and M-11.⁵⁰ China was believed to have transferred “dozens, perhaps hundreds, of missile guidance systems and computerized machine tools” to Iran, as well as rocket propellant ingredients that could be used in its current stockpile of short-range Scud-Mod Bs and Scud-Mod Cs, as well as on Scud variants that Iran might produce in the future.⁵¹ In the final analysis, however, the United States did not find that China’s missile transactions with Iran violated China’s MTCR-related pledges and declined to impose MTCR-related sanctions against either China or Iran.⁵² In 2001, however, the Department of Defense still determined that Chinese, along with Russian, “entities have continued to supply a wide variety of missile-related goods, technology and expertise to Iran.”⁵³

In 1996, it became clear that North Korea was exporting missile capabilities to Iran. As a result, the United States imposed sanctions on May 26, 1996, on the Iranian Ministry of Defense Armed Forces Logistics, the Iranian State Purchasing Office, and the Korea Mining Development Trading Bureau.⁵⁴ The precise nature of the offending transactions remains classified, but U.S. officials indicated that North Korea had sold missile components, equipment, and materials to Iran, although not complete missiles, production technology, or major subsystems.

During 1997, U.S. press reports quoted U.S. and Israeli intelligence findings that Russian enterprises, including cash-strapped Russian technical institutes, research facilities, and defense-production companies, were transferring to Iran Russian SS-4 MRBM technologies. According to these assessments, Iran hoped to employ these SS-4 MRBM technologies to develop two Iranian derivatives of the 1,000-kilometer-range North Korean No Dong missile. The first indigenous missile, the Shahab III, is projected to have a range between 1,300 and 1,500 kilometers. The second such missile is the Shahab IV, which has a 2,000-kilometer range and a 1,000-kilogram payload.

In September 1997 then-Vice President Al Gore raised the issue in Moscow with Prime Minister Viktor Chernomyrdin, as a result of which there was a visible decline in Russian assistance until the summer of 1998.⁵⁵ Nevertheless, Russian assistance remains critical to Iran’s development of the Shahab series, helping Iran “to save years in its development of the Shahab III”; further it “could significantly accelerate the pace of its ballistic missile development program.”⁵⁶ The Shahab III was tested in July 1998, July 2000, and September 2000. United States officials believe that only the September 1998 test was suc-

cessful.⁵⁷ In February 1999 Iran said that it was testing the Shahab IV but that it would be used only as a satellite-launch vehicle.⁵⁸ Iran has publicly mentioned plans for a Shahab V, with a possible range of 6,000 kilometers.

The U.S. intelligence community has indicated that Iran will likely continue development of IRBM and ICBM systems by initially testing them as space launch vehicle programs. The 2001 National Intelligence Estimate indicated uniform agreement among U.S. intelligence agencies that “Iran *could* attempt to launch an ICBM/SLV about mid-decade although most agencies believe Iran is *likely* to take until the last half of the decade to do so” (emphasis in original).⁵⁹ It was also noted that one agency does not find it likely that Iran will achieve a successful test of an ICBM before 2015.

Nevertheless, the 2001 NIE reiterates the importance of the acquisition of complete systems or major subsystems from North Korea or Russia in speeding Iranian ICBM flight-test capability. Thus, even in the aftermath of September 11, the Bush administration is determined to pressure Russia on the issue of Iranian nuclear and missile assistance.⁶⁰

Biological and Chemical Weapon Analysis

Iran’s biological weapon program was launched in the early 1980s during the Iran–Iraq War. Despite its ratification of the Biological Weapons Convention in 1973, Iran has allegedly pursued biological weapons under the guise of its extensive biotechnology and pharmaceutical industries. According to U.S. officials, “The Iranian military has used medical, education, and scientific research organizations for many aspects of BW procurement, research, and production.”⁶¹ Iran is also actively pursuing dual-use equipment and technology through contacts with Russia and other entities.

During the Iran–Iraq War, Iraq employed chemical weapons against Iranian troops. The primary agents used were mustard gas and the nerve agent tabun. Approximately 50,000 Iranian casualties were reported.⁶² In March 1986, U.N. Secretary General Javier Perez de Cuellar formally accused Iraq of using chemical weapons against Iran in violation of the 1925 Geneva Protocol. Iran began its chemical weapon program to deter Iraq’s use of chemical weapons. Allegedly, Iran also employed chemical weapons late in the war, but with less success than the Iraqis had.

Continued research on nerve agents presumably continues, as well as the active pursuit of Russian and Chinese expertise to improve chemical precursor production. Iran ratified the Chemical Weapons Convention in 1997.

NOTES

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Table 15.1: Iran's Missile Programs

| Missile | Status | Range (km) | Payload (kg) | Suppliers | Notes |
|-------------|--------|--------------|--------------|-----------------|---|
| M-7 (CSS-8) | O | 150 | 190 | PRC | Modified SA-2 |
| Scud-B | O/U | 300 | 1,000 | Libya/ Syria | 300+ produced |
| Scud-C | O | 500 | 700 | DPRK | 60+ produced |
| Shahab III | O | 1,300 | 750 | I/DPRK | From No Dong; tested 22 July 1998 |
| Shahab IV | D | 2,000 | ? | I/Russia | From Russian SS-4 |
| Shahab V | D? | 3,000-5,500? | ? | I/Russia | |

Table 15.2: **Iran: Nuclear Infrastructure**

| Name/Location of Facility | Type/Status | IAEA Safeguards |
|-------------------------------------|--|-----------------|
| POWER REACTORS | | |
| Bushehr I | Light-water, LEU, 1,000-MWe; damaged by Iraqi air strikes (1987, 1988). Currently under construction. | Planned |
| Bushehr II | Light-water, LEU, 1,300-MWe; damaged by Iraqi air strikes (1987, 1988). Facility remains unfinished, and project is currently suspended. | Planned |
| RESEARCH REACTORS | | |
| Tehran | Light-water, HEU, 5-MWt; operating ¹ | Yes |
| Esfahan | Miniature neutron source reactor (MNSR), 900 grams of HEU, 27-kW operating | Yes |
| URANIUM ENRICHMENT | | |
| Tehran | Alleged uranium centrifuge research program, Sharif University of Technology | No |
| REPROCESSING (PLUTONIUM EXTRACTION) | | |
| Tehran | Laboratory-scale hot cells; may not be operational ² | No |
| URANIUM PROCESSING | | |
| Yazd Province | Discovery of uranium deposits announced in 1990 | N/A |
| Tehran | Uranium-ore concentration facility; incapacitated. | N/A |
| Esfahan | Planned uranium conversion plant that could produce UF ₄ , UF ₆ , and UO ₂ . China cancelled its assistance in this area in 1997. | Yes |

Abbreviations

| | | | |
|-----|--|-----|--------------------------------------|
| HEU | highly enriched uranium | MWt | millions of watts of thermal output |
| LEU | low-enriched uranium | kWt | thousands of watts of thermal output |
| MWe | millions of watts of electrical output | N/A | not applicable |

NOTES

1. The reactor is located at the Amirabad Technical College, also called Tehran Nuclear Research Center. See "Iran's Weapons of Mass Destruction," *Jane's Intelligence Review*, Special Report No. 6, 1995, p. 10.
2. See David Albright, "An Iranian Bomb?" *Bulletin of the Atomic Scientists*, July/August 1995, p. 25, and "Iran's Weapons of Mass Destruction," *Jane's Intelligence Review*, p. 11.



