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Proliferation in Iran

An Overview of Delivery Systems and Possible CBRN Weapons Programs

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Revised: February 20, 2004

Iran's Search for Weapons of Mass Destruction

Delivery Systems

- Iran has numerous aircraft that could be used to deliver a nuclear weapon or modified for use as a UAV. They include some 65 F-4D/E, 60 F-5E/F, 30 Su-24MK, and 7 Su-25K.
    - Su-24 long-range strike fighters with range-payloads roughly equivalent to US F-111 and superior to older Soviet medium bombers.
    - F-4D/E fighter-bombers with capability to carry extensive payloads to ranges of 450 miles.
- Iran has shorter missile range systems:
    - In 1990, Iran bought CSS-8 surface-to-surface missiles (converted SA-2s) from China with ranges of 130-150 kilometers.
    - Has Chinese sea and land-based anti-ship cruise missiles. Iran fired 10 such missiles at Kuwait during Iran-Iraq War, hitting one US-flagged tanker.
- Large numbers of multiple rocket launchers and tube artillery that could be used for short range delivery of CBRN weapons.
- The Soviet-designed Scud B (17E) guided missile currently forms the core of Iran's ballistic missile forces — largely as a result of the Iran-Iraq War.
    - Iran only acquired its Scuds in response to Iraq's invasion. It obtained a limited number from Libya and then obtained larger numbers from North Korea. It deployed these units with a special Khatam ol-Anbya force attached to the air element of the Pasdaran. Iran fired its first Scuds in March 1985. It fired as many as 14 Scuds in 1985, 8 in 1986, 18 in 1987, and 77 in 1988. Iran fired 77 Scud missiles during a 52 day period in 1988, during what came to be known as the "war of the cities." Sixty-one were fired at Baghdad, nine at Mosul, five at Kirkuk, one at Tikrit, and one at Kuwait. Iran fired as many as five missiles on a single day, and once fired three missiles within 30 minutes. This still, however, worked out to an average of only about one missile a day, and Iran was down to only 10-20 Scuds when the war of the cities ended.
    - Iran's missile attacks were initially more effective than Iraq's attacks. This was largely a matter of geography. Many of Iraq's major cities were comparatively close to its border with Iran, but Tehran and most of Iran's major cities that had not already been targets in the war were outside the range of Iraqi Scud attacks. Iran's missiles, in contrast, could hit key Iraqi cities like Baghdad. This advantage ended when Iraq deployed extended range Scuds.
    - The Scud B is a relatively old Soviet design which first became operational in 1967, designated as the R-17E or R-300E. The Scud B has a range of 290-300 kilometers with its normal conventional payload. The export version of the missile is about 11 meters long, 85-90 centimeters in diameter and weighs 6,300 kilograms. It has a nominal CEP of 1,000 meters. The Russian versions can be equipped with conventional high explosive, fuel air explosive, runway penetrator, submunition, chemical, and nuclear warheads.
    - The export version of the Scud B comes with a conventional high explosive warhead weighing about 1,000 kilograms, of which 800 kilograms are the high explosive payload and 200 are the warhead structure and fusing system. It has a single stage storable liquid rocket engine and is usually deployed on the MAZ-543 eight wheel transporter-erector-launcher (TEL) . It has a strap-down inertial guidance, using three gyros to correct its ballistic trajectory, and uses internal graphite jet vane steering. The warhead hits at a velocity above Mach 1.5.
    - Most estimates indicate that Iran now has 6-12 Scud launchers and up to 200 Scud B (R-17E) missiles with 230-310 KM range.
    - Some estimates give higher figures. They estimate Iran bought 200-300 Scud Bs from North Korea between 1987 and 1992, and may have continued to buy such missiles after that time. Israeli experts estimate that Iran had at least 250-300 Scud B missiles, and at least 8-15 launchers on hand in 1997.
    - US experts also believe that Iran can now manufacture virtually all of the Scud B, with the possible exception of the most sophisticated components of its guidance system and rocket motors. This makes it difficult to estimate how many missiles Iran has in inventory and can acquire over time, as well as to estimate the precise performance characteristics of Iran's missiles, since it can alter the weight of the warhead and adjust the burn time and improve the efficiency of the rocket motors

- Iran has new long range North Korean Scuds - with ranges near 500 kilometers.
    - The North Korean missile system is often referred to as a "Scud C." Typically, Iran formally denied the fact it had such systems long after the transfer of these missiles became a fact. Hassan Taherian, an Iranian foreign ministry official, stated in February 1995, “There is no missile cooperation between Iran and North Korea whatsoever. We deny this.”
    - In fact, a senior North Korean delegation traveled to Tehran to close the deal on November 29, 1990, and met with Mohsen Rezaei, the former commander of the IRGC. Iran either bought the missile then, or placed its order shortly thereafter. North Korea then exported the missile through its Lyongaksan Import Corporation. Iran imported some of these North Korean missile assemblies using its B-747s, and seems to have used ships to import others.
    - Iran probably had more than 60 of the longer range North Korean missiles by 1998, although other sources report 100, and one source reports 170.
    - Iran may have 5-10 Scud C launchers, each with several missiles. This total seems likely to include four new North Korean TELs received in 1995.
    - Iran seems to want enough missiles and launchers to make its missile force highly dispersible.
    - Iran has begun to test its new North Korean missiles. There are reports it has fired them from mobile launchers at a test site near Qom about 310 miles (500 kilometers) to a target area south of Shahroud. There are also reports that units equipped with such missiles have been deployed as part of Iranian exercises like the Saeqer-3 (Thunderbolt 3) exercise in late October 1993.
    - The missile is more advanced than the Scud B, although many aspects of its performance are unclear. North Korea seems to have completed development of the missile in 1987, after obtaining technical support from the People's Republic of China. While it is often called a “Scud C,” it seems to differ substantially in detail from the original Soviet Scud B. It seems to be based more on the Chinese-made DF-61 than on a direct copy of the Soviet weapon.
    - Experts estimate that the North Korean missiles have a range of around 310 miles (500 kilometers), a warhead with a high explosive payload of 700 kilograms, and relatively good accuracy and reliability. While this payload is a bit limited for the effective delivery of chemical agents, Iran might modify the warhead to increase payload at the expense of range and restrict the using of chemical munitions to the most lethal agents such as persistent nerve gas. It might also concentrate its development efforts on arming its Scud C forces with more lethal biological agents. In any case, such missiles are likely to have enough range-payload to give Iran the ability to strike all targets on the southern coast of the Gulf and all of the populated areas in Iraq, although not the West. Iran could also reach targets in part of eastern Syria, the eastern third of Turkey, and cover targets in the border area of the former Soviet Union, western Afghanistan, and western Pakistan.
    - Accuracy and reliability remain major uncertainties, as does operational CEP. Much would also depend on the precise level of technology Iran deployed in the warhead. Neither Russia nor the People's Republic of China seem to have transferred the warhead technology for biological and chemical weapons to Iran or Iraq when they sold them the Scud B missile and CSS-8. However, North Korea may have sold Iran such technology as part of the Scud C sale. If it did so, such a technology transfer would save Iran years of development and testing in obtaining highly lethal biological and chemical warheads. In fact, Iran would probably be able to deploy far more effective biological and chemical warheads than Iraq had at the time of the Gulf War.
    - Iran may be working with Syria in such development efforts, although Middle Eastern nations rarely cooperate in such sensitive areas. Iran served as a transshipment point for North Korean missile deliveries during 1992 and 1993. Some of this transshipment took place using the same Iranian B-747s that brought missile parts to Iran. Others moved by sea. For example, a North Korean vessel called the *Des Hung Ho*, bringing missile parts for Syria, docked at Bandar Abbas in May, 1992. Iran then flew these parts to Syria. An Iranian ship coming from North Korea and a second North Korean ship followed, carrying missiles and machine tools for both Syria and Iran. At least 20 of the North Korean missiles have gone to Syria from Iran, and production equipment seems to have been transferred to Iran and to Syrian plants near Hama and Aleppo.
    - Iran can now assemble Scud B and Scud C missiles using foreign-made components. It may soon be able to make entire missile systems and warhead packages in Iran.
- Iran has created shelters and tunnels in its coastal areas which it could use to store Scud and other missiles in hardened sites and reduce their vulnerability to air attack.
- Iran is developing an indigenous missile production capability with both solid and liquid fueled missiles. Seems to be seeking capability to produce MRBMs.

- The present scale of Iran's production and assembly efforts is unclear. Iran seems to have a design center, at least two rocket and missile assembly plants, a missile test range and monitoring complex, and a wide range of smaller design and refit facilities.
- The design center is said to be located at the Defense Technology and Science Research Center, which is a branch of Iran's Defense Industry Organization, and located outside Karaj — near Tehran. This center directs a number of other research efforts. Some experts believe it has support from Russian and Chinese scientists.
- Iran's largest missile assembly and production plant is said to be a North Korean-built facility near Isfahan, although this plant may use Chinese equipment and technology. There are no confirmations of these reports, but this region is the center of much of Iran's advanced defense industry, including plants for munitions, tank overhaul, and helicopter and fixed wing aircraft maintenance. Some reports say the local industrial complex can produce liquid fuels and missile parts from a local steel mill.
- A second missile plant is said to be located 175 kilometers east of Tehran, near Semnan. Some sources indicate this plant is Chinese-built and began rocket production as early as 1987. It is supposed to be able to build 600-1,000 Oghab rockets per year, if Iran can import key ingredients for solid fuel motors like ammonium perchlorate. The plant is also supposed to produce the Iran-130.
- Another facility may exist near Bandar Abbas for the assembly of the Seersucker. China is said to have built this facility in 1987, and is believed to be helping the naval branch of the Guards to modify the Seersucker to extend its range to 400 kilometers. It is possible that China is also helping Iran develop solid fuel rocket motors and produce or assemble missiles like the CS-801 and CS-802. There have, however, been reports that Iran is developing extended range Scuds with the support of Russian experts, and of a missile called the Tondar 68, with a range of 700 kilometers.
- Still other reports claim that Iran has split its manufacturing facilities into plants near Pairzan, Seman, Shiraz, Maghdad, and Islaker. These reports indicate that the companies involved in building the Scuds are also involved in Iran's production of poison gas and include Defense Industries, Shahid, Bagheri Industrial Group, and Shahid Hemat Industrial Group.
- Iran's main missile test range is said to be further east, near Shahroud, along the Tehran-Mashhad railway. A telemetry station is supposed to be 350 kilometers to the south at Taba, along the Mashhad-Isfahan road. All of these facilities are reportedly under the control of the Islamic Revolutionary Guards Corps.
- Iran may have been cooperating on an indigenously manufactured cruise missile, the Raad, based on the Chinese Silkworm airframe. The missile is estimated to have a payload of approximately 500 kg, and range potentially in excess of 350 km. The Missile Technology Control Regime (MTCR) is concerned with missiles with payloads greater than 500 kg and ranges exceeding 300 km. While China is thought to have provided Iran with a great deal of technical assistance on their Silkworm missiles, North Korea may be the main technological partner on the Raad missile. Although China is not a signatory to the MTCR, they have agreed to comply with its export controls.[1]

- There were many reports during the late 1980s and early 1990s that Iran had ordered the North Korean No Dong missile, which was planned to have the capability to carry nuclear and biological missile ranges of up to 900 kilometers. This range would allow the missile could reach virtually any target in Gulf, Turkey, and Israel. The status of the No Dong program has since become increasingly uncertain, although North Korea deployed some developmental types at test facilities in 1997.
  - The No Dong underwent flight tests at ranges of 310 miles (500 kilometers) on May 29, 1993. Some sources indicate that Iranians were present at these tests. Extensive further propulsion tests began in August 1994, and some reports indicate operational training began for test crews in May 1995. Missile storage facilities began to be built in July 1995, and four launch sites were completed in October 1995.
  - The progress of the program has been slow since that time, and may reflect development problems. However, mobile launchers were seen deployed in northeast North Korea on March 24, 1997. According to some reports, a further seven launcher units were seen at a facility about 100 kilometers from Pyongyang.
  - The No Dong 1 is a single-stage liquid-fueled missile, with a range of up to 1,000 to 1,300 kilometers (810 miles), although longer ranges may be possible with a reduced warhead and maximum burn. There are also indications that there may be a No Dong 2, using the same rocket motor, but with an improved fuel supply system that allows the fuel to burn for a longer period.
  - The missile is about 15.2 meters long — four meters longer than the Scud B — and 1.2 meters in diameter. The warhead is estimated to weigh 770 kilograms (1,200-1,750 pounds) and a warhead manufacturing facility exists near Pyongyang. The No Dong has an estimated theoretical CEP of 700 meters at maximum range, versus 900 meters for the Scud B, although its practical accuracy could be as wide as 3,000-4,000 meters. It has an estimated terminal velocity of Mach 3.5, versus 2.5 for the Scud B, which presents added problems for tactical missile

defense. The missile is transportable on a modified copy of the MAZ-543P TEL that has been lengthened with a fifth axle and which is roughly 40 meters long. The added support stand for the vertical launch modes brings the overall length to 60 meters, and some experts questioned whether a unit this big is practical.

- Other reports during the later 1980s and early 1990s indicated that Iran was also interested in two developmental North Korean IRBMs called the Tapeo Dong 1 and Tapeo Dong 2
    - The Tapeo Dong 1 missile has an estimated maximum range of 2,000 kilometers, and the Tapeo Dong 2 may have a range up to 3,500 kilometers.
    - Both Tapeo Dongs are liquid fueled missiles which seem to have two stages.
    - Unlike the No Dong, the Tapeo Dongs must be carried to a site in stages and then assembled at a fixed site. The No Dong transporter may be able to carry both stages of the Tapeo Dong 1, but some experts believe that a special transporter is needed for the first stage of the Tapeo Dong 1, and for both stages of the Tapeo Dong 2.
- Since the early 1990s, the focus of reports on Iran's missile efforts have shifted, and it has since become clear that Iran is developing its own longer-range variants of the No Dong for indigenous production with substantial Russian and some Chinese aid:
    - As early as 1992, one such missile was reported to have a range of 800-930 miles and a 1,650 pound warhead. Reports differ sharply on its size. Jane's estimates a launch weight up to 16,000 kilograms, provided the system is derived from the No Dong. It could have a launch weight of 15,000 kilograms, a payload of 600 kilograms, and a range of 1,700-1,800 kilometers if it is based on a system similar to the Chinese CSS-5 (DF-21) and CSS-N3 (JL-1). These systems entered service in 1983 and 1987.
    - A longer-range missile was said to have improved guidance components, a range of up to 1,240 miles and a warhead of up to 2,200 pounds.
    - IOC dates were then estimated to be 1999-2001.
    - Russia agreed in 1994 that it would adhere to the terms of the Missile Technology Control Regime and would place suitable limits on the sale or transfer of rocket engines and technology. Nevertheless, the CIA has identified Russia as a leading source of Iranian missile technology, and the State Department has indicated that President Clinton expressed US concerns over this cooperation to President Yeltsin. This transfer is one reason the President appointed former Ambassador Frank Wisner, and then Robert Gallucci, as his special representatives to try to persuade Russia to put a firm halt to aid support of the Iran.
    - These programs are reported to have condinuing support from North Korea, and from Russian and Chinese firms and technicians. One such Chinese firm is Great Wall Industries. The Russian firms include the Russian Central Aerohydrodynamic Institute, which has provided Iran's Shahid Hemat Industrial Group (SHIG) with wind tunnels for missile design, equipment for manufacturing missile models, and the software for testing launch and reentry performance. They may also include Rosvoorouzhenie, a major Russian arms-export agency; NPO Trud, a rocket motor manufacturer; a leading research center called the Bauman Institute, and Polyus (Northstar), a major laser test and manufacturing equipment firm.
    - The CIA reported in June 1997 that Iran obtained major new transfers of new long-range missile technology from Russian and Chinese firms during 1996. Since that time, there have been many additional reports of technology transfer from Russia.
    - The reports on Chinese technology transfers involve the least detail:
        - There have been past reports that Iran placed orders for PRC-made M-9 (CSS-6/DF-15) missile (280-620 kilometers range, launch weight of 6,000 kilograms).
        - It is more likely, however, that PRC firms are giving assistance in developing indigenous missile R&D and production facilities for the production of an Iranian solid fueled missile.
        - The US offered to provide China with added missile technology if it would agree to fully implement an end of technology transfer to Iran and Pakistan during meetings in Beijing on March 25-26, 1998.
- Recent reports and tests have provided more detail on the Shahab system:
    - Some US experts believe that Iran tested booster engines in 1997 capable of driving a missile to ranges of 1,500 kilometers. Virtually all US experts believe that Iran is rapidly approaching the point where it will be able to manufacture missiles with much longer ranges than the Scud B.

- It is less clear when Iran will be able to bring such programs to the final development stage, carry out a full range of suitable test firings, develop highly lethal warheads, and deploy actual units. Much may still depends on the level of foreign assistance.
- Eitan Ben Eliyahu — the commander of the Israeli Air Force — reported on April 14, 1997 that Iran had tested a missile capable of reaching Israel. The background briefings to his statement implied that Russia was assisting Iran in developing two missiles — with ranges of 620 and 780 miles. Follow-on intelligence briefings that Israel provided in September 1997 indicated that Russia was helping Iran develop four missiles. US intelligence reports indicate that China has also been helping Iran with some aspects of these missile efforts.
- These missiles included the Shahab ("meteor") missiles, with performance similar to those previously identified with Iranian missiles adapted from North Korean designs.
- The Israeli reports indicated that the Shahab 3 was a liquid-fueled missile with a range of 810 miles (1,200-1,500 kilometers) and a payload of 1550 pounds (700 kilograms).
- Other reports cite intelligence sources indicating that the missile's range is between 1,000 and 1,300 km, with a payload of between 800 and 1000 kg. US intelligence sources are quoted as saying that the Shahab 3's CEP is 3 km.[2]
- The recent announcements regarding upgrades to the Shahab 3 may increase its range to as much as 1,600 km.

- Iran tested the Shahab 3 on July 21, 1998, claiming that it was a defensive action to deal with potential threats from Israel.
  - The missile flew for a distance of up to 620 miles, before it exploded about 100 seconds after launch. US intelligence sources could not confirm whether the explosion was deliberate, but indicated that the final system might have a range of 800-940 miles (a maximum of 1,240 kilometers), depending on its payload. The test confirmed the fact the missile was a liquid fueled system.
  - Gen. Mohammad Bagher Qalibaf, head of the Islamic Revolutionary Guards Corps' air wing publicly reported on August 2, 1998 that the Shahab-3 is 53-foot-long ballistic missile that can travel at 4,300 mph and carry a one-ton warhead at an altitude of nearly 82,000 feet. He claimed that the weapon was guided by an Iranian-made system that gives it great accuracy: "The final test of every weapon is in a real war situation but, given its warhead and size, the Shahab-3 is a very accurate weapon."
  - Other Iranian sources reported that the missile had a range of 800 miles. President Mohammad Khatami on August 1, 1998 stated that Iran was determined to continue to strengthen its armed forces, regardless of international concerns: "Iran will not seek permission from anyone for strengthening its defense capability."
  - Martin Indyck, the US Assistant Secretary for Near East Affairs testified on July 28, that the US estimated that the system needed further refinement but might be deployed in its initial operational form between September 1998 and March 1999.
  - Iran publicly displayed the Shahab 3 on its launcher during a parade on September 25, 1998. The missile carrier bore signs saying, "The US can do nothing" and "Israel would be wiped from the map."
  - There are some reports of a Shahab-3B missile with extended range and a larger booster.
  - The resulting system seems to be close to both the No Dong and Pakistani Ghauri or Haff-5 missile, first tested in April 1998, raising questions about Iranian-North Korean-Pakistani cooperation.
  - North Korean parades exhibiting the Tapeo Dong in September 1999 exhibited a missile with rocket motor and nozzle characteristics similar to those of the Shahab 3.
  - Iran conducted further tests of the Shahab 3.
    - Tests on July 15, 2000 and May 23, 2003 were successful.
    - An additional test on September 21, 2000 was claimed to be successful test launch by Iran, although US officials claim that the missile exploded shortly after launch.
    - A July 2002 test was also determined to be unsuccessful. On whole, test firings of the Shahab 3 series have met with success in approximately half of all launches.
    - The total number of test firings is estimated to be between 7 and 9, with Iran announcing its last test launch on July 8, 2003.
  - Sources quote unconfirmed reports by Turkish intelligence that the Shahab 3 is now in production. Additionally, Israeli intelligence is quoted as saying that Turkey (Turkey or Iran?) may have as many as 20 missiles.[3] Reports suggest that Iran may plan to produce as many as 20 missiles per year.

    - On July 4, 2000, Iran's Islamic Revolutionary Guards Corps claimed to have formed five new missile units, apparently to be equipped with Shahab 3 missiles.[4]

- A November 5th, report from the Iranian news agency ISNA indicated that Iran would not be pursuing development of its Shahab 4 missile, but rather focus on "optimizing" the Shahab 3. It is entirely possible that development of the Shahab 4 could take place, in secret, within the context of the Shahab 3 development program.
  - Iran also claims that the Shahab 4 is a space launch vehicle, rather than a ballistic missile.
  - On January 5, 2004 the official Iranian news agency reported a statement from Iran's Defense Minister that Iran would launch a domestically manufactured satellite (the type was not mentioned) with "its own indigenous launch system" within 18 months.
- In September 1999, the Revolutionary Guard exhibited another missile called the Zelzal, which it stated was "now in mass production." The missile was said to have taken four and one-half years to develop and to be derived from the Zelzal 2, which the IRGC had exhibited earlier. Some estimates indicate that it can carry a warhead of 500 kilograms for up to 900 kilometers. However, the missile exhibited in Tehran was a rocket on a truck-mounted launch rail that seemed more likely to have a range of 150-200 kilometers.
    - There have been growing reports that Iran might be using Russian technology to develop long-range missiles with ranges from 2,000 to 6,250 kilometers.
- Israeli and US intelligence sources have reported that that Iran is developing the Shahab 4, with a range of 2,000 kilometers (1,250 miles), a payload of around 2,000 pounds, and a CEP of around 2,400 meters. Some estimates indicate that this system could be operational in 2-5 years. US Assistant Secretary for Near East Affairs testified on July 28, 1998, that the US estimated that the system still needed added foreign assistance to improve its motors and guidance system.
    - Some reports indicate that the Shahab 4 is based on the Soviet SS-4 missile. Others that there is a longer range Shahab 5, based on the SS-4 or Tapeo Dong missile. Reports saying the Shahab is based on the SS-4 say it has a range of up to 4,000 kilometers and a payload in excess of one ton. Other reports suggest a much shorter range of 2,000 km, but with a 1.4 ton payload.
    - Iran may have two other missile programs include longer-range systems, variously reported as having maximum ranges of 3,650, 4,500-5,000, 6,250, or 10,000 kilometers.
    - It seems clear that Iran has obtained some of the technology and design details of the Russian SS-4. The SS-4 (also known as the R-12 or "Sandal") is an aging Russian liquid fuel designed that first went into service in 1959, and which was supposedly destroyed as part of the IRBM Treaty. It is a very large missile, with technology dating back to the early 1950s, although it was evidently updated at least twice during the period between 1959 and 1980. It has a CEP of 2-4 kilometers and a maximum range 2,000 kilometers, which means it can only be lethal with a nuclear warhead or a biological weapon with near-nuclear lethality.
    - At the same time, the SS-4's overall technology is relatively simple and it has a throwweight of nearly 1,400 kilograms (3,000 pounds). It is one of the few missile designs that a nation with a limited technology base could hope to manufacture or adapt, and its throw weight and range would allow Iran to use a relatively unsophisticated nuclear device or biological warhead. As a result, an updated version of the SS-4 might be a suitable design for a developing country.
  - Iran is reported to have carried out the test of a sea-launched ballistic missile in 1998.
- Russia has been a key supplier of missile technology.
    - Some sources have indicated that Russian military industries have signed contracts with Iran to help produce liquid fueled missiles and provide specialized wind tunnels, manufacture model missiles, and develop specialized computer software. For example, these reports indicate that the Russian Central Aerohydrodynamic Institute is cooperating with Iran's Defense Industries Organization (DIO) and the DIO's Shahid Hemmat Industrial Group (SHIG). The Russian State Corporation for Export and Import or Armament and Military Equipment (Rosvoorouzhenie) and Infor are also reported to be involved in deals with the SHIG. These deals are also said to include specialized laser equipment, mirrors, tungsten-coated graphite material, and maraging steel for missile development and production. They could play a major role in help Iran develop long range versions of the Scud B and C, and more accurate variations of a missile similar to the No Dong.
    - The Israeli press reported in August 1997 that Israeli had evidence that Iran was receiving Russian support. In September 1997, Israel urged the US to step up its pressure on Iran, and leaked reported indicating that private and state-owned Russian firms had provided gyroscopes, electronic components, wind tunnels, guidance and propulsion systems, and the components needed to build such systems to Iran.

    - President Yeltsin and the Russian Foreign Ministry initially categorically denied that such charges were true. Following a meeting with Vice President Gore, President Yeltsin stated on September 26, 1997 that, "We are being accused of supplying Iran with nuclear or ballistic missile technologies. There is nothing further from the truth. I again and again categorically deny such rumors."

    - Russia agreed, however, that Ambassador Wisner and Yuri Koptyev, the head of the Russian space program, should jointly examine the US intelligence and draft a report on Russian transfers to Iran. This report reached a very different conclusion from President Yeltsin and concluded that Russia had provided such aid to Iran. Further, on October 1, 1997 — roughly a week after Yeltsin issued his denial — the Russian security service issued a statement that it had "thwarted" an Iranian attempt to have parts for liquid fuel rocket motors manufactured in Russia, disguised as gas compressors and pumps.

    - Russian firms said to be helping Iran included the Russian Central Aerohydrodynamic Institute which developed a special wind tunnel; Rosvoorouzhenie, a major Russian arms-export agency; Kutznetzov (formerly NPO Trud) a rocket motor manufacturer in Samara; a leading research center called the Bauman National Technical University in Moscow, involved in developing rocket propulsion systems; the Tsagi Research Institute for rocket propulsion development; and the Polyus (Northstar) Research Institute in Moscow, a major laser test and manufacturing equipment firm. Iranians were also found to be studying rocket engineering at the Baltic State University in St. Petersburg and the Bauman State University.

    - Russia was also found to have sold Iran high strength steel and special foil for its long-range missile program. The Russian Scientific and Production Center Inor concluded an agreement as late as September 1997 to sell Iran a factory to produce four special metal alloys used in long-range missiles. Inor's director, L. P Chromova worked out a deal with A. Asgharzadeh, the director of an Iranian factory, to sell 620 kilograms of special alloy called 21HKMT, and provide Iran with the capability to thermally treat the alloy for missile bodies. Iran had previously bought 240 kilograms of the alloy. Inor was also selling alloy foils called 49K2F, CUBE2, and 50N in sheets 0.2-0.4 millimeters thick for the outer body of missiles. The alloy 21HKMT was particularly interesting because North Korea also uses it in missile designs. Inor had previously brokered deals with the Shahid Hemat Industrial Group in Iran to supply maraging steel for missile cases, composite graphite-tungsten material, laser equipment, and special mirrors used in missile tests.

    - The result was a new and often tense set of conversations between the US and Russia in January 1998. The US again sent Ambassador Frank Wisner to Moscow, Vice President Gore called Prime Minster Viktor Chernomyrdin and Secretary of State Madeline Albright made an indirect threat that the Congress might apply sanctions. Sergi Yastrzhembsky, a Kremlin spokesman, initially responded by denying that any transfer of technology had taken place.

    - This Russian denial was too categorical to have much credibility. Russia had previously announced the arrest of an Iranian diplomat on November 14, 1997, that it caught attempting to buy missile technology. The Iranian was seeking to buy blueprints and recruit Russian scientists to go to Iran. Yuri Koptev, the head of the Russian Space Agency, explained this, however, by stating that that, "There have been several cases where some Russian organizations, desperately struggling to make ends meet and lacking responsibility, have embarked on some ambiguous projects...they were stopped long before they got to the point where any technology got out."

    - The end result of these talks was an agreement by Gore and Chernomyrdin to strengthen controls over transfer technology, but it was scarcely clear that it put an end to the problem. As Koptev has said, "There have been several cases where some Russian organizations, desperately struggling to make ends meet and lacking responsibility, have embarked on some ambiguous projects." Conditions in Russia are getting worse, not better, and the desperation that drives sales has scarcely diminished.

    - Prime Minister Chernomyrdin again promised to strengthen his efforts to restrict technology transfer to Iran in a meeting with Gore on March 12, 1998. The US informed Russia of 13 cases of possible Russian aid to Iran at the meeting and offered to increase the number of Russian commercial satellite launches it would license for US firms as an incentive.

    - New arrests of smugglers took place on April 9, 1998. The smugglers had attempted to ship 22 tons of specialized steel to Iran via Azerbaijan, using several Russia shell corporations as a cover.

    - On April 16, 1998, the State Department declared 20 Russian agencies and research facilities were ineligible to receive US aid because of their role in transferring missile technology to Iran.

- A US examination of Iran's dispersal, sheltering, and hardening programs for its anti-ship missiles and other missile systems indicate that Iran has developed effective programs to ensure that they would survive a limited number of air strikes and that Iran had reason to believe that the limited number of preemptive strikes Israel could conduct against targets in the lower Gulf could not be effective in denying Iran the capability to deploy its missiles.

- Iran has acquired much of the technology necessary build long-range cruise missile systems from China:

  - Such missiles would cost only 10% to 25% as much as ballistic missiles of similar range, and both the HY-2 Seersucker and CS-802 could be modified relatively quickly for land attacks against area targets.
  - Iran reported in December, 1995 that it had already fired a domestically built anti-ship missile called the Saeqe-4 (Thunderbolt) during exercises in the Strait of Hormuz and Gulf of Oman Other reports indicate that China is helping Iran build copies of the Chinese CS-801/CS-802 and the Chinese FL-2 or F-7 anti-ship cruise missiles. These missiles have relatively limited range. The range of the CS-801 is 8-40 kilometers, the range of the CS-802 is 15-120 kilometers, the maximum range of the F-7 is 30 kilometers, and the maximum range of the FL-10 is 50 kilometers. Even a range of 120 kilometers would barely cover targets in the Southern Gulf from launch points on Iran's Gulf coast. These missiles also have relatively small high explosive warheads. As a result, Iran may well be seeking anti-ship capabilities, rather than platforms for delivering weapons of mass destruction.
  - A platform like the CS-802 might, however, provide enough design data to develop a scaled-up, longer-range cruise missile for other purposes, and the Gulf is a relatively small area where most urban areas and critical facilities are near the coast. Aircraft or ships could launch cruise missiles with chemical or biological warheads from outside the normal defense perimeter of the Southern Gulf states, and it is at least possible that Iran might modify anti-ship missiles with chemical weapons to attack tankers — ships which are too large for most regular anti-ship missiles to be highly lethal.
  - Building an entire cruise missile would be more difficult. The technology for fusing CBW and cluster warheads would be within Iran's grasp. Navigation systems and jet engines, however, would still be a major potential problem. Current inertial navigation systems (INS) would introduce errors of at least several kilometers at ranges of 1,000 kilometers and would carry a severe risk of total guidance failure — probably exceeding two-thirds of the missiles fired. A differential global positioning system (GPS) integrated with the inertial navigation system (INS) and a radar altimeter, however, might produce an accuracy of 15 meters. Some existing remotely piloted vehicles (RPVs), 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.
  - There are commercially available reciprocating and gas turbine engines that Iran could adapt for use in a cruise missile, although finding a reliable and efficient turbofan engine for a specific design application might be difficult. An extremely efficient engine would have to be matched to a specific airframe. It is doubtful that Iran could design and build such an engine, but there are over 20 other countries with the necessary design and manufacturing skills.
  - While airframe-engine-warhead integration and testing would present a challenge and might be beyond Iran's manufacturing skills, it is inherently easier to integrate and test a cruise missile than a long-range ballistic missile. Further, such developments would be far less detectable than developing a ballistic system if the program used coded or low altitude directional telemetry.
  - Iran could bypass much of the problems inherent in developing its own cruise missile by modifying the HY-2 Seersucker for use as a land attack weapon and extending its range beyond 80 kilometers, or by modifying and improving the CS-801 (Ying Jai-1) anti-ship missile. There are reports that the Revolutionary Guards are working on such developments at a facility near Bandar Abbas.
  - China has delivered approximately 150 of 400 C-802 missiles ordered by Iran.[5]
  - A number of reports claim that Chinese companies have provided extensive technical assistance to Iranian cruise missile efforts, in engineering, production assistance, critical materials and equipment upgrades.
- Can modify HY-2 Silkworm missiles and SA-2 surface-to-air missiles to deliver weapons of mass destruction.
- Iran may have been cooperating on an indigenously manufactured cruise missile, the Raad, based on the Chinese Silkworm airframe but using a turbofan engine. The missile is estimated to have a payload of approximately 500 kg, and range potentially in excess of 350 km. The Missile Technology Control Regime (MTCR) is concerned with missiles with payloads greater than 500 kg and ranges exceeding 300 km. While China is thought to have provided Iran with a great deal of technical assistance on their Silkworm missiles, North Korea may be the main technological partner on the Raad missile. Although China is not a signatory to the MTCR, they have agreed to comply with its export controls.[6]
- Iran has made several indigenous long-range rockets.
  - The Iran-130, or Nazeat, since the end of the Iran-Iraq War. The full details of this system remain unclear, but it seems to use commercially available components, a solid fuel rocket, and a simple inertial guidance system to reach ranges of about 90-120 kilometers. It is 355 mm in diameter, 5.9 meters long, weighs 950 kilograms, and has a 150 kilogram warhead. It seems to have poor reliability and accuracy, and its payload only seems to be several hundred kilograms.

    - The Shahin 2. It too has a 355 mm diameter, but is only 3.87 meters long, and weighs only 580 kilograms. It evidently can be equipped with three types of warheads: A 180 kilogram high explosive warhead, another warhead using high explosive submunitions, and a warhead that uses chemical weapons.
    - Iranian Oghab (Eagle) rocket with 40+ kilometers range.
    - New SSM with 125 mile range may be in production, but could be modified FROG.

- The CIA reported in January 1999 that entities in Russia and China continue to supply missile-related goods and technology to Iran. Tehran is using these goods and technologies to achieve its goal of becoming self-sufficient in the production of MRBMs. The July flight test of the Shahab-3 MRBM demonstrates the success Iran has achieved in realizing that goal. Iran already is producing Scud SRBMs with North Korean help and has begun production of the Shahab-3. In addition, Iran's Defense Minister has publicly acknowledged the development of the Shahab-4 ballistic missile, with a "longer range and heavier payload than the 1,300-km Shahab-3."
  - Iran's earlier success in gaining technology and materials from Russian companies accelerated Iranian development of the Shahab-3 MRBM, which was first flight tested in July 1998.
  - The CIA report on missile proliferation in September 1999 estimated that Iran is the next hostile country most capable of testing an ICBM capable of delivering a weapon to the United States during the next 15 years.
    - Iran *could test* an ICBM that could deliver a several-hundred kilogram payload to many parts of the United States in the between 2005 and 2010, using Russian technology and assistance.
    - Iran *could pursue* a Taepo Dong-type ICBM. Most analysts believe it could test a three-stage ICBM patterned after the Taepo Dong-1 SLV or a three-stage Taepo Dong-2-type ICBM, possibly with North Korean assistance, in the next few years.
    - Iran is *likely to test* an SLV by 2010 that—once developed—could be converted into an ICBM capable of delivering a several-hundred kilogram payload to the United States.
  - Analysts differ on the likely timing of Iran's first flight test of an ICBM that could threaten the United States. Assessments include:
    - *likely* before 2010 and *very likely* before 2015 (noting that an SLV with ICBM capabilities will *probably be tested within the next few years)*;
    - no more than an *even chance* by 2010 and a *better than even chance* by 2015;
    - and less than an even chance by 2015.
- The CIA reported in November 20003 that, "Ballistic missile-related cooperation from entities in the former Soviet Union, North Korea, and China over the years has helped Iran move toward its goal of becoming self-sufficient in the production of ballistic missiles. Such assistance during the first half of 2003 continued to include equipment, technology, and expertise. Iran's ballistic missile inventory is among the largest in the Middle East and includes some 1,300-km-range Shahab-3 medium-range ballistic missiles (MRBMs) and a few hundred short-range ballistic missiles (SRBMs)—including the Shahab-1 (Scud-B), Shahab-2 (Scud C), and Tondar-69 (CSS-8)—as well as a variety of large unguided rockets. Already producing Scud SRBMs, Iran announced that it had begun production of the Shahab-3 MRBM and a new solid-propellant SRBM, the Fateh-110. In addition, Iran publicly acknowledged the development of follow-on versions of the Shahab-3. It originally said that another version, the Shahab-4, was a more capable ballistic missile than its predecessor but later characterized it as solely a space launch vehicle with no military applications. Iran is also pursuing longer-range ballistic missiles."
- The Center for Nonproliferation Studies at the Monterey Institute of International Studies has compiled a chronology of North Korean assistance to Iran through 2003[7]:

Date	Item(s)	Remarks
1980s	About 100 Scud missile launchers	
Late 1984-Early 1985	Technical assistance for Scud-B production facility	In October 1983 Iran and North Korea reach agreement for assistance in setting up missile production capability.
1987-88	100 modified Scud-B missiles and 12 TELs	

1987	Technical assistance for modified Scud-B production	
1987-88	Unknown number of HY-2 Silkworm anti-ship missiles	Agreement signed in 1986; some believe that the missiles were supplied by China, but Beijing insists Pyongyang was supplier.
1987-92	200-300 Scud-B missiles	
1988 Early	40 Scud-B missiles	Probably part of the 100 Scuds reportedly shipped in 1987-1988.
1988 January	four Styx anti-ship missiles and at least one HY-2 Silkworm anti-ship missile	
1988 February	80 HY-2 Silkworm anti ship missiles and 40 Scud-B missiles	Report says missiles came from both China and North Korea.
1990 Early	20 Scud-B missiles	
1990 December	Missile technicians	North Korean technicians arrive in eastern Iran to convert a missile maintenance facility into a missile production plant.
1991	170 Scud-C missiles	Uncertain; Iran probably had not received all 170 missiles by 1991 because, according to estimates, North Korea would not have been able to produce 170 Scud-C missiles by this time.
1992 March	Unknown; suspected Scud-B missiles	US officials suspect Iranian ship with Scud missiles travels from Singapore to the Iranian port of Char Bahar.
1992 Second Half	A few No Dong-1 prototypes	
1992 October	100 Scud-C missiles	Half of the Scud-C shipment possibly transferred to Syria.
1993	Unknown number of Scud-C missiles	Possibly the same shipment of 100 Scud-Cs reported in late October 1992.
1994 Mid to Late	No Dong-1 components or a small number of complete missiles	In April 1993 North Korea reportedly agreed to sell 150 No Dongs to Iran in exchange for access to test facilities and financial support.
Late 1994-Early 1995	At least four Scud-C TELs and possibly a No Dong MEL	
1995 Early	At least 12 No Dong missiles	Based on an Israeli intelligence report; in April 1996, Jane's Defense Weekly reports that North Korea may have exported as many as 20 No Dongs.
1997	Unknown missile components	
1997 Early	Computer software for No Dong production	

1999 November	12-20 No Dong engines	
2001 March	Engines and airframes; unspecified number of missile components	US reconnaissance satellite detects missile components being loaded onto an Iranian Il-76 transport plane at Sunan International Airport near Pyongyang.

Chemical Weapons

- Iran purchased large amounts of chemical defense gear from the mid-1980s onwards. Iran also obtained stocks of non-lethal CS gas, although it quickly found such agents had very limited military impact since they could only be used effectively in closed areas or very small open areas.
- Acquiring poisonous chemical agents was more difficult. Iran did not have any internal capacity to manufacture poisonous chemical agents when Iraq first launched its attacks with such weapons. While Iran seems to have made limited use of chemical mortar and artillery rounds as early as 1985 — and possibly as early as 1984 — these rounds were almost certainly captured from Iraq.
- Iran had to covertly import the necessary equipment and supplies, and it took several years to get substantial amounts of production equipment, and the necessary feedstocks. Iran sought aid from European firms like Lurgi to produce large "pesticide" plants, and began to try to obtain the needed feedstock from a wide range of sources, relying heavily on its Embassy in Bonn to manage the necessary deals. While Lurgi did not provide the pesticide plant Iran sought, Iran did obtain substantial support from other European firms and feedstocks from many other Western sources.
- By 1986-1987, Iran developed the capability to produce enough lethal agents to load its own weapons. The Director of the CIA, and informed observers in the Gulf, made it clear that Iran could produce blood agents like hydrogen cyanide, phosgene gas, and/or chlorine gas. Iran was also able to weaponize limited quantities of blister (sulfur mustard) and blood (cyanide) agents beginning in 1987, and had some capability to weaponize phosgene gas, and/or chlorine gas. These chemical agents were produced in small batches, and evidently under laboratory scale conditions, which enabled Iran to load small numbers of weapons before any of its new major production plants went into full operation.
- These gas agents were loaded into bombs and artillery shells, and were used sporadically against Iraq in 1987 and 1988.
- Reports regarding Iran's production and research facilities are highly uncertain:
    - Iran seems to have completed completion of a major poison gas plant at Qazvin, about 150 kilometers west of Tehran. This plant is reported to have been completed between November 1987 and January 1988. While supposedly a pesticide plant, the facility's true purpose seems to have been poison gas production using organophosphorous compounds
    - It is impossible to trace all the sources of the major components and technology Iran used in its chemical weapons program during this period. Mujahideen sources claim Iran also set up a chemical bomb and warhead plant operated by the Zakaria Al-Razi chemical company near Mahshar in southern Iran, but it is unclear whether these reports are true.
    - Reports that Iran had chemical weapons plants at Damghan and Parchin that began operation as early as March, 1988, and may have begun to test fire Scuds with chemical warheads as early as 1988-1989, are equally uncertain.
    - Iran established at least one large research and development center under the control of the Engineering Research Centre of the Construction Crusade (Jahad e-Sazandegi), had established a significant chemical weapons production capability by mid-1989,
- Debates took place in the Iranian parliament or Majlis in late 1988 over the safety of Pasdaran gas plants located near Iranian towns, and that Rafsanjani described chemical weapons as follows: "Chemical and biological weapons are poor man's atomic bombs and can easily be produced. We should at least consider them for our defense. Although the use of such weapons is inhuman, the war taught us that international laws are only scraps of paper."
- Post Iran-Iraq War estimates of Iran chemical weapons production are extremely uncertain:
    - US experts believe Iran was beginning to produce significant mustard gas and nerve gas by the time of the August, 1988 cease-fire in the Iran-Iraq War, although its use of chemical weapons remained limited and had little impact on the fighting.
    - Iran's efforts to equip plants to produce V-agent nerve gases seem to have been delayed by US, British, and German efforts to limit technology transfers to Iran, but Iran may have acquired the capability to produce persistent nerve gas during the mid 1990s.

    - Production of nerve gas weapons started no later than 1994.
    - Began to stockpile of cyanide (cyanogen chloride), phosgene, and mustard gas weapons after 1985. Recent CIA testimony indicates that production capacity may approach 1,000 tons annually.

- On August 2, 2002, the NSC's Director for the Near East indicated that Iran is producing and stockpiling blister, blood and choking agents.
- The Defense Department's 2001 Report "Proliferation: Threat and Response" suggests that Iran, in addition to producing and stockpiling blister, blood and choking agents, has weaponized these agents for use with artillery shells, mortars, rockets and bombs. The report also states that Iran is continuing its research into nerve agents.
- Weapons include bombs and artillery. Shells include 155 mm artillery and mortar rounds. Iran also has chemical bombs and mines. It may have developmental chemical warheads for its Scuds, and may have a chemical package for its 22006 RPV (doubtful).
- There are reports that Iran has deployed chemical weapons on some of its ships. Training for Iranian naval forces suggests that they are preparing for the possibility of operating in a contaminated environment.
- Iran has increased chemical defensive and offensive warfare training since 1993.
- Iran is seeking to buy more advanced chemical defense equipment, and has sought to buy specialized equipment on world market to develop indigenous capability to produce advanced feedstocks for nerve weapons.
    - CIA sources indicated in late 1996, that China might have supplied Iran with up to 400 tons of chemicals for the production of nerve gas.
    - One report indicated in 1996, that Iran obtained 400 metric tons of chemicals for use in nerve gas weapons from China — including carbon sulfide.
    - Another report indicated that China supplied Iran with roughly two tons of calcium-hypochlorate in 1996, and loaded another 40,000 barrels in January or February of 1997. Calcium-hypochlorate is used for decontamination in chemical warfare.
    - Iran placed several significant orders from China that were not delivered. Razak Industries in Tehran, and Chemical and Pharmaceutical Industries in Tabriz ordered 49 metric tons of alkyl dimethylamine, a chemical used in making detergents, and 17 tons of sodium sulfide, a chemical used in making mustard gas. The orders were never delivered, but they were brokered by Iran's International Movalled Industries Corporation (Imaco) and China's North Chemical Industries Co. (Nocinco). Both brokers have been linked to other transactions affecting Iran's chemical weapons program since early 1995, and Nocinco has supplied Iran with several hundred tons of carbon disulfide, a chemical uses in nerve gas.
    - Another Chinese firm, only publicly identified as Q. Chen, seems to have supplied glass vessels for chemical weapons.
    - The US imposed sanctions on seven Chinese firms in May 1997, for selling precursors for nerve gas and equipment for making nerve gas — although the US made it clear that it had, "no evidence that the Chinese government was involved." The Chinese firms were the Nanjing Chemical Industries Group and Jiangsu Yongli Chemical Engineering and Import/Export Corporation. Cheong Yee Ltd., a Hong Kong firm, was also involved. The precursors included thionyl chloride, dimethylamine, and ethylene chlorohydril. The equipment included special glass lined vessels, and Nanjing Chemical and Industrial Group completed construction of a production plant to manufacture such vessels in Iran in June 1997.
    - Iran sought to obtain impregnated alumina, which is used to make phosphorous oxychloride — a major component of VX and GB — from the US.
    - It has obtained some equipment from Israelis. Nahum Manbar, an Israeli national living in France, was convicted in an Israeli court in May 1997 for providing Iran with $16 million worth of production equipment for mustard and nerve gas during the period from 1990 to 1995.
    - CIA reported in June 1997 that Iran had obtained new chemical weapons equipment technology from China and India in 1996.
    - India is assisting in the construction of a major new plant at Qazvim, near Tehran, to manufacture phosphorous pentasulfide, a major precursor for nerve gas. The plant is fronted by Meli Agrochemicals, and the program was negotiated by Dr. Mejid Tehrani Abbaspour, a chief security advisor to Rafsanjani.
    - A recent report by German intelligence indicates that Iran has made major efforts to acquire the equipment necessary to produce Sarin and Tabun, using the same cover of purchasing equipment for pesticide plants that Iraq

used for its Sa'ad 16 plant in the 1980s. German sources note that three Indian companies — Tata Consulting Engineering, Transpek, and Rallis India — have approached German pharmaceutical and engineering concerns for such equipment and technology under conditions where German intelligence was able to trace the end user to Iran

- Iran ratified the Chemical Weapons Convention in June 1997.
    - It submitted a statement in Farsi to the CWC secretariat in 1998, but this consisted only of questions in Farsi as to the nature of the required compliance.
    - It has not provided the CWC with any data on its chemical weapons program.
- The CIA estimated in January 1999 that Iran obtained material related to chemical warfare (CW) from various sources during the first half of 1998. It already has manufactured and stockpiled chemical weapons, including blister, blood, and choking agents and the bombs and artillery shells for delivering them. However, Tehran is seeking foreign equipment and expertise to create a more advanced and self-sufficient CW infrastructure.
- The CIA stated that Chinese entities sought to supply Iran with CW-related chemicals during 1997-1998 period. The US sanctions imposed in May 1997 on seven Chinese entities for knowingly and materially contributing to Iran's CW program remain in effect.
  - There exists a large number of sites in Iran that are alleged to be related to Iran's chemical warfare effort[8]:
    - Abu Musa Island: Iran hold a large number of chemical weapons, principally 155mm artillery shells, in addition to some weaponized biological agents.
    - Bandar Khomeni: Allegedly the location of a chemical weapons facility, run by the Razi chemical corporation, established during the Iran-Iraq war to manufacture chemical weapons.
    - Damghan: Either a chemical weapons plant or warhead assembly facility. Primarily involved in 155mm artillery shells and SCUD warheads.
    - Isfahan: Suspected location of a chemical weapons facility, possibly operated by the Poly-Acryl Corporation.
    - Karaj: Located about 14km of Tehran, this is the site of an alleged storage and manufacturing facility for chemical weapons. Reports suggest that this facility was built with Chinese assistance.
    - Marvdasht: The Chemical Fertilizers Company is suspected to have been a manufacturing facility for mustard agents during the Iran-Iraq War.
    - Parchin: The location of at least one munitions factory and is suspected of being a major chemical weapons production facility. Reports of uncertain reliability indicate that the plant was in operation no later than March 1988. In April 1997, a German newspaper reported that, according to the German Federal Intelligence Service, the factories at Parchin were producing primary products for chemical warfare agents.
    - Qazvin: A large pesticide plant at this location is widely believed to produce nerve gas.
    - Mashar: Iranian opposition groups have made allegations, of uncertain reliability, that a warhead filling facility is operated at this location.
- A number of reports indicate that China has provided Iran with the ability to manufacture chemical weapons indigenously as well as providing precursors since at least 1996.[9]
- The CIA reported in November 2003 that, "Iran is a party to the Chemical Weapons Convention (CWC). Nevertheless, during the reporting period it continued to seek production technology, training, and expertise from Chinese entities that could further Tehran's efforts to achieve an indigenous capability to produce nerve agents. Iran likely has already stockpiled blister, blood, choking, and probably nerve agents—and the bombs and artillery shells to deliver them—which it previously had manufactured."
- On May 2, 2003, the Iranian news agency, IRNA, issued a report stating that Iran called "on all world countries to take serious and coordinated measures to obliterate chemical weapons."
- In mid-May 2003, the Bush Administration released a statement to the Organization for Prohibition of Chemical Weapons in which the US accused Iran of continuing to pursue production technology, training, and expertise from abroad. The statement asserts that Iran is continuing to stockpile blister, blood, choking, and some nerve agents.

Biological Weapons

- Extensive laboratory and research capability.

- Weapons effort documented as early as 1982. Reports surfaced that Iran had imported suitable type cultures from Europe and was working on the production of mycotoxins — a relatively simple family of biological agents that require only limited laboratory facilities for small-scale production.
- US intelligence sources reported in August 1989, that Iran was trying to buy two new strains of fungus from Canada and the Netherlands that can be used to produce Mycotoxins. German sources indicated that Iran had successfully purchased such cultures several years earlier.
- The Imam Reza Medical Center at Mashhad Medical Sciences University and the Iranian Research Organization for Science and Technology were identified as the end users for this purchasing effort, but it is likely that the true end user was an Iranian government agency specializing in biological warfare.
- Many experts believe that the Iranian biological weapons effort was placed under the control of the Islamic Revolutionary Guards Corps, which is known to have tried to purchase suitable production equipment for such weapons.
- Since the Iran-Iraq War, Iran has conducted research on more lethal active agents like Anthrax, hoof and mouth disease, and biotoxins. In addition, Iranian groups have repeatedly approached various European firms for the equipment and technology necessary to work with these diseases and toxins.
    - Unclassified sources of uncertain reliability have identified a facility at Damghan as working on both biological and chemical weapons research and production, and believe that Iran may be producing biological weapons at a pesticide facility near Tehran.
    - Some universities and research centers may be linked to biological weapons program.
    - Reports surfaced in the spring of 1993 that Iran had succeeded in obtaining advanced biological weapons technology in Switzerland and containment equipment and technology from Germany. According to these reports, this led to serious damage to computer facilities in a Swiss biological research facility by unidentified agents. Similar reports indicated that agents had destroyed German bio-containment equipment destined for Iran.
    - More credible reports by US experts indicate that Iran has begun to stockpile anthrax and Botulinum in a facility near Tabriz, can now mass manufacture such agents, and has them in an aerosol form. None of these reports, however, can be verified.
    - The CIA has reported that Iran has, “sought dual-use biotech equipment from Europe and Asia, ostensibly for civilian use.” It also reported in 1996 that Iran might be ready to deploy biological weapons. Beyond this point, little unclassified information exists regarding the details of Iran's effort to “weaponize” and produce biological weapons.
- Iran may have the production technology to make dry storable and aerosol weapons. This would allow it to develop suitable missile warheads and bombs and covert devices.
- Iran may have begun active weapons production in 1996, but probably only at limited scale suitable for advanced testing and development.
- CIA testimony indicates that Iran is believed to have weaponized both live agents and toxins for artillery and bombs and may be pursuing biological warheads for its missiles. The CIA reported in 1996 that, “We believe that Iran holds some stocks of biological agents and weapons. Tehran probably has investigated both toxins and live organisms as biological warfare agents. Iran has the technical infrastructure to support a significant biological weapons program with little foreign assistance.(endquote needed)
- CIA reported in June 1997 that Iran had obtained new dual use technology from China and India during 1996.
- Iran announced in June 1997 that it would not produce or employ chemical weapons including toxins.
- The CIA estimated in January 1999 that Iran continued to pursue purchasing dual-use biotechnical equipment from Russia and other countries, ostensibly for civilian uses. Its biological warfare (BW) program began during the Iran-Iraq war, and Iran may have some limited capability for BW deployment. Outside assistance is both important and difficult to prevent, given the dual-use nature of the materials and equipment being sought and the many legitimate end uses for these items.
- A report produced by the Iranian insurgent group, the Mojahedin Khalq Organization asserted that Iran had started producing weaponized anthrax and was actively working with at least five other pathogens, including small pox. The Mojahedin Khalq Organization was the same organization that produced early evidence of Iran’s non-compliance with the terms of the Nuclear Non-Proliferation Treaty. Iran issued a vehement denial of these charges in a May 16, 2003 press release. The accuracy of either set of statements is uncertain.
- The CIA reported in November 2003 that, “Even though Iran is part of the Biological Weapons Convention (BWC), Tehran probably maintained an offensive BW program. Iran continued to seek dual-use biotechnical materials, equipment, and expertise. While such materials had legitimate uses, Iran's biological warfare (BW) program also could have benefited from

them. It is likely that Iran has capabilities to produce small quantities of BW agents, but has a limited ability to weaponize them."

- Russia remains a key source of biotechnology for Iran. Russia's world-leading expertise in biological weapons makes it an attractive target for Iranians seeking technical information and training on BW agent production processes.

Nuclear Weapons

- The Shah established the Atomic Energy Organization of Iran in 1974, and rapidly began to negotiate for nuclear power plants.
    - He concluded an extendible ten-year nuclear fuel contract with the US in 1974, with Germany in 1976, and France in 1977.
    - In 1975, he purchased a 10% share in a Eurodif uranium enrichment plant being built at Tricastin in France that was part of a French, Belgian, Spanish, and Italian consortium. Under the agreement the Shah signed, Iran was to have full access to the enrichment technology Eurodif developed, and agreed to buy a quota of enriched uranium from the new plant.
    - He created an ambitious plan calling for a network of 23 power reactors throughout Iran that was to be operating by the mid-1990s, and sought to buy nuclear power plants from Germany and France.
    - By the time the Shah fell in January 1979, he had six reactors under contract, and was attempting to purchase a total of 12 nuclear power plants from Germany, France, and the US. Two 1,300 megawatt German nuclear power plants at Bushehr were already 60% and 75% completed, and site preparation work had begun on the first of two 935 megawatt French plants at Darkhouin that were to be supplied by Framatome.
        - 5 megawatt light-water research reactor operating in Tehran.
        - 27 kilowatt neutron-source reactor operating in Isfahan.
        - Started two massive 1300 megawatt reactor complexes.
- US experts believe that Shah began a low-level nuclear weapons research program in the early 1970s, centered at the Amirabad Nuclear Research Center. This research effort included studies of weapons designs and plutonium recovery from spent reactor fuel.
        - It also involved a laser enrichment program which began in 1975, and led to a complex and highly illegal effort to obtain laser separation technology from the US. This latter effort, which does not seems to have had any success, continued from 1976 until the Shah's fall, and four lasers operating in the critical 16 micron band were shipped to Iran in October, 1978.
        - At the same time, Iran worked on other ways to obtain plutonium, created a secret reprocessing research effort to use enriched uranium, and set up a small nuclear weapons design team.
        - In 1976, Iran signed a secret contract to buy $700 million worth of yellowcake from South Africa, and appears to have reached an agreement to buy up to 1,000 metric tons a year. It is unclear how much of this ore South Africa shipped before it agreed to adopt IAEA export restrictions in 1984, and whether South Africa really honored such export restrictions. Some sources indicate that South Africa still made major deliveries as late as 1988-1989.
        - Iran also tried to purchase 26.2 kilograms of highly enriched uranium; the application to the US for this purchase was pending when the Shah fell
        - The Shah did eventually accept full IAEA safeguards but their value is uncertain.
    - In 1984, Khomeini seems to have revived the nuclear weapons program begun under the Shah.
        - Received significant West German and Argentine corporate support in some aspects of nuclear technology during the Iran-Iraq War.
        - Limited transfers of centrifuge and other weapons related technology from PRC, possibly Pakistan.
        - Iran had a Chinese-supplied heavy-water, zero-power research reactor at Isfahan Nuclear Research Center, and two-Chinese supplied sub-critical assemblies — a light water and graphite design.
        - Iran had stockpiles of uranium and mines in Yazd area. It may have had a uranium-ore concentration facility at University of Tehran, but status unclear.
        - Some experts feel that the IRGC moved experts and equipment from the Amirabad Nuclear Research Center to a new nuclear weapons research facility near Isfahan in the mid-1980s, and formed a new nuclear research

center at the University of Isfahan in 1984 — with French assistance. Unlike many Iranian facilities, the center at Isfahan was not declared to the IAEA until February 1992, when the IAEA was allowed to make a cursory inspection of six sites that various reports had claimed were the location of Iran's nuclear weapons efforts.

  - Iran began to make efforts to revive the Bushehr I & II reactor projects on, on the Gulf Coast just southwest of Isfahan, which were partially completed at the time of the Shah's fall. Iran attempted to revive the program and sought German and Argentine support, but the reactors were damaged by Iraqi air strikes in 1987 and 1988.
  - Iran opened a new uranium ore processing plant close to its Shagand uranium mine in March 1990, and it seems to have extended its search for uranium ore into three additional areas. Iran may have also begun to exploit stocks of yellowcake that the Shah had obtained from South Africa in the late 1970s while obtaining uranium dioxide from Argentina by purchasing it through Algeria.
  - Iran began to show a renewed interest in laser isotope separation (LIS) in the mid-1980s, and held a conference on LIS in September 1987.
  - Iran opened a new nuclear research center in Isfahan in 1984, located about four kilometers outside the city and between the villages of Shahrida and Fulashans. This facility was built at a scale far beyond the needs of peaceful research, and Iran sought French and Pakistani help for a new research reactor for this center.
  - The Khomeini government may also have obtained several thousand pounds of uranium dioxide from Argentina by purchasing it through Algeria. Uranium dioxide is considerably more refined than yellowcake, and is easier to use in irradiating material in a reactor to produce plutonium.

- Iran repeatedly denied the existence of such a program.
  - On February 7, 1990, the speaker of the Majlis publicly toured the Atomic Energy Organization of Iran and opened the new Jabir Ibn al Hayyan laboratory to train Iranian nuclear technicians. Reports then surfaced that Iran had at least 200 scientists and a work force of about 2,000 devoted to nuclear research
  - Iran's Deputy President Ayatollah Mohajerani stated in October 1991, that Iran should work with other Islamic states to create an "Islamic bomb."
  - The Iranian government has repeatedly made proposals to create a nuclear-free zone in the Middle East. For example, President Rafsanjani was asked if Iran had a nuclear weapons program in an interview in the CBS program *60 Minutes* in February 1997. He replied, "Definitely not. I hate this weapon."
  - Other senior Iranian leaders, including President Khatami have made similar categorical denials. Iran's new Foreign Minister, Kamal Kharrazi, stated on October 5, 1997, that, "We are certainly not developing an atomic bomb, because we do not believe in nuclear weapons... We believe in and promote the idea of the Middle East as a region free of nuclear weapons and other weapons of mass destruction. But why are we interested to develop nuclear technology? We need to diversify our energy sources. In a matter of a few decades, our oil and gas reserves would be finished and therefore, we need access to other sources of energy...Furthermore, nuclear technology has many other utilities in medicine and agriculture. The case of the United States in terms of oil reserve is not different from Iran's The United States also has large oil resources, but at the same time they have nuclear power plants. So there is nothing wrong with having access to nuclear technology if it is for peaceful purposes..."

- Until 2003, the IAEA reported that Iran had fully complied with its present requirements, and that it has found no indications of nuclear weapons effort, but the IAEA only inspected Iran's small research reactors.
  - The IAEA visited five suspect Iranian facilities in 1992 and 1993 in this manner, but did not conduct full inspections.
  - Iranian officials have repeatedly complained that the West tolerated Iraqi use of chemical weapons and its nuclear and biological build-up during the Iran-Iraq War, and has a dual standard where it does not demand inspections of Israel or that Israel sign the NPT.
  - The IAEA has inspected the uranium enrichment facility at Natanz, although it is unclear what kind of future inspection regime will be put in place.
  - Despite agreeing to discuss concluding an Additional Protocol for inspections with the IAEA, during a March 13, 2003 interview with Le Monde, the Iranian Vice President Gholamreza Aghazadeh indicated that Iran would not sign such a protocol unless the United States lifted economic sanctions.
- There were, however, many reasons to assume that Iran had a nuclear weapons program:

- Iran attempted to buy highly enriched fissile material from Kazakhstan. The US paid between $20 million and $30 million to buy 1,300 pounds of highly enriched uranium from the Ust-Kamenogorsk facility in Kazakhstan that Iran may have sought to acquire in 1992. A total of 120 pounds of the material — enough for two bombs — cannot be fully accounted for.

- Iran has imported maraging steel, sometimes used for centrifuges, by smuggling it in through dummy fronts. Britain intercepted 110 pound (50 kilogram) shipment in August 1996. Seems to have centrifuge research program at Sharif University of Technology in Tehran. IAEA "visit" did not confirm.

- . Argentina agreed to train Iranian technicians at its Jose Balaseiro Nuclear Institute, and sold Iran $5.5 million worth of uranium for its small Amirabad Nuclear Research Center reactor in May 1987. A CENA team visited Iran in late 1987 and early 1988, and seems to have discussed selling sell Iran the technology necessary to operate its reactor with 20% enriched uranium as a substitute for the highly enriched core provided by the US, and possibly uranium enrichment and plutonium reprocessing technology as well. Changes in Argentina's government, however, made it much less willing to support proliferation. The Argentine government announced in February 1992, that it was canceling an $18 million nuclear technology sale to Iran because it had not signed a nuclear safeguards arrangement. Argentine press sources suggested, however, that Argentina was reacting to US pressure.

- In February 1990 a Spanish paper reported that Associated Enterprises of Spain was negotiating the completion of the two nuclear power plants at Bushehr. Another Spanish firm called ENUSA (National Uranium Enterprises) was to provide the fuel, and Kraftwerke Union (KWU) would be involved. Later reports indicated that a 10 man delegation from Iran's Ministry of Industry was in Madrid negotiating with the Director of Associated Enterprises, Adolofo Garcia Rodriguez.

- Iran negotiated with Kraftwerke Union and CENA of Germany in the late 1980s and early 1990s. Iran attempted to import reactor parts from Siemens in Germany and Skoda in Czechoslovakia. None of these efforts solved Iran's problems in rebuilding its reactor program, but all demonstrate the depth of its interest.

- Iran took other measures to strengthen its nuclear program during the early 1990s. It installed a cyclotron from Ion Beam Applications in Belgium at a facility in Karzaj in 1991.

- Iran conducted experiments in uranium enrichment and centrifuge technology at its Sharif University of Technology in Tehran. Sharif University was also linked to efforts to import cylinders of fluorine suitable for processing enriched material, and attempts to import specialized magnets that can be used for centrifuges, from Thyssen in Germany in 1991.

- In 1992, Iran attempted to buy beryllium from a storage site in Kazakhstan that also was storing 600 kilograms of highly enriched uranium. These contacts then seem to have expanded to an attempt to try the material, In 1994, they helped lead the US to buy the enriched material and fly it out of the country.

- Iran seems to have conducted research into plutonium separation and Iranians published research on uses of tritium that had applications to nuclear weapons boosting. Iran also obtained a wide range of US and other nuclear literature with applications for weapons designs. Italian inspectors seized eight steam condensers bound for Iran that could be used in a covert reactor program in 1993, and high technology ultrasound equipment suitable for reactor testing at the port of Bari in January 1994.

- Other aspects of Iran's nuclear research effort had potential weapons applications. Iran continued to operate an Argentine-fueled five megawatt light water highly enriched uranium reactor at the University of Tehran. It is operated by a Chinese-supplied neutron source research reactor, and subcritical assemblies with 900 grams of highly enriched uranium, at its Isfahan Nuclear Research Center. This Center has experimented with a heavy water zero-power reactor, a light water sub-critical reactor, and a graphite sub-critical reactor. In addition, it may have experimented with some aspects of nuclear weapons design.

- The German Ministry of Economics circulated a wide list of such Iranian fronts that Iran is known to have use to import or attempted to import controlled items. These fronts include the:

  - Bonyad e-Mostazafan;
  - Defense Industries Organization (Sazemane Sanaye Defa);
  - Pars Garma Company, the Sadadja Industrial Group (Sadadja Sanaye Daryaee);
  - Iran Telecommunications Industry (Sanaye Mokhaberet Iran);
  - Shahid Hemat Industrial Group, the State Purchasing Organization, Education Research Institute (ERI);
  - Iran Aircraft Manufacturing Industries (IAI);
  - Iran Fair Deal Company, Iran Group of Surveyors;

  - Iran Helicopter Support and Renewal Industries (IHI);
  - Iran Navy Technical Supply Center;
  - Iran Tehran Kohakd Daftar Nezarat, Industrial Development Group;
  - Ministry of Defense (Vezerate Defa).

- Iran continued to claim it needs to build enough nuclear reactors to provide at least 20% of its electric power. This Iranian nuclear power program presents serious problems in terms of proliferation. Although the reactors are scarcely ideal for irradiating material to produce Plutonium or cannibalizing the core, they do provide Iran with the technology base to make its own reactors, have involved other technology transfer helpful to Iran in proliferating and can be used to produce weapons if Iran rejects IAEA safeguards.

- Russian has agreed to build up to four reactors, beginning with a complex at Bushehr — with two 1,000-1,200 megawatt reactors and two 465 megawatt reactors, and provide significant nuclear technology.

  - Russia has consistently claimed the light water reactor designs for Bushehr cannot be used to produce weapons grade Plutonium and are similar to the reactors the US is providing to North Korea.
  - The US has claimed, however, that Victor Mikhaliov, the head of Russia's Atomic Energy Ministry, proposed the sale of a centrifuge plant in April 1995. The US also indicated that it had persuaded Russia not to sell Iran centrifuge technology as part of the reactor deal during the summit meeting between President's Clinton and Yeltsin in May 1995.
  - It was only after US pressure that Russia publicly stated that it never planned to sell centrifuge and advanced enrichment technology to Iran, and Iran denied that it had ever been interested in such technology. For example, the statement of Mohammed Sadegh Ayatollahi, Iran's representative to the IAEA, stated that, "We've had contracts before for the Bushehr plant in which we agreed that the spent fuel would go back to the supplier. For our contract with the Russians and Chinese, it is the same." According to some reports, Russia was to reprocess the fuel at its Mayak plant near Chelyabinsk in the Urals, and could store it at an existing facility, at Krasnoyarsk-26 in southern Siberia.
  - The CIA reported in June 1997 that Iran had obtained new nuclear technology from Russia during 1996.
  - A nuclear accident at plant at Rasht, six miles north of Gilan, exposed about 50 people to radiation in July, 1996.
  - Russian Nuclear Energy Minister Yevgeny Adamov and Russian Deputy Prime Minister Vladimir Bulgak visited in March 1998 and Iran and dismissed US complaints about the risk the reactors would be used to proliferate.
    - Russia indicated that it would go ahead with selling two more reactors for construction at Bushehr within the next five years.

- The first 1,000 megawatt reactor at Bushehr has experienced serious construction delays. In March 1998, Russia and Iran agreed to turn the construction project into a turn key plant because the Iranian firms working on infrastructure had fallen well behind schedule. In February, Iran had agreed to fund improved safety systems. The reactor is reported to be on a 30- month completion cycle.

- The US persuaded the Ukraine not to sell Iran $45 million worth of turbines for its nuclear plant in early March 1998, and to strengthen its controls on Ukrainian missile technology under the MTCR.

  - The CIA reported in January 1999 that Russia remained a key supplier for civilian nuclear programs in Iran and, to a lesser extent, India. With respect to Iran's nuclear infrastructure, Russian assistance would enhance Iran's ability to support a nuclear weapons development effort. Such assistance is less likely to significantly advance India's effort, given that India's nuclear weapons program is more mature. By its very nature, even the transfer of civilian technology may be of use in the nuclear weapons programs of these countries.
  - Following intense and continuing engagement with the United States, Russian officials have taken some positive steps. Russia has committed to observe certain limits on its nuclear cooperation with Iran, such as not providing militarily useful nuclear technology.
  - In January 1998, the Russian Government issued a broad decree prohibiting Russian companies from exporting items known or believed to be used for developing WMD or related delivery systems, whether or not these items are on Russia's export control list. In May 1998, Russia announced a decree intended to strengthen compliance of Russian businesses with existing export controls on proliferation-related items. These actions, if enforced, could help to counter the proliferation of WMD and their delivery systems.

    - However, there are signs that Russian entities have continued to engage in behavior inconsistent with these steps. Monitoring Russian proliferation behavior, therefore, will have to remain a very high priority for some time to come.
    - On January 14, 2000, Russia's Minister of Defense Igor Ivanavov met with Hassan Rowhani, the secretary of Iran's Supreme National Security Council, and promised that Russia would maintain defense cooperation, and that Russia, "intends to fulfill its obligations under the agreements made in 1989-1990."
    - The same day, Vice Minister Ilya Klebanov met with Hassan Rowhani, and announced that Iran might order three additional Russian reactors.
    - The CIA warned in January 2000 that Russia might have sold Iran heavy water and graphite technology.

- The impact of these reactor programs is controversial. If the reactor at Bushehr was overtly used for weapons production, reconfigured for this purpose, and its fuel cycle was adjusted accordingly, some experts claim that it could produce between 250 and 300 kg of plutonium per year – enough for roughly 50 warheads. This is a worst case, and most experts feel the reactor could only produce a limited amount of weapons grade Plutonium under such conditionms. If the reactor is used to provide optimal power generation, the mix of plutonium isotopes would only have limited value for weapons design, but still produce some usable material
  - In the plutonium used in basic weapons designs, the amount of Plutonium 240 isotope is about 6-7%, rather than 14% in the plutonium extracted from a LWR.
  - This reduces yield and weapons safety, as Pu 240 tends to start the chain reaction prematurely.
  - Calculations of near-weapons grade plutonium show that in a simple device, the probability of producing a small nuclear explosion is quite high – the mean is about 10 KT, and there is a one in three chance of getting a 20 kT yield..
  - More generally the reactor grade fuel produced after three fuel cycles (rather than one, as hypothesized above) still can be used to produce a device with a yield in the kiloton range.
- China is reported to have agreed to provide significant nuclear technology transfer and possible sale of two 300 megawatt pressurized water reactors in the early 1990s, but then agreed to halt nuclear assistance to Iran after pressure from the US.
  - Iran signed an agreement with China's Commission on Science, Technology, and Industry for National Defense on January 21, 1991, to build a small 27-kilowatt research reactor at Iran's nuclear weapons research facility at Isfahan. On November 4, 1991, China stated that it had signed commercial cooperation agreements with Iran in 1989 and 1991, and that it would transfer an electromagnetic isotope separator (Calutron) and a smaller nuclear reactor, for "peaceful and commercial" purposes.
  - The Chinese reactor and Calutron were small research-scale systems and had no direct value in producing fissile material. They did, however, give Iran more knowledge of reactor and enrichment technology, and US experts believe that China provided Iran with additional data on chemical separation, other enrichment technology, the design for facilities to convert uranium to uranium hexaflouride to make reactor fuel, and help in processing yellowcake.
  - The US put intense pressure on China to halt such transfers. President Clinton and Chinese President Jiang Zemin reached an agreement at an October 1997 summit. China strengthened this pledge in negations with the US in February 1998.
  - In March 1998, the US found that the China Nuclear Energy Corporation was negotiating to sell Iran several hundred tons of anhydrous hydrogen fluoride (AHF) to Isfahan Nuclear Research Corporation in central Iran, a site where some experts believe Iran is working on the development of nuclear weapons. AHF can be used to separate plutonium, help refine yellowcake into uranium hexaflouride to produce U-235, and as a feedstock for Sarin. It is on two nuclear control lists. China agreed to halt the sale.
  - Iran denied that China had halted nuclear cooperation on March 15, 1998.
  - The US acting Under Secretary of State for Arms Control and International Security Affairs stated that China was keeping its pledge not to aid Iran on March 26, 1998.
    - The CIA reported in January 1999 that During the first half of 1998, China continued to take steps to strengthen its control over nuclear exports. China promulgated new export control regulations in June 1998 that cover the sale of dual-use nuclear equipment. This follows on the heels of the September 1997 promulgation of controls covering the export of equipment and materials associated exclusively with nuclear applications. These export controls should give the Chinese Government greater accounting and control of the transfer of equipment, materials, and technology to nuclear programs in countries of concern.
    - China pledged in late 1997 not to engage in any new nuclear cooperation with Iran and to complete work on two remaining nuclear projects—a small research reactor and a zirconium production facility—in a relatively short

period of time. During the first half of 1998, Beijing appears to have implemented this pledge. The Intelligence Community will continue to monitor carefully Chinese nuclear cooperation with Iran.

- During the reporting period, Chinese entities provided a variety of missile-related items and assistance to several countries of proliferation concern. China also was an important supplier of ACW to Iran through the first half of 1998.

- China may, however, have provided Iran with nuclear weapons designs. On February 15, 2004, the *Washington Post* reported that the US had discovered that the nuclear weapons designs Libya obtained through a Pakistan had come from a smuggling network that originated in China. The bomb designs and other papers turned over by Libya to the included text in Chinese, with detailed, step-by-step instructions for assembling a 1,000 pound implosion-type nuclear bomb that could fit atop a large ballistic missile. The device was similar to a weapon known to have been tested by China in the 1960s. Although of an older design, the bomb design is a moderate-sized implosion device that uses use precision-timed conventional explosives to squeeze a sphere of fissile material and trigger a nuclear chain. Pakistan's first nuclear test in 1998 involved a more modern design than the one sold to Libya.

  - The documents included technical instructions for manufacturing components for the device. The package of documents was turned over to U.S. officials in November following Libyan leader Moammar Gaddafi's decision to renounce weapons of mass destruction and open his country's weapons laboratories to international inspection.

  - The documents were "copies of copies of copies." The primary documents were entirely in English, while a few ancillary papers contained Chinese text. The package also included open-literature articles on nuclear weapons from U.S. weapons laboratories, officials familiar with the docu

  - Although most essential design elements were included, some key parts were missing. The Poast reported that investigators speculated that the missing papers could have been lost, or were being withheld pending additional payments. Libyan scientists claimed they had not seriously studied them and were unaware that anything was missing.

  - U.S. and European investigators feel there are many similarities among the other nuclear-related designs and components found in Libya and Iran, suggesting they were provided by the same sources, and suspect that Iran may have the same nuclear weapons design data as Libya.

- The control of fissile material in the FSU also remains a major problem:

  - US estimates indicate the FSU left a legacy of some 1,485 tons of nuclear material. This includes 770 tons in some 27,000 weapons, including 816 strategic bombs, 5,434 missile warheads, and about 20,000 theater and tactical weapons. In addition, there were 715 tons of fissile or near-fissile material in eight countries of the FSU in over 50 sites: enough to make 35,000-40,000 bombs.

  - There are large numbers of experienced FSU technicians, including those at the Russian weapons design center at Arzamas, and at nuclear production complexes at Chelyabinsk, Krasnoyarsk, and Tomsk.

  - These factors led the US to conduct Operation Sapphire in 1994, where the US removed 600 kilograms of highly enriched uranium from the Ulba Metallurgy Plant in Kazakhstan at a time Iran was negotiating for the material.

  - They also led to Britain and the US cooperating in Auburn Endeavor, and airlifting fissile material out of a nuclear research facility in Tiblisi, Georgia. There were 10 pounds of material at the institute, and 8.8 pounds were HEU. (It takes about 35 pounds to make a bomb.) This operation was reported in the New York Times on April 21, 1998. The British government confirmed it took place, but would not give the date.

  - Some reporting exaggerates this threat. The Jerusalem Post reported on April 9, 1998 that Iran had purchased four tactical nuclear weapons from Russian smugglers for $25 million in the early 1990s, that the weapons had been obtained from Kazakhstan in 1991, and that Argentine technicians were helping to activate the weapon.

    - It quoted what it claimed was an Iranian report, dated December 26, 1991, of a meeting between Brigadier General Rahim Safavi, the Deputy Commander of the Revolutionary Guards and Reza Amrohalli, then head of the Iranian atomic energy organization.

    - It also quoted a second document — dated January 2, 1992 — saying the Iranians were awaiting the arrival of Russian technicians to show them how to disarm the protection systems that would otherwise inactivate the weapons if anyone attempted to use them.

    - The documents implied the weapons were flawed by did not indicate whether Iran had succeeded in activating them.

    - The US intelligence community denied any evidence that such a transfer had taken place.

- US estimates of Iran's progress in acquiring nuclear weapons have changed over time.

- In 1992, the CIA estimated that Iran would have the bomb by the year 2000. In 1995, John Holum testified that Iran could have the bomb by 2003.
- In 1997, after two years in which Iran might have made progress, he testified that Iran could have the bomb by 2005-2007.
- In 1999, the NIE on proliferation estimated that Iran could test a missile that could reach the US by 2010, but did not change the 1997 estimate or when Iran might acquire a bomb.

- The CIA estimated in January 1999 that, Iran remains one of the most active countries seeking to acquire WMD technology and ACW. During the reporting period, Iran focused its efforts to acquire WMD-related equipment, materials, and technology primarily on two countries: Russia and China. Iran is seeking to develop an indigenous capability to produce various types of nuclear, chemical, and biological weapons and their delivery systems.
  - Iran actively sought relevant production technology to lessen its dependence on foreign sources.
  - Russian entities continued to market and support a variety of nuclear-related projects in Iran during the first half of 1998, ranging from the sale of laboratory equipment for nuclear research institutes to the construction of a 1,000-megawatt nuclear power reactor in Bushehr, Iran, that will be subject to International Atomic Energy Agency (IAEA) safeguards. These projects, along with other nuclear-related purchases, will help Iran augment its nuclear technology infrastructure, which in turn would be useful in supporting nuclear weapons research and development.
    - The completion date of the light-water reactor at Bushehr has been moved forward from 2005 to the end of 2003.
    - Russia has indicated that it would provide fuel for the reactor, in a bid to decouple the construction of the reactor from the Iranian fuel production program.
    - Russia has agreed to provide fuel only if Iran returns the spent fuel to Russia. This is intended to deny Iran the fuel rods needed for plutonium production. Under an unusual arrangement, Russia has agreed to pay Iran for the spent fuel rods. Motives behind that decision are rather unclear.
    - At the time of writing, Russia and Iran were still locked in negotiations over the price and provisions for the return of spent fuel.
  - Russia has committed to observe certain limits on its nuclear cooperation with Iran. For example, President Yel'tsin has stated publicly that Russia will not provide militarily useful nuclear technology to Iran. Beginning in January this year, the Russian Government has taken a number of steps. For example, in May 1998, Russia announced a decree intended to strengthen compliance of Russian businesses with existing export controls on proliferation-related items.
  - China continued to work on one of its two remaining projects—to supply Iran's civil nuclear program with a zirconium production facility. This facility will be used by Iran to produce cladding for reactor fuel. As a party to the Nuclear Nonproliferation Treaty, Iran is required to apply IAEA safeguards to nuclear fuel, but safeguards are not required for the zirconium plant or its products. During the US-China October 1997 Summit, China pledged not to engage in any new nuclear cooperation with Iran and to complete cooperation on two ongoing nuclear projects in a relatively short time. This pledge appears to be holding. In addition, China promulgated new export regulations in June 1998 that cover the sale of dual-use nuclear equipment. The regulations took effect immediately and were intended to strengthen control over equipment and material that would contribute to proliferation. Promulgation of these regulations fulfills Jiang Zemin's commitment to the United States last fall to implement such controls by the middle of 1998.
  - Iran wants to develop a complete nuclear fuel cycle for its civilian energy program. In that guise, it seeks to obtain whole facilities, such as a uranium conversion facility, that, in fact, could be used in any number of ways in support of efforts to produce fissile material needed for a nuclear weapon. Despite outside efforts to curtail the flow of critical technologies and equipment, Tehran continues to seek fissile material and technology for weapons development and has set up an elaborate system of military and civilian organizations to support its effort.

- In early 2000, the *New York Times* reported that the CIA had warned that Iran might now be able to maker a nuclear weapon. The assessment stated that the CIA could not monitor Iran closely enough to be certain whether Iran had acquired fissile material from an outside source.
  - US experts refered to Iran's efforts as "creeping proliferation" and there is no way to tell when or if Iranian current efforts will produce a weapon, and unclassified lists of potential facilities have little credibility..

- Timing of weapons acquisition depends heavily on whether Iran can buy fissile material — if so it has the design capability and can produce weapons in 1-2 years — or must develop the capability to process Plutonium or enrich Uranium — in which case, it is likely to be 5-10 years.

- A Department of Defense report in January 2001 reported that,

  - Although a signatory to NPT and the CTBT, Iran also is seeking fissile material and technology for weapons development through an elaborate system of military and civilian organizations. We believe Iran also has an organized structure dedicated to developing nuclear weapons by trying to establish the capability to produce both plutonium and highly enriched uranium. Iran claims to desire the establishment of a complete nuclear fuel cycle for its civilian energy program. In that guise, it seeks to obtain whole facilities that could be used in numerous ways in support of efforts to pro-duce fissile material for a nuclear weapon. The potential availability of black market fissile material also might provide Iran a way to acquire the fissile material necessary for a nuclear weapon.

  - Iran's success in achieving a nuclear capability will depend, to a large degree, on the supply policies of Russia and China or on Iran's successful illicit acquisition of adequate quantities of weapons-usable fissile material. Russia is continuing work on a 1,000-megawatt power reactor at Bushehr. Although Russian officials have provided assurances that Russian cooperation with Iran will be limited to the Bushehr reactor project during the period of its construction, the United States Government is aware that a number of Russian entities are engaged in cooperation with Iran that goes beyond this project. One of Iran's primary goals is the acquisition of a heavy water-moderated, natural uranium-fueled nuclear reactor and associated facilities suitable for the production of weapons-grade plutonium. Although Bushehr will fall under IAEA safeguards, Iran is using this project to seek access to more sensitive nuclear technologies from Russia and to develop expertise in related nuclear technologies. Any such projects will help Iran augment its nuclear technology infrastructure, which in turn would be useful in supporting nuclear weapons research and development.

  - In the past, Chinese companies have been major suppliers of nuclear-related facilities and technology albeit under IAEA safeguards. China pledged in 1997 that it would not undertake any new nuclear cooperation with

  - Iran and that it would close out its two existing projects —a small research reactor and a zirconium production facility, which will produce cladding for nuclear fuel —as soon as possible. (Neither of these two projects poses a significant proliferation concern.) China also agreed to terminate cooperation on a uranium conversion project. This project would have allowed Iran to produce uranium hexafluoride or uranium dioxide, which are the feedstock materials for the manufacture of weapons grade plutonium. In addition, China announced new export controls in June 1998 that cover the sale of dual-use nuclear equipment. China appears to be living up to its 1997 commitments.

- The CIA reported in September 2001 that,

  - "Iran sought nuclear-related equipment, material, and technical expertise from a variety of sources, especially in Russia. Work continues on the construction of a 1,000-megawatt nuclear power reactor at Bushehr that will be subject to International Atomic Energy Agency (IAEA) safeguards. In addition, Russian entities continued to interact with Iranian research centers on various activities. These projects will help Iran augment its nuclear technology infrastructure, which in turn would be useful in supporting nuclear weapons research and development. The expertise and technology gained, along with the commercial channels and contacts established—particularly through the Bushehr nuclear power plant project—could be used to advance Iran's nuclear weapons research and development program.

  - Beginning in January 1998, the Russian Government took a number of steps to increase its oversight of entities involved in dealings with Iran and other states of proliferation concern. In 1999, it pushed a new export control law through the Duma. Russian firms, however, faced economic pressures to circumvent these controls and did so in some cases. The Russian Government, moreover, failed to enforce its export controls in some cases regarding Iran. A component of the Russian Ministry of Atomic Energy (MINATOM) contracted with Iran to provide equipment clearly intended for Atomic Vapor Laser Isotope Separation (AVLIS). The laser equipment was to have been delivered in late 2000 but continues to be held up as a result of US protests. AVLIS technology could provide Iran the means to produce weapons quantities of highly enriched uranium.

  - The Russian Government's commitment, willingness, and ability to curb proliferation-related transfers remain uncertain. The export control bureaucracy was reorganized again as part of President Putin's broader government reorganization in May 2000. The Federal Service for Currency and Export Controls (VEK) was abolished and its functions assumed by a new department in the Ministry of Economic Development and Trade. VEK had been tasked with drafting the implementing decrees for Russia's July 1999 export control law; the status of these decrees is not known. Export enforcement continues to need improvement. In February 2000, Sergey Ivanov, then Secretary of Russia's Security Council, said that during 1998-99 the government had obtained convictions for unauthorized technology transfers in three cases. The Russian press has reported on cases where advanced equipment is simply described as something else in the export documentation and is exported. Enterprises sometimes falsely declare goods to avoid government taxes.

  - China pledged in October 1997 to halt cooperation on a uranium conversion facility (UCF) and not to engage in any new nuclear cooperation with Iran but said it would complete cooperation on two nuclear projects: a small research reactor and a zirconium production facility at Esfahan that Iran will use to produce cladding for reactor fuel. As a party to the Nuclear Nonproliferation Treaty (NPT), Iran is required to apply IAEA safeguards to nuclear fuel, but safeguards are not required for the zirconium plant or its products. Although the Chinese appear to have lived up to these commitments, we are aware of some interactions between Chinese and Iranian entities that have raised questions about its "no new nuclear cooperation" pledge. According to the State Department, the Administration is seeking to address these questions with appropriate Chinese authorities.
  - Iran has attempted to use its civilian energy program, which is quite modest in scope, to justify its efforts to establish domestically or otherwise acquire assorted nuclear fuel-cycle capabilities. But such capabilities can also support fissile material production for a weapons program, and we believe it is this objective that drives Iran's efforts to acquire relevant facilities. For example, Iran has sought to obtain turnkey facilities, such as the UCF, that ostensibly would be used to support fuel production for the Bushehr power plant. But the UCF could be used in any number of ways to support fissile material production needed for a nuclear weapon—specifically, production of uranium hexafluoride for use as a feedstock for uranium enrichment operations and production of uranium compounds suitable for use as fuel in a plutonium production reactor. In addition, we suspect that Tehran most likely is interested in acquiring foreign fissile material and technology for weapons development as part of its overall nuclear weapons program."

- The CIA estimated in January 2002 that the US " Intelligence Community judges that Iran does not yet have a nuclear weapon. Most agencies assess that Tehran could have one by the end of the decade, although one agency judges it will take longer. All agree that Iran could reduce this time frame by several years with foreign assistance. Iran has biological and chemical weapons programs."
- Director of Central Intelligence George J. Tenet's testimony Before the Senate Select Committee on Intelligence on February 6, 2002 stated that:
  - "Russia continues to supply significant assistance on nearly all aspects of Tehran's nuclear program. It is also providing Iran assistance on long-range ballistic missile programs."
  - Chinese firms remain key suppliers of missile-related technologies to Pakistan, Iran, and several other countries. This is in spite of Beijing's November 2000 missile pledge not to assist in any way countries seeking to develop nuclear-capable ballistic missiles. Most of China's efforts involve solid-propellant ballistic missile development for countries that are largely dependent on Chinese expertise and materials, but it has also sold cruise missiles to countries of concern such as Iran.
  - We are closely watching Beijing's compliance with its bilateral commitment in 1996 not to assist unsafeguarded nuclear facilities, and its pledge in 1997 not to provide any new nuclear cooperation to Iran.
- Developments since mid 2002 have strongly indicated that Iran has lied in denying it has a nuclear weapons program.
- Some of the most detailed public reports of Iran's nuclear weapons program have come from the People's Mujahideen, a violent, anti-regime, terrorist group. Such claims have sometimes been doubtful, but the People's Mujahideen reported during 1990-2002 that:
  - Iran's facilities include a weapons site called Ma'allem Kelayah, near Qazvin on the Caspian. This is said to be an IRGC-run facility established in 1987, which has involved an Iranian investment of $300 million. Supposedly, the site was to house the 10 megawatt reactor Iran tried to buy from India.
  - Two Soviet reactors were to be installed at a large site at Gorgan on the Caspian, under the direction of Russian physicists.
  - The People's Republic of China provided uranium enrichment equipment and technicians for the site at Darkhouin, where Iran once planned to build a French reactor.
  - A nuclear reactor was being constructed at Karaj; and that another nuclear weapons facility exists in the south central part of Iran, near the Iraqi border.
    - Later investigation revealed that the Karaj site was home to a radioactive waste storage facility.
  - The ammonia and urea plant that the British firm M. W. Kellog was building at Borujerd in Khorassan province, near the border with Turkestan, might be adapted to produce heavy water.
  - The Amir Kabar Technical University, the Atomic Energy Organization of Iran (AEOI) (also known as the Organization for Atomic Energy of Iran), Dor Argham Ltd., the Education and Research Institute, GAM Iranian Communications, Ghoods Research Center, Iran Argham Co., Iran Electronic Industries, Iranian Research Organization, Ministry of Sepah, Research and Development Group, Sezemane Sanaye Defa, the Sharif University of Technology, Taradis Iran Computer Company, and Zakaria Al-Razi Chemical Company are all participants in the

Iranian nuclear weapons effort.

- Other sources based on opposition data have listed the Atomic Energy Organization of Iran, the Laser Research Center and Ibn-e Heysam Research and Laboratory Complex, the Bonab Atomic Energy Research Center (East Azerbaijan), the Imam Hussein University of the Revolutionary Guards, the Jabit bin al-Hayyan Laboratory, the Khoshomi uranium mine (Yazd), a possible site at Moallem Kalayeh, the Nuclear Research Center at Tehran University, the Nuclear Research Center for Agriculture and Medicine (Karaj), the Nuclear Research Center of Technology (Isfahan), the Saghand Uranium mine (Yazd), the Sharif University (Tehran) and its Physics Research Center.

- On August 14, 2002, the representative office of the National Council of Resistance of Iran (NCRI), an Iranian opposition group which includes the People's Mujahideen, held a press briefing in which they released information about Iran's nuclear program.
  - The construction of a large site in Natanz that, according to the allegations, was to have been completed by March 2003.
  - The construction of a heavy water production facility at Arak.
  - Additional nuclear projects at a number of facilities:
    - The Bushehr power reactor complex.
    - The Nuclear Fuel Center in Isfahan.
    - The Nuclear Research Center at Karaj.
    - Research Center of Bonab.
    - Saghand Research Center of Yazd.
    - Amirabad Research and Reactor Center in Tehran.
- The Natanz site was not previously public knowledge, although its existence was known to US ntelligence.. By late 2002, the facility had been identified as a uranium enrichment facility.
  - In September 2002, Iran informed the IAEA of the existence of the facility. In a March 17, 2003 report the IAEA had confirmed their February 21, 2002 inspection of the facility.
  - At the time of the inspection, the IAEA Director General Mohamed El Baradei observed approximately 164 gas centrifuges operating at a pilot plant, with parts for perhaps an additional 1,000 centrifuges. When the IAEA delegation visited the facility, no uranium was in any of the centrifuges.
    - The Iranian government has stated that uranium hexaflouride will be produced at Isfahan and then shipped to Natanz for separation and processing. A March 14, 2003 Iranian state television broadcast indicated that on March 3, 2003, the Secretary of the Supreme National Security Council stated that the Isfahan facility for converting yellowcake into uranium hexaflouride was complete.
  - News stories quoting government sources, independent analysis of commercially-available satellite imagery and reports from the NCRI all note that the two main halls were quite large (between 25,000 m^2 and 32,000 m^2), were several meters underground and had walls in excess of two meters thick.
    - The size of the halls suggested that the total number of centrifuges might total roughly 50,000 or more – compared to recent media reports which claimed that Natanz was only intended to house 5,000 centrifuges.[10] This number may have been an interim goal for the site.
    - Previously the Iranian government had announced that it intended to achieve complete self-sufficiency throughout the entire fuel cycle for a projected generation capacity of 6,000 megawatts over the next 20 years.
    - The total capacity of the Natanz facility depends on the efficiency of the centrifuges. At the low end, a complex housing 50,000 centrifuges would produce a quarter of the fuel need for the Bushehr reactor – which is only about 4 percent of the total stated goal of the Iranian nuclear program. At the high end, 50,000 centrifuges could produce 25% more than the amount called for in publicly stated nuclear program objectives.
      - Unconfirmed reports quoting western governmental sources suggest that the Iranian centrifuges may tend towards the upper bounds of the range of production capabilities. Recent findings of more advanced centrifuge designs make it possible that Iran could bring significantly more enrichment capacity to bear than previously thought.

- The amount of separation capacity needed to meet the stated goals of providing sufficient fuel for 6,000 MW is sufficient to produce enough highly enriched uranium for 180 weapons annually, pending centrifuge efficiency.
- It is uncertain what portion, if any, of the separation capacity at Natanz was to be dedicated to producing highly-enriched, weapons-grade uranium versus low-enriched uranium for use in power reactors.
- More significantly, the ability to construct a plant of this scale suggests that Iran had ample capacity to produce separation equipment for use in a weapons program. Such equipment could be located at other, unknown, sites.

- The National Council of Resistance of Iran (NCRI) also released information about a heavy water production facility at Arak during it's August 14, 2002, press briefing.
    - Heavy water can be used in a reactor that uses natural uranium fuel.
    - Analysts note that reactors that are moderated with heavy water and use natural uranium fuel are superior for the production of weapons-grade plutonium.
- On December 13, 2002, IAEA Director General Mohammed El-Baradei indicated that the reports by Iranian opposition groups and Western governments on Iranian nuclear facilities at Natanz and Arak was not a surprise, citing discussions with Iranian authorities over the last 6 months.
- On February 9, 2003, Iranian President Khatami made a televised speech on Iran's nuclear program in which a number of pronouncements were made indicating the scope and scale of the Iraninan nuclear program.
    - Iran has started mining uranium near the city of Yazd.
    - A facility for converting ore into yellowcake has been built in the same province as the mines.
    - Iran is building or operating uranium mines, uranium concentration and conversion facilities and fuel fabrication plants.
        - A statement made the next day by the head of Iran's Atomic Energy Organization, stated that the Isfahan facility would convert yellowcake into uranium oxide, uranium hexaflouride and uranium metal.
- On February 22, 2003 Iran permitted three IAEA personnel to visit the Natanz enrichment facility. More detailed inspections began on March 10, 2003.
    - During the visit, personnel observed between 160-200 active centrifuges at the Natanz pilot plant. However, none of these centrifuges appeared to have contained uranium hexaflouride. It is possible that some UF_6 has been processed somewhere in Iran, at least on a trial basis.
    - Inspectors also observed parts for about an additional 1,000 centrifuges.
    - Iranian authorities promised to provide information on centrifuge design no later than 60 days before the start of processing of uranium hexaflouride. Under existing agreements, Iran would also be required to provide IAEA with data covering the number of centrifuges installed as well as the total facility throughput.
    - Following the analysis of environmental samples from the sites at Natanz and the Kalaye Electric Company particles of highly enriched uranium were found. This disproved Iranian claims that Iran had not previously enriched any uranium although Iran claimed that the particles were from pre-existing contamination.
- On March 3, 2003, the state-run Islamic Republic News Agency reported that the Isfahan facility was completed and would begin operation.
    - Unenriched uranium metal is used in laser isotope separation, while uranium metal made from HEU is key for building nuclear weapons.
- In a March 5 2003, letter, Iran admitted to carrying out a total of 113 experiments on the production of uranium metal. Neither the experiments nor the laboratories at which the experiments had been conducted were declared by Iran prior to this.
- In June 2003, the IAEA issued a report criticizing Iran for failing to disclose the purchase of Uranium from China in the early 1990s.
- In July 2003, IAEA inspectors found traces of HEU at Nantaz. Iran had repeatedly denied producing such material.
- On July 12, 2003, Iran indicated presented preliminary designs for a 30-40 MW heavy-water reactor to be built at Arak. Contrary to expectations, the designs did not include provisions for hot cells, which had been expected by the IAEA and are items that should have been declared. In an October 12, 2003 letter, Iran admitted that two hot cells had been foreseen, but Iran did not, at the time, have more detailed information.

  - In a subsequent November 1st, 2003 communication, Iran indicated that they had plans to build another facility with hot cells for the production of isotopes.
  - The reactor at Arak would be able to produce between 8 and 10 kg per year – enough for about two weapons annually.[11]
  - Originally, construction was to start in 2004, with completion as early as 2009.
  - The establishment of a plutonium device is thought to be significant as it reduces the size of the warhead such that a missile like the Shahab 3 can carry a warhead.
- In an August 19, 2003 letter, Iran indicated that, contrary to earlier explanations, they had carried out UF_4 conversion experiments using depleted uranium dioxide. Earlier, Iran had stated that the UO2 had been lost during processing.
- Following the discovery of Iranian failure to fully disclose its nuclear activities, the IAEA set forth a resolution on September 12, 2003 demanding full disclosure by October 31, 2003, as well as demanding that Iran sign the additional protocol and voluntarily suspending enrichment activities.
- On October 9th, 2003, Iran indicated that tit had, in fact, carried out extensive experiments in uranium conversion in kilogram quantities between 1981 and 1993, contrary to its earlier statements.
- On October 21, 2003, Iran agreed to voluntarily suspend uranium enrichment activities as well as to sign the IAEA Additional Protocol and generally acceded to the demands of the IAEA as a result of the IAEA's findings and increased international pressure\.
- Following the Iranian disclosure, the IAEA issued a report on November 10th detailing the chronology to date as well as the specific incidences of Iranian non-compliance found to date.
  - Iran admitted that it had carried out some testing of centrifuges at the Kalaye Electric Company between 1998 and 2002 using uranium hexafluoride imported in 1991.
    - Iran produced the requested drawings of the declared centrifuges on October 2, 2003.
    - In a November 1st, 2003 meeting, Iranian officials declared that they had not enriched any uranium beyond 1.2%, and that any HEU particles found must be residual contamination.
    - 1.9 kg of uranium hexafluoride that Iran had claimed leaked out of its storage cylinders was used to test centrifuges at this facility.
  - Between 1991 and 2000 Iran had a laser enrichment program. During the course of that program, Iran used 30 kg of uranium metal that had not been declared.
  - Between 1998 and 1992, Iran had irradiated 7 kg of uranium dioxide targets and extracted small quantities of plutonium.
  - Iran admitted it had not accurately reported on use of safeguarded material and unsafeguarded material obtained both before and after the Revolution.
  - Additionally, Iran conceded that it had produced uranium metal not only for the creation of shielding material, but also for use in laser enrichment.
- Iran permitted IAEA inspectors to visit a laboratory at Lashkar Ab'ad, which was involved in the use of lasers to separate isotopes.
  - Further information has indicated that Iran established a pilot plant in 2000 and had conducted laser enrichment experiments between October 2002 and January 2003, using previously undeclared uranium metal imported in 1994.
  - In May 2003, the separation equipment was dismantled and transferred, along with the uranium metal to Karaj for storage. These items were presented to inspectors on October 28, 2003.
  - Iran initially claimed that the reactor was an indigenous design.
- In it's November 10th, 2003 report, the IAEA reached the following conclusions:
  - Iran had a nearly complete fuel cycle.
  - Iran had pursued centrifugal enrichment for 18 years, laser enrichment for 12 years, and during the course of these programs had produced low-enriched uranium.
  - In total, the report notes at least nine incidences of foreign assistance from at least four countries.

    - Iran had failed to report a large amount of information related to conversion, fabrication, irradiation and plutonium production.
        - Reporting failures included the import of natural UF_6, depleted uranium dioxide and uranium metal. Additionally the production of UO_2, UO_3, UF_4, UF_6, AUC, U_3O_8 (both depleted and natural) as well as the wastes associated with the production of these items.
        - Additionally, Iran failed to meet its obligations regarding declaration of the production of UO_2 targets, their irradiation, and the subsequent extraction of plutonium.
        - Iran also failed to provide appropriate design information for a number of facilities including:
            - The Kalaye Electric Company centrifuge testing and assembly center;
            - The laser laboratories at the Tehran Nuclear Research Center (TNRC) and Lashkar Ab'ad;
            - The waste storage site at Karaj;
            - The uranium conversion and compound production facilities at ENTC and TNRC;
            - The isotope production laboratories at both the Tehran Research Reactor and the TNRC;
            - The waste handling facility at TNRC.
    - In total, Iran declared 12 facilities in 2003 and a total of 22 facilities were put under IAEA safeguards.
- The new agreement drawn up on November 28, 2003, following the passing of the deadline for full-disclosure, complete transparency, and total cooperation with the IAEA contained the following items of note:
    - The agreement notes that Vice-President Aghazadeh of Iran has reaffirmed his country's decision to "provide a full picture of its nuclear activities and has also reaffirmed his country's decision to implement a policy of cooperation and full transparency:"
    - The document also states that the Director General of the IAEA has been given assurances that Iran is committed to a policy of full disclosure.
    - Additionally, it emphasizes that in order to restore confidence, Iranian cooperation and transparency will need to be complete and sustained.
    - The agreement also stresses that continued suspension of uranium enrichment activities is critical in rebuilding international confidence.
    - Furthermore, the agreement states, "…that, should any further serious Iranian failures come to light, the Board of Governors would meet immediately to consider, in the light of the circumstances and of advice from the Director General, all options at its disposal…"
- Iran signed the Additional Protocol to the NNPT, allowing far more demanding IAEA inspections, on December 18, 2003.
- Iran issues statements in early February 2004 that it intended to produce LEU in excess of its requirements at Bushehr (in order to sell it on the international market). This is a matter of serious concern because it could make monitoring the use of L:EU for weapons purposes much more difficult..
        - Reprocessing of spent fuel produces plutonium.
        - Russia's earlier agreements regarding the construction of the reactor at Bushehr included an agreement for Russia to provide reactor fuel. This agreement was contingent on Iran returning spent fuel rods to Russia.
        - The core of a typical reactor such as the one under construction at Bushehr contains roughly 75 tons of low-enriched uranium (LEU) fuel; a third of which is replaced at a time (about every 1.5 years). This means that Iran would have to produce approximately 17 tons of LEU annually to fuel each reactor. This would require about 75,000 separative work units (SWU) of enrichment capacity. This would yield, very roughly, a facility the size of the one at Natanz.
        - However, if the same facility is used to produce HEU, it could produce some 400 kg of weapons-grade uranium per year. This would be enough for about 20 warheads.
        - If Iran were to either acquire, or divert and store additional LEU and use that as stock to produce HEU, then the amount of enrichment capacity needed drops by 80%. In other words, given sufficient LEU, the same facility at Natanz could produce 2000 kg of HEU – enough for some 100 weapons per year.
        - This also means that a smaller amount of LEU can be used to produce a steady flow of usable bombs. Use of roughly 4 tons of LEU feed per year to produce 100 kg of HEU (enough for 5 weapons), would require perhaps

1,000 centrifuges. This is equivalent to the amount of equipment that IAEA inspectors saw parts for at Natanz, and might cover an area a bit more than 30 meters on a side.

In February 2004, IAEA inspectors declare that they learned in October that Iran possessed blueprints for a previously undeclared --and far more efficient -- gas centrifuge enrichment program during the process of comparing the materials found in Libya with the ones declared by Iran. They then found parts for such centrifuges and several complete machines at one facility and machines for making such centrigures at another facility -- evidently at Doshen-Tappen Airbase. The blueprints were for a super efficient P2 type of centrifuge. US officials say the P-2 parts are similar to those found in Libya, and might have been obtained illegally through the institute headed by Pakistani scientist A.Q. Khan, although they cannot confirm this. Other sources indicate that the designs are for high-efficiency maraging steel centfiruge designs sold by Pakistan to Libya, and of the kind used in the manufacture of the shipload of centrifuge components intercepted between Malaysia and Libya.. Hamid Reza Assefi, a spokesman for the Iranian Foreign Ministry, denies Iran had the sophisticated centrifuges, and repeats past claims that the Iranian nuclear program is for peaceful purposes.

- The only design that had been previously declared was a lower efficiency design using aluminum walls. The parts found at Natanz were made using the older design.
- Subsequently, Iran's foreign minister indicated that Iran intends to sell reactor fuel internationally. This means that Iran, therefore, would be restarting its uranium enrichment program.
- Both the older and newer centrifuge designs match those found in Libya and provided by Pakistan.
- President Bush stated that Iran and North Korea had both exploited a loophole in the NPT that permits states to "acquire the material and infrastructure necessary for manufacturing illegal weapons."
  - According to this argument the civilian program is not a cover for a military program, as much as it is part of the military program.[12]
  - Within the context of the NNPT treaty, there is nothing that prohibits Iran from separating plutonium or enriching uranium, just so long as they declare it.
  - Estimates about the amount of time needed to manufacture a weapon given sufficient fissile material, design information and necessary preparations range from 1 week to 1 month.

- On February 20, 2004, the *Washington Post* reports that IAEA inspectors have found two ditstict types of enriched Uranium that Iran has not previously declared, including one that seems to have come from Pakistan and another on unknown origin that indicates Iran may have an enrichement facilioty that it has not previously declared.

Missile Defenses

- Seeking Russian S-300 or S-400 surface-to-air missile system with limited anti tactical ballistic missile capability.

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