NUCLEAR- AND MISSILE-RELATED TRADE AND DEVELOPMENTS FOR SELECTED COUNTRIES, MARCH-JUNE 1998

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The material in this overview is drawn from selected abstracts that appear in the Center for Nonproliferation Studies' nuclear and missile databases. Transactions of nuclear and missile technologies, parts, and materials are listed according to the recipient country. Other developments are listed according to the country where the event or development took place.

ASIA

AUSTRALIA

Nuclear

On 2 June 1998, Energy Resources of Australia Ltd. (ERA) won an 18-year battle to build a uranium mine bordering the World Heritage-listed Kakadu National Park. ERA also operates the Ranger uranium mine in the same area. The Ranger mine has contracts with Electricite de France. ERA's chief executive, Phillip Shirvington, denied that there was a possibility that the mined uranium could make its way into nuclear weapons. He said "all uranium from Jabiluka will be sold under strict international safeguard systems for use in nuclear power stations."

AFP; in Inquisit, [Online] http://www.inquisit.com/, 3 June 1998.

CHINA

Nuclear

China has abolished the China National Nuclear Corp. (CNNC) in a bid to restructure its nuclear power sector and place it on a more stable commercial footing. So far there are no details on how the nuclear sector will be reorganized. But the civilian nuclear power sector could be grouped into a "profit center" under a to-be-determined central government ministry. Similarly, nuclear weapons activity could be given to the State Ministry of Defense. Earlier, the CNNC was a quasi-autonomous body responsible to only the State Planning Commission (SPC). Now the CNNC will be accountable to several government industries. Although it will be several months before the new lines of authority become visible, U.S. industry officials speculate that the nuclear safety, radiological, protection, and regulatory arms of the CNNC could gain more independence. Likewise, the civilian and defense activities may also be further separated. The nuclear fuel activities that were earlier under CNNC's control could be set up as a separate entity dubbed the China Nuclear Fuel Corp. This new entity could come to control uranium procurement and other activities that were earlier under the control of the China Nuclear Energy Industry Corp (CNEIC).

Mark Hibbs, *Nucleonics Week*, 26 March 1998, pp. 1, 8-9.

The second phase of the Russian-assisted, gas-centrifuge uranium enrichment plant in China will be commissioned in August 1998. According to the Russian Ministry for Atomic Energy, the first phase has already been put into operation in the town of Hanzhun. Russia believes that the building of a gas-centrifuge enterprise and the Lianyungang nuclear power plant will be of great political importance and boost economic cooperation between the two countries. The third phase of the uranium-enrichment project is expected to be commissioned in January 2002. This enterprise will produce fuel for Chinese nuclear power plants and has already been placed under International Atomic Energy Agency (IAEA) safeguards. Russia and China have also signed a contract for nuclear fuel supplies and the technology transfers associated with the VVER-1000 reactors being built at the Lianyungang nuclear power plant.

Interfax (Moscow); in FBIS-SOV-98-098, 8 April 1998.

The Pentagon is trying to block the sale of a vacuum-induction melting furnace by the U.S. based Consarc Corp. to China's state-owned Shenyang Institute of Metals Research. Vacuum-induction melting furnaces can be used to miniaturize nuclear warheads. The Shenyang Institute of Metals Research is involved in the development of nuclear weapons and ballistic missiles in China and therefore is banned from receiving dual-use technologies under current U.S. law. Although the furnace was to be supplied under a World Bank effort to fund rare metals research in China, the Pentagon has cited national security reasons to try to block the sale. Another reason for preventing the sale has been China's refusal to allow post-shipment inspections of the furnace.

Barbara Opall, *Defense News*, 27 April-3 May 1998, pp. 1, 20.

The United States has lifted the ban on the export of some dual-use technologies to China. Exports have been liberalized and brought into line with the less stringent Wassenaar Arrangement on Export Controls. Even so, export license requests will be reviewed on a case-by-case basis. According to the Director of the Wisconsin Project on Proliferation, Gary Milhollin, exporters will now be able to apply to the Commerce Department for licenses to export to China dual-use items such as "lasers, vacuum furnaces, neutron generators, and high-speed oscilloscopes that can be used to improve the design of nuclear warheads."

Times of India, [Online] http:/www.timesofindia.com, 6 May 1998.

On 17 June 1998, China announced that new regulations aimed at strictly controlling exports of nuclear-related technology and products are effective immediately. The new law requires export agents to apply for permits every time they plan to export nuclear equipment, materials, or technology specifically listed in the regulations. Agents must apply for permits whether the exports are considered trade, gifts, exhibitions, technology cooperation or aid programs. Permits will be granted only if: (1) receivers promise not to use the items or technology to build bombs, (2) exports will only be used for nuclear facilities operating under international safeguards, and (3) exports will not be transferred to third parties without the Chinese government's consent. The Ministry of Foreign Trade and Economic Cooperation, the China Atomic Energy Authority, and the Foreign Ministry will review the applications. Permits will be granted within a 45-day period, unless it is a major transaction, which will require the approval of the State Council. Violators of the new regulations will face criminal prosecution. The announcement follows U.S. criticism of suspected nuclear technology transfers from China.

South China Morning Post, 18 June 1998; in Inquisit, [Online] http://www.inquisit.com/, 18 June 1998.

Missile

Acting U.S. Undersecretary of State for Arms Control and International Security John Holum, told reporters in Beijing that while the United States believes that China was honoring its pledge not to help Iran build nuclear weapons, it remains concerned over Chinese missile sales to Iran. In addition to discussing the proliferation of chemical weapons and missiles, Holum also discussed the possibility of increasing China's quota of U.S. commercial satellite launches.

Reuters; in *Inside China Today*, [Online] http// www.insidechina.com/, 27 March 1998. AFP, 26 March 1998.

U.S. intelligence officials believe that China is developing a new short-range missile called the CSSX-7. The CSSX-7 will have a range greater than 185 miles.

Bill Gertz, *Washington Times*, 27 March 1998, p. 10.

According to the Belarus House of Representatives National Security Committee Chairman Uladzimir Yahoraw, Belarus and China have signed a number of agreements on military-technical and military-scientific cooperation since 1995. Belarus will continue to provide China with "Minsk-made wheeled tractors, which can be used as strategic missile carriers." China, however, is planning to produce its own tractors.

Minsk Belapan; in FBIS-TAC-98-090, 31 March 1998.

Two U.S. companies, Hughes Electronics and Loral Space and Communications, are under investigation by the U.S. Justice Department to determine whether they transferred sensitive missile-related technology to China. On 15 February 1996, a Chinese rocket carrying a $200 million Loral satellite exploded within seconds after launch. In the aftermath of the explosion, Loral Space and Communications and Hughes Electronics participated in an independent study to determine the cause of the rocket launch failure. The cause of the accident was traced to an electrical flaw in the electronic flight-control system. According to a classified Pentagon report, however, scientists from the companies also shared sensitive rocket guidance-related information that significantly helped improve the reliability of China's nuclear ballistic missiles. The report concludes that the "U.S.'s national security has been harmed."

A new report issued by the Defense Technology Security Administration (DTSA) on 16 May 1997, outlines more precisely some of the details of the damage and violations done by Loral Space and Communications and Hughes Electronics when they helped China find the cause of a failed rocket launch in February 1996. The 20-page DTSA report states that "there were three major breaches," which the Pentagon would have stopped had "military authorities been given the opportunity to screen the material before it was given to the Chinese." Three medium violations are also mentioned. One significant breach was that the companies volunteered alternative causes for the accident, which the Chinese did not arrive at on their own. China was also advised to use diagnostic techniques to detect flaws in its rocket guidance systems. Thus Chinese engineers will now be able to detect flaws in the guidance systems of nuclear missiles as well. The report argues that "the significant benefits derived by China from these activities are likely to lead to improvements in the overall reliability of their space launch vehicles and ballistic missiles, and in particular, their guidance systems." These violations would not have occurred had the State Department been involved in the overall review process. When the State Department learned of the nature of the information shared with the Chinese it immediately requested four federal agencies with expertise in rocket tech-

nology to review the security implications of the exchange. CIA director George Tenet has also ordered his agency to reassess the impact of the information exchange with China on U.S. national security.

The Pentagon and the U.S. Central Intelligence Agency (CIA) differ in their analyses as to whether an American technical report about a 1996 Chinese rocket failure raises proliferation concerns. The CIA, basing its analysis on the original report submitted by the Loral-led panel and another report put together by its attorneys, concluded that the company had made "a concerted effort" to avoid providing space or missile related technologies to the Chinese during the review. In contrast, the Pentagon concluded that Loral provided China with significant information in areas of "guidance system problems." This information, it is believed, has been used by China to improve guidance systems on its ballistic missiles.

Loral Space and Communications has denied that it divulged sensitive guidance information that may have helped China improve the reliability of its nuclear-armed ballistic missiles.

Jeff Gerth and Raymond Bonner, *New York Times*, 4 April 1998, p. 1. Jeff Gerth, *New York Times*, 13 April 1998, p. 1. Walter Pincus, *Washington Post*, 7 June 1998, p. 6. Eric Schmitt, *New York Times*, 27 June 1998. Reuters; in *Inside China Today*, [Online] http://www.insidechina.com/, 15 April 1998.

China has informally linked its accession to the Missile Technology Control Regime (MTCR) with curtailments in sales of U.S. weapons and ballistic missile defense technology to Taiwan. Under the U.S.-Taiwan Anti-Ballistic Missile Defense Cooperation Act, the U.S. Secretary of Defense has to decide by July 1998 whether ballistic missile defense systems should be transferred to Taiwan. As a Chinese government official put it, "we expect any nonproliferation agreement on our side to be accompanied by the basic acknowledgement that U.S. arms sales to Taiwan are a dangerous form of proliferation." China is abiding by its 1994 MTCR commitment not to supply whole missile systems abroad. But it seems to have circumvented that commitment by continuing to sell components for missile systems to Iran and Pakistan. On 6 May 1998, the U.S. Undersecretary of State for Nonproliferation, Robert Einhorn, and the Chinese Vice Foreign Minister, Zhang Deguang, concluded a memorandum of understanding on visits and exchanges of information pertaining to U.S. transfers of nuclear technology to China. But China has rejected a U.S. proposal to allow the U.S. government "pre-license" and "post-shipment" inspections of all dual-use technologies exported to China.

Barbara Opall, *Defense News*, 18-24 May 1998, p. 8.

In 1996, the U.S. Department of Justice launched a criminal investigation to determine whether China diverted dual-use aircraft manufacturing equipment from a civilian to a military plant. In 1993, China purchased 19 computer-controlled machines from the U.S. aircraft manufacturer McDonnell Douglas. The machines, which are between nine and 26 years old, were used to sculpt metal parts for the B-1 bomber and the C-17 transport aircraft. China assured the U.S. Department of Commerce that the dual-use machines would be used to build commercial jetliners. But six of the 19 machines were diverted to the Nanchang Aircraft Co., which manufactures Silkworm cruise missiles. Officials from McDonnell Douglas reported the diversion to the U.S. Department of Commerce, which in turn raised the matter with the Chinese. Since then the machines have been transferred from the Nanchang plant to Shanghai. Officials from the Pentagon's Defense Technology Security Administration (DTSA) believe, however, that China never intended to use the machines for building commercial jet liners and that McDonnell Douglas willfully turned a blind eye to the prospects of diversion. These charges have been denied by Boeing, which recently acquired McDonnell Douglas.

John Mintz, *Washington Post*, 7 June 1998, p. 6.

The United States dropped plans to persuade China to join the MTCR during President Clinton's summit meeting with Chinese leaders in June 1998. In April 1998, U.S. Undersecretary of State for Nonproliferation John Holum offered China financial incentives in return for joining the MTCR. However, according to a Clinton administration official speaking on conditions of anonymity, "their answer has been a flat no." The CIA believes that although China has not exported complete missile systems during the last three years, it has continued to assist Pakistan and Iran in the development of ballistic missiles. In particular, China supplied both countries with solid-fuel and improved guidance system technologies for building ballistic missiles. Intelligence officials now speculate that nuclear developments in South Asia might tempt China to help Pakistan with its ballistic missile program.

Richard Parker, *Philadelphia Inquirer*, 11 June 1998, p. 2.

INDIA

Nuclear

Atal Behari Vajpayee, leader of the Bharatiya Janata Party (BJP), was sworn in as prime minister of India on 19 March 1998. The new government has said that it will "review the country's nuclear policy and induct nuclear weapons into its military arsenal." The BJP has always wanted to declare India as a nuclear state. On 23 February 1998, a senior advisor to the Indian government Abdul Kalam spoke on the ongoing Indian development programs for weapons of mass destruction (WMD). He said that India should use "the most up-to-date technologies, including nuclear ones, to strengthen the country's defense potential." In reference to Pakistan's suspected development of WMD, Kalam said that India "cannot allow our country to lag behind in scientific, experimental, and designing work for defense purposes."

John Burns, *New York Times*, [Online] http://www.nytimes.com, 19 March 1998. *Disarmament Diplomacy*, February 1998, p. 55. *The Hindu*, [Online] http://www.hinduonline.com, 27 March 1998, p. 13. *Indian Express*, [Online] http://www.expressindia.com, 19 March 1998.

Defence Minister George Fernandes said on 20 March 1998 that the government's decision to induct nuclear weapons into the military "has been kept on hold." He said that the government "did not say that [they] were going in for nuclear weapons." Fernandes stated that a strategic re-evaluation of India's security policy would be conducted by a revived national security council. "In light of that, we will decide on the nuclear option,"

said Fernandes.

The Hindu, 28 March 1998, p. 2.

In early April 1998, India's Center for Development of Advanced Computing unveiled its new indigenously developed supercomputer called the Param 10000. It is a 100 gigaflops machine. This technology would allow India to test nuclear weapons, "reliably and rapidly," without physically exploding them. The open-frame architecture of the Param 10000 allows it to "be scaled up to the rarefied world of teraflop computers," and to manage data from a network (a teraflop computer can do 10e12 floating-point operations per second, whereas a gigaflop computer can do 10e9 floating-point operations per second).

Pakistan Link, [Online] http://www.pakistanlink.com, 6 April 1998.

Officials from the U.S. Defense Department and the Indian Defence Ministry are meeting on 14-15 April 1998 in Washington D.C. to discuss the new BJP government's stance on nuclear weapons. Indian defense officials wish to reassure the United States, as well as the entire international community, that "the government intends no drastic change in India's nuclear policy." U.S. defense analysts believe that Pakistan's 6 April 1998 test firing of the Ghauri missile was "a warning shot aimed at Indian Prime Minister Atal Behari Vajpayee's government." U.S. defense officials believe that further deployment or acquisition of ballistic missiles by India or Pakistan would be destabilizing and undermine security in the region.

Defense News, 13-19 April 1998, p. 24.

Indian army chief Gen. V.P. Malik said on 20 April 1998 that the Indian military's main concern should be a strategic deterrent to counter the nuclear and missile challenges proposed by Pakistan. He said that "strength and vigilance alone will ensure [India's] defense and national security."

Indian Express, [Online] http://www.expressindia.com, 21 April 1998.

Defence Minister George Fernandes said during a TV broadcast on 4 May 1998 that China was India's greatest threat to national security. Fernandes said that China's navy is expanding fast and it "will be the biggest navy in this part of the world" and "will be getting into the Indian Ocean fairly soon." Fernandes said that China "has surrounded India with military installations and stockpiled nuclear weapons in Tibet." Fernandes accused China of entering a frontier area in the northeastern state of Arunachal Pradesh multiple times. Fernandes also said that China trained and equipped forces in neighboring Myanmar (also known as Burma). China said that the allegations were "unfounded and extremely irresponsible." Fernandes said that the strategic challenge presented by China is a challenge that can be met. He said that "India would exercise its nuclear option if the planned strategic review recommended it," and that if it became obvious that it was the time to exercise the nuclear option, "then [India] will do it." Fernandes also said that China was a greater threat than Pakistan and "any person who is concerned about India's security must agree with that fact." Since late 1997, China has expanded military airfields in Tibet in preparation for the new Russian-made Sukhoi combat aircraft. China has also created a "massive electronic surveillance establishment" in the Coco islands.

Indian Express, [Online] http://www.expressindia.com, 4 May 1998. *Times of India*, [Online] http://www.timesofindia.com, 4 May 1998.

India conducted three underground nuclear tests in the Pokhran desert on 11 May. Prime Minister Vajpayee announced that "the tests conducted today were with a fission device, a low yield device, and a thermonuclear device. The measured yields are in line with expected values. Measurements have also confirmed that there was no release of radioactivity into the atmosphere." Vajpayee said that the tests were "contained" explosions, just like the explosion in May 1974. U.S. officials said they were "stunned" by India's tests and are "huddling to assess what happened and what [they are] going to be able to do." Sanctions from the international community are expected to follow. Principal Secretary to the Prime Minister Brajesh Mishra said that "these tests have established that India has a proven capability for a weaponized nuclear program." The tests will help scientists design "nuclear weapons of different yields for different applications and for different delivery systems." A sound computer simulation capability, which might be supported by sub-critical experiments if necessary, is one project in which these tests will help Indian nuclear scientists. Vajpayee has said that India needs nuclear weapons to prevent the "military adventurism" of neighboring Pakistan. Senior Pakistani nuclear scientist Abdul Qadeer Khan said in early May 1998 that "Pakistan does not have nuclear weapons but has the capability to [make] them." He also said that once India exploded a nuclear device, "it's just a matter of a few weeks, a few days [before Pakistan can] put it together." Secretary Mishra said that India still supports "efforts to realize the goal of a truly comprehensive international arrangement which would prohibit underground nuclear testing of all weapons as well as related experiments described as sub-critical or hydronuclear."

Rediff on the Net, [Online] http://www.rediff.com, 11 May 1998. *ABC News*, [Online] http://www.abcnews.com, 11 May 1998. *CNN*, [Online] http://www.cnn.com, 11 May 1998. *The Hindu*, [Online] http://www.hinduonline.com, 12 May 1998, p. 1. *Washington Post*, [Online] http://www.washingtonpost.com, 11 May 1998. *Times of India*, [Online] http://www.timesofindia.com, 12 May 1998.

On 13 May, India exploded two additional nuclear devices at its test range in Pokhran. Official statements out of India indicate that it has completed its planned series of tests with its latest tests of two sub-kiloton, hydro-nuclear devices. These tests, like the previous three on 11 May, were fully contained and no radioactivity was released into the atmosphere. Defense experts said that the latest tests come as no surprise. Having conducted the first series of tests on 11 May, experts said, there would be no reason for India to abandon further testing until it had collected all necessary data. After the latest tests, the Indian government said that it "was deeply concerned about the nuclear environment in India's neighborhood" and that these tests "provided reassurance to the Indian citizens that national security was paramount, and would be promoted and protected at all costs." In an official statement given by the Indian government, the latest tests were said to have been conducted "to generate addi-

tional data for improved computer simulation of designs and for attaining the capability to carry out sub-critical experiments."

Rediff on the Net, [Online] http://www.rediff.com, 13 May 1998. *CNN*, [Online] http://cnn.com, 13 May 1998.

The Washington-based Institute for Science and International Security (ISIS) said that India has about 370 kg of weapons-grade plutonium, enough for about 74 nuclear weapons.

Reuters, 14 May 1998.

On 13 May 1998, the United States imposed far-reaching sanctions on India after it conducted a series of five nuclear explosions. The sanctions will cut off virtually all U.S. aid to India, halt U.S. loans, cause India's World Bank and IMF loans to be opposed, and restrict the export of supercomputers and other equipment that might have military applications.

Dawn, [Online] http://dawn.com, 14 May 1998.

A senior official from Russia's atomic energy complex reported that India's recent nuclear tests could "complicate" Moscow-New Delhi negotiations on the nuclear power plant Russia was to build in India. The official also reported that Russia and India were close to signing a contract on a project involving two light water reactors of the VVER-1000 type, but no agreement was finalized due to financial problems. Former Russian Atomic Energy Minister Viktor Mikhailov said that Russia should begin construction on India's nuclear power plants despite India's nuclear tests.

Jamestown Monitor, 14 May 1998.

Although the fissile material that was used in India's nuclear tests has not been officially revealed, there is speculation that for one of its low-yield devices, India used a man-made variety of uranium for the first time. Natural occurring uranium comes in two forms: Uranium-238 and Uranium-235. India is believed to have used a third type of uranium, Uranium-233, which does not occur naturally and has to be artificially produced by transmuting uranium with thorium. India has the second largest reserves of thorium in the world and can extract thorium from Kerala's beach sands. Since 1988, India has been converting thorium into Uranium-233 and stockpiling it. The Kamini reactor at Kalpakkam is the only reactor operating in the world which is fueled by Uranium-233.

Indian Express, [Online] http://www.expressindia.com, 14 May 1998.

Prime Minister Vajpayee announced on 15 May that India was now a "nuclear weapon state" and that it "would not hesitate to use the bomb if attacked." Vajpayee said that India now has "the capacity for a big bomb," as well as the necessary command-and-control system. Although Vajpayee said that India would not use its nuclear weapons to attack other countries, he also vowed "not [to] hesitate in using them for defense."

AFP, 15 May 1998.

A.P.J. Adbul Kalam, scientific advisor to the defense minister, said that India has become a nuclear weapon state. The announcement was made at a press conference on 18 May. Kalam was accompanied by the Chairman of the Atomic Energy Commission, Dr. R. Chidambaram, and scientists Dr. K. Santhanam of the Defence Research and Development Organization (DRDO) and Dr. Anil Kakodkar of the Bhabha Atomic Research Center (BARC). Santhanam and Kakodkar are the co-directors of the Shakti-98, the codename of India's weaponization program, which culminated with the 11 and 13 May tests. Kalam said that the command and control structure, which has existed for several years, has been "consolidated." One of the devices tested on 11 May was a 43 kiloton (kt) thermonuclear device with a fission trigger and a secondary fusion stage, not a boosted fission device as was first speculated. The fission device tested had a yield of 12 kt and the low-yield device a 0.2 kt yield. The sub-kiloton devices exploded on 13 May had a yield from 0.2 kt to 0.6 kt. In an interview, Chidambaram explained in detail the steps leading up to the 11 May test, as well as details about the test itself. Chidambaram said the Atomic Energy Commission was cleared by the government to test around 10 April, at which time the air force and army began preparations. An hour-and-a-half before the tests, an army team went to the nearby Khelotai village, 35 km from the testing site at Pokhran. The tests were originally planned for the morning, but were put off until the wind direction changed to the northeast. The control room was located 3.5 km away from the testing site and one trigger detonated all three devices.

The Hindu, [Online] http://www.hinduonline.com, 18 May 1998, p. 1. *Times of India*, [Online] http://www.timesofindia.com, 19 May 1998.

Defence Minister George Fernandes said on 18 May that India is "a nuclear weapons state and the international community should address [it] on those terms." He said that existing nuclear treaties, such as the NPT, were discriminatory, which doesn't recognize nuclear states after 1967, and promoted nuclear hegemony by the five nuclear weapons states. Fernandes also said that he never described China as "India's greatest enemy," rather that "in terms of threat perception, China ranked highest."

Times of India, [Online] http://www.timesofindia.com, 19 May 1998.

Prime Minister Atal Behari Vajpayee told Russian President Boris Yeltsin, during a telephone conversation, that India would refrain from conducting further nuclear tests. Vajpayee also informed Yeltsin that India would negotiate a treaty concerning a complete nuclear test ban. Yeltsin said that Russia and India will continue to maintain "a long-standing, close-knit and friendly relation" and that he (Yeltsin) would visit India later in 1998.

RIA-Novosti, Issue 023, [Online] http://www.ria-novosti.com, 22 May 1998.

U.S. officials acknowledged that the United States' failure to anticipate India's nuclear tests was a group effort that includes senior policymakers, diplomats, and intelligence officials. However, some U.S. officials believe that spy satellite photographs that were shown to India in 1995 by Frank Wisner, Jr., then U.S. ambassador to India, revealed how the United States had spied on its test site. Officials said these photographs enabled the Indians to conceal their preparations, for example, "by burying the cables and wires running into the shaft where they conducted the tests."

New York Times, 25 May 1998, p. 3.

Peter Zimmerman, a U.S. nuclear physicist and arms control expert, reported that some of India's nuclear tests might be only "press release tests." Zimmerman said "there was an inconsistency between Indian claims and what scientists had detected outside." India's first round of tests was conducted on 11 May; the Indians claimed that they were able to explode a hydrogen bomb that only produced a yield of 43 kt. If the Indian claims were correct, Zimmerman said, this would be a strong indicator that the device is small enough to mount on a ballistic missile. India's second round of tests conducted on 13 May is still a "puzzle" to Zimmerman. Indian scientists said that the tests were "low yield," which allowed them to acquire enough data to perform computer simulations of nuclear explosions. Zimmerman said that the tests must have been "very low yield, indeed" because the seismic record indicated that no tests were conducted that day. Zimmerman also said, "it is conceivable that the tests occurred only as a press release and not in the field." India reported that its low-yield tests had been conducted in a sand dune. Zimmerman said that a sand dune is porous and would not retain the radioactive gases produced in the explosion. If India did conduct its test in a sand dune, Zimmerman said that India thwarted its responsibility not to vent radioactive debris into the atmosphere.

Dawn, [Online] http://www.dawn.com, 26 May 1998.

Defence Minister George Fernandes said that India's decision to implement a unilateral moratorium on nuclear tests will not affect the weaponization process. Fernandes also said, "without weaponization this whole question of being a nuclear weapons state does not make any sense." In addition, Fernandes said that nuclear weaponization is inevitable.

Indian Express, [Online] http://www.expressindia.com, 26 May 1998.

On 26 May, the Clinton administration persuaded the World Bank to "indefinitely delay" a $865 million loan to India. Japan, which is the second largest contributor to the World Bank, also sought a delay. However, unidentified officials said that most European nations, including Britain, opposed economic sanctions and said sanctions would not deter India from turning its nuclear capability into weapons. The United States has also "cut off bilateral aid to India, including trade credits, private U.S. bank loans to the Indian government, and loan guarantees to U.S. companies doing business there."

David E. Sanger, *New York Times*, [Online] http://www.nytimes.com, 27 May 1998.

Prime Minister Atal Behari Vajpayee submitted to India's Parliament a policy paper that would revise India's developing nuclear doctrine. Vajpayee stated that India would not initiate a nuclear preemptive strike against Pakistan and instead would discuss a "no-first-use" bilateral agreement. Mohan Guruswamy, a national security advisor to Vajpayee's Bharatiya Janata Party (BJP), said "the latest offer was specifically intended to allay Pakistani insecurity and rebuild bilateral confidence that was shattered by the tests."

Washington Post, 28 May 1998.

The G-8 states, a group of the most economically developed countries, agreed on 12 June to block new international loans to India and Pakistan because of the two countries' nuclear tests. Foreign ministers of the G-8 said that they would be "seeking a moratorium on loans, except those needed for humanitarian purposes." In addition, the G-8 "demanded" that both countries cease nuclear testing and sign the Comprehensive Test Ban Treaty. The ministers also said that the two countries should conduct talks on "all issues which divide them, including Kashmir."

BT Online, [Online] http://www.asia1.com, 13 June 1998.

Russian Atomic Energy Minister Yevgeni Adamov and Indian Atomic Energy Commission Chairman R. Chidambaram signed an agreement on 21 June that would provide India with two nuclear power reactors. Under the $2.6 billion agreement, Russia will build two VVER-1000 light water reactors at Koodankulam. The Koodankulam power plants will be placed under International Atomic Energy Agency (IAEA) safeguards. However, the safeguards will be "facility specific" rather than "full-scope," meaning the safeguards will not cover India's entire nuclear program. The U.S. administration opposed the project and said that Russia is violating its international commitment to insist on fullscope safeguards on its nuclear exports to non-nuclear weapon states. Russia said that the deal did not apply to nuclear agreements negotiated prior to 1992. Negotiations over the nuclear power plants began in 1979 and were finalized in November 1988 by then Prime Minister Rajiv Gandhi and Soviet leader Mikhail Gorbachev.

Indian Express, [Online] http://www.expressindia.com, 21 June 1998.

Missile

India recently completed a successful test of a three-ton cryogenic rocket engine. This test comes after the test of a one-ton cryogenic engine completed in early 1997. The test was conducted at the Liquid Propulsion System Center of the Indian Space Research Organization (ISRO). The goal of India's space program is to develop an indigenous space launch capability. The program is divided into four stages, which are expected to result in the production of a giant Geostationary Satellite Launch Vehicle (GSLV) capable of launching a 2,500 kg satellite. The cryogenic engine burns liquid oxygen and liquid hydrogen and will be used for the GSLV. The cryogenic engine is currently the most efficient rocket engine available and produces the highest thrust per kilogram of propellant of any engine. Constrained by the restrictions of the Missile Technology Control Regime (MTCR), India has had to build its own cryogenic engine after being denied Russian technological assistance.

All India Radio General Overseas Service (Delhi), 7 March 1998; in FBIS-NES-98-066, 7 March 1998.

Defence Minister George Fernandes said that India was not worried about Pakistan's testing of the medium-range Ghauri ballistic missile. Fernandes said that "the [Indian] Prithvi [short-range] missile is there; we have it in adequate numbers. We are capable of taking care of our threat perceptions vis-à-vis Pakistan." Fernandes also said that India ruled

out further testing of the Agni [intermediate-range] missile and "that it has undergone all the tests it needed to."

Times Of India, [Online] http://www.timesofindia.com, 10 April 1998.

Secretary of the All India Congress Committee (AICC), retired Major Sudhir Sawant, said if India wants to become a credible nuclear power, it still needs to develop a second-strike capability and an inter-continental ballistic missile system. Sawant reported that the second-strike capability would only be possible through a submarine-launched system. Sawant also reported that India did not have this capability because the Sagarika, India's submarine-launched missile system, is still in the developmental stage.

Indian Express, [Online] http://www.expressindia.com, 21 April 1998.

V.K. Saraswat, director of Indian air defense, reported that India could destroy any possible threat posed by Pakistan. He said that India's missiles could easily reach Karachi and other strategically important places located on Pakistan's coast. Saraswat also reported that India would not further develop inter-continental missiles. However, different models of existing missiles would be developed, "enhancing their capacity up to 5,000 km."

Times Of India, [Online] http://www.timesofindia.com, 22 April 1998.

Senior Clinton administration officials reported that Russia is aiding India in its development of a sea-launched ballistic missile named Sagarika. Officials also reported that the Sagarika has a range of 200 miles, is capable of carrying a nuclear warhead, and will be launched from a submerged submarine. In the U.S. State Department, the Pentagon, and the Central Intelligence Agency, officials are divided about whether Russia's assistance violates the MTCR. If Russia violated the MTCR, the United States could place sanctions on both India and Russia. A senior Defense Department official said "even if Russian help did not violate the regime, the cooperation has still raised concerns that India is close to mastering technology that would significantly improve its arsenal of missiles."

New York Times, [Online] http://www.nyt.com, 27 April 1998.

On 28 April, Russia denied allegations that it was assisting India in building a sea-launched ballistic missile capable of carrying a nuclear warhead. A Russian Foreign Ministry spokesman said "there has been no cooperation between Russia and India in creating missile systems." Yevgeny Anayev, director-general of Russia's state-owned arms exporting company Rosvoorouzhenie, said that his company "is involved in all projects of military-technical co-operation with India." Anayev said that India's missile program is closed to Russia, and that he has never come across any information of assistance. He said further that it is Russia's policy not to supply "offensive weapons capable of destabilizing the regional balance in the Indian subcontinent."

Indian Express, [Online] http://www.expressindia.com, 29 April 1998.

India's Defence Research and Development Organization (DRDO) sources said on 3 May that "defense scientists have been given the green signal" to work on the second phase of the Agni intermediate-range ballistic missile. The present range of the Agni is 1,500 km, and the next phase will "modify the design to increase its range." DRDO officials said that the technology does not need to be tested, since the desired performance capabilities of the Agni have been established during the three test flights already conducted. DRDO scientists said that the next version of the Agni would have a "much higher range," but refused to give any more details. Indian Defence Ministry officials reported that despite pressure from the United States, India's intermediate-range ballistic missile (IRBM) projects were never "capped completely." An unnamed official also reported that "capping the missile program at this stage means creating a considerable technological gap, and India cannot afford to do that keeping in mind its war history." In addition, sources said that India is in the process of increasing the range of the Agni intermediate-range ballistic missile from 1,500 km to 2,500 km.

Indian Express, [Online] http://www.expressindia.com, 4 May 1998. *The Hindu*, [Online] http://www.hinduonline, 11 May 1998.

During the second phase of "strategic dialogue" between the United States and India, Foreign Secretary K. Raghunath met with U.S. National Security Advisor Sandy Berger, Assistant Secretary of State Strobe Talbott, Under Secretary for Political Affairs Thomas Pickering, director of the Arms Control and Disarmament Agency John Holum, and other scholars and specialists. Among other things, they discussed India's concerns over Chinese assistance in nuclear and missile technology to Pakistan.

Times of India, [Online] http://www.timesofindia.com, 5 May 1998.

An Indian Defense Ministry spokesman said that the multi-purpose short-range missile Trishul was test-fired by the Indian army to test its surface-to-surface capability. The Trishul has a range of 50 km and cannot carry nuclear weapons. It was launched from the Chandipur firing range on 11 May 1998.

Inquisit, [Online] http://www.inquisit.com, 11 May 1998.

Abdul Kalam, chief of DRDO, said that India is attempting to develop a long-range missile "that can be used as many as 100 times and is capable of carrying a nuclear warhead." Kalam also said that the reusable missile is a compilation of technologies from aircraft, cruise missiles, and remotely piloted vehicles. Kalam further added that the "dream missile" is in the "conceptual stage," and that DRDO will make a proposal to the Indian Defence Ministry for funding within the next three to five years. Kalam described characteristics of the missile, which include hypersonic speed and the ability to go undetected by radar due to the composite material it would be made of. Kalam also said the missile will "use a referential guidance system (RGS) to hit the target and return to base." Kalam, however, did not comment on how the RGS works. The missile will also use an air-breathing propulsion system called ramjet and scramjet engines "in which air sucked in during flight will be mixed with hydrogen and burned to produce a thrust pushing the missile to seven times the speed of sound (5,000 km/h)." Kalam reported that the ramjet engine is being used in India's Akash surface-to-air missile and

the scramjet engine was recently ignited at a defense laboratory in Hyderabad.

Inquisit, [Online] http://www.inquisit.com, 15 May 1998.

Representatives from the Russian Strategic Rocket Force's main headquarters said that it would take India several years to weaponize its nuclear arsenal. Unidentified sources in the Indian Defense Ministry reported that India has only five "operational-tactical" Prithvi missiles. The Prithvi is a surface-to-surface missile that has a range of 250 km.

RIA-Novosti, [Online] http://www.ria-novosti.com, 15 May 1998.

Trade sources reported that the U.S. Commerce Department gave a U.S. company, Viewlogic Systems Inc., authorization to export design software to Bharat Dynamic, an Indian company "notorious for rocket and missile production." This transaction occurred the same day that U.S. President Bill Clinton imposed sanctions on India for conducting two additional nuclear tests. The Wisconsin Project's *Risk Report* identified Bharat Dynamics as the leading manufacturer for India's Defence Research and Development Organization and the maker of India's Prithvi short-range ballistic missile. A U.S. commerce official reported that Bharat Dynamics does not appear on a "U.S. entity list of proliferators," therefore the transaction was allowed.

Inquisit, [Online] http://www.inquisit.com, 15 May 1998.

Indian defense experts said that India has the ability to arm its missiles with nuclear warheads. Rahul Roy-Chaudhury, a spokesman for India's Institute of Defense Studies and Analyses, said "Indian missiles have now become the ultimate weapons of deterrence." Indian officials reported that the data obtained from the nuclear tests provided India with the technology to design thermonuclear warheads for India's Agni and Prithvi missiles. Indian defense planners said that without a nuclear warhead the Agni had "limited strategic importance, but with a thermonuclear warhead it gave India credible deterrence against China."

Inquisit, [Online] http://www.inquisit.com, 16 May 1998.

A high-level Indian defense delegation led by Defence Secretary Ajit Kumar met with Russian counterparts on 20 June in Moscow to discuss military-technical cooperation. During the talks, Russia agreed to sell India six SA-12 Giant anti-tactical ballistic missile (ATBM) systems. The deal is being carried out under the existing long-term Indo-Russian defense cooperation program.

Pakistan Link, [Online] http://www.pakitstanlink.com, 20 June 1998.

INDONESIA

Nuclear

Indonesia's economic crisis has forced it to shelve plans to purchase floating pressurized heavy water reactors (PHWR) from Russia's Ministry of Atomic Energy (Minatom). Minatom had proposed to build barge-borne 35 megawatt electric (MWe) KLT-40C reactors to enable Indonesia to supply electricity to islands in its outlying eastern archipelago. The reactors, originally designed as propulsion units for the Soviet Navy by the OKBM engineering bureau, would be contained in ships and belong to Minatom. Under the proposal, the spent fuel would be repatriated to Russia and the ships containing the reactors would also return to Russia for refueling. Western and International Monetary Fund officials believe, however, that the project is unlikely to succeed because of its poor economics. Indonesia is more likely to tap natural gas fields in its territorial waters and international waters around Thailand and Malaysia to meet its energy needs.

Nucleonics Week, 9 April 1998, p. 5.

JAPAN

Nuclear

Japan and Russia are exploring the prospects of joint cooperation in the peaceful use of atomic energy. Proposals under consideration include the use of fissile material from Russia's dismantled nuclear warheads and the construction of nuclear power reactors incorporating the latest technology.

Vladimir Andrianov, RIA-Novosti, [Online] http://www.ria-novosti.com/, 10 March 1998.

Japan's Power Reactor and Nuclear Fuel Development Corp. (PNC) will be restructured due to accidents and attempted coverups at its nuclear facilities. The reorganization is expected to take place around 1 October 1998. PNC is owned by the government and reports to the Science and Technology Agency (STA). Part of the reorganization will include the shutting down of the Fugen ATR reactor in March 2003. The 100 MW reactor at Joyo will continue to operate once modification and inspection have been completed. The light water reactor (LWR) fuel processing plant at Tokai is expected to continue operation until March 1999. It was shut down after a fire in the bitumen plant in March 1997. The uranium enrichment plant at Ningyo Toge will be restarted and run for an additional three years. It will use reprocessed uranium from PNC's Tokai plant. The new organization will likely build a second underground laboratory at the PNC Geoscience Center at Tono in addition to the one that will be built to study conditions in a rock formation suitable for a hot light-water (HLW) repository. Under the reorganization plan, all of the PNC's uranium exploration projects will be sold off.

Nuclear Engineering International, May 1998, p. 19.

Japanese police raided Ryokosha Co. for exporting restricted "high-precision equipment that could be used in the manufacture of nuclear weapons," to China. The firm admitted the machines exported were able to measure microns in the production of nuclear weapons. The firm sold 18 precision machines to China in December 1996 with a fake export request indicating that the shipment was destined for South Korea.

AFP; in *Hong Kong Standard*, [Online] http://www.hkstandard.com, 28 May 1998.

Missile

The U.S. defense department believes that North Korea has developed and deployed at least one Nodong medium-range ballistic missile. The missile has an estimated range of 1,000 km and the potential to reach most of Japan within 10 minutes. The United States believes that the Nodong's accuracy is low. Defense officials in Tokyo have stated, however, that they do not have enough evidence to agree

with the U.S. Department of Defense. The United States has proposed that Japan upgrade its Theater Missile Defense system from the PAC-2 Patriot missiles to a larger system capable of responding to a possible Nodong threat.

Akinori Uchida, *Daily Yomiuri*, [Online] http://www.yomiuri.co.jp, 11 April 1998.

KAZAKHSTAN

Nuclear

Eleven electric utility companies, including the Japan Atomic Power Co. (JAPCI), will undertake joint research in commercializing a fast breeder reactor (FBR) in Kazakhstan. The three-year project will begin in 1998. Since Kazakhstan is one of the few countries taking the FBR route, Japan has decided to establish a cooperative relationship between the two countries to share their researchers and facilities. Japan is expected to spend approximately ¥500 million to send its researchers to Kazakhstan. Although Japan has made some headway in FBR technology, it hopes to collaborate in the areas of safety and economy of the reactor core technology by jointly investigating fuel changes during an accident. Japan's plans to commercialize an FBR by the year 2030 have been setback because of a sodium leak in the Monju prototype reactor.

Nikkei Sangyo Shimbun; in FBIS-EAS-98-092, 2 April 1998.

Foreign Minister Kasymzhomart Tokayev has denied allegations published in the *Jerusalem Post* on 9 April 1998 and 10 April 1998 that Kazakhstan may have transferred four nuclear warheads to Iran. According to the *Jerusalem Post*, classified Iranian government documents indicate that in 1991, Iran received several nuclear warheads from a former Soviet republic, presumably Kazakhstan. The warheads were reportedly serviced by Russian nuclear experts. Foreign Minister Tokayev claimed that "Kazakh-Iranian cooperation is economic by nature" and questioned the basis for the recent allegations.

Interfax (Almaty), 15 April 1998.

At an 18 March 1998 news conference in Almaty, Timur Zhantikin, director of the Kazakhstani Agency for Atomic Energy, said that the decision to build the South Kazakhstan Nuclear Power Plant has been finalized. All documents concerning its feasibility have been submitted to the government for final approval. The plant will house six VVER-640 reactors, planned to be completed by 2030.

Revmira Voshchenko, RIA-Novosti HotLine, Russian Dailies, Issue 066, 18 March 1998.

KOREAN PENINSULA ENERGY DEVELOPMENT ORGANIZATION (KEDO)

ABB-Combustion Engineering (ABB-CE) has withdrawn an application to the U.S. Nuclear Regulatory Commission (NRC) to export two nuclear reactors to North Korea. The application was withdrawn after critics demanded a public hearing on the issue. NRC officials said that reactor sales to North Korea can only be approved if the two countries have a nuclear cooperation agreement. North Korea's nuclear materials also need to be fully accounted for before a nuclear cooperation agreement can be reached. But under the terms of the 1994 U.S.-North Korea Agreed Framework, a full inspection regime cannot be instituted before key reactor components have been delivered to North Korea. The IAEA is also concerned that so much time has elapsed since North Korea discharged the graphite reactor fuel that the reactor's operating history cannot be reconstructed through normal means (by measuring isotopic ratios). According to a government affairs expert, however, NRC approvals can be bypassed and exports commenced by executive authorization under Section 126(b) of the U.S. Atomic Energy Act. North Korea has expressed unhappiness over continued U.S. economic sanctions and the slow pace of the light water reactor project. North Korea's Foreign Ministry issued a statement saying, "nobody can predict what will happen unless the United States seeks new practical measures and takes decisive action to implement its obligations."

Fresh Fuel, 2 March 1998, pp. 1-2. AP, 10 March 1998.

Western intelligence agencies are concerned that North Korea may still have a clandestine nuclear weapons program. Although IAEA Director General Mohamad El Baradei is confident that "a freeze is in place," Western officials and experts are not so sure. In the past, some U.S. government intelligence estimates about North Korea's nuclear weapons program have been proven wrong. The U.S. CIA "crucially underestimated" the capability of a refueling machine at the Yongbyon graphite reactor complex and hence "undershot" the amount of weapons-grade plutonium that could have been "unloaded" prior to 1994. Also, analysts at Lawrence Livermore National Laboratory misidentified a textile plant in North Korea as a spent-fuel reprocessing facility. Intelligence estimates now suggest that North Korea may have converted part of the plutonium separated at the reprocessing hot cells at Yongbyon into plutonium metal before the Agreed Framework was signed with the United States. North Korea may have hidden as much as eight to 10 kg of weapons-grade plutonium, enough for a single nuclear weapon. U.S. intelligence also believes that, before signing the Agreed Framework, North Korea tried to conduct diagnostic and other tests of equipment used in a nuclear device. North Korea is believed to have conducted several high-explosive tests at its Yongbyon complex. Unlike reactor operations and reprocessing activities that leave behind signatures, weaponization activities do not. Furthermore, given North Korea's labyrinth of underground tunnels and military complexes, doubts have been expressed about the IAEA's ability to detect a clandestine nuclear weapons program.

Mark Hibbs and Margaret L. Ryan, *Nucleonics Week*, 5 March 1998, p.12-13.

KEDO is in financial trouble, with debts from three years of operation totalling $47 million. The debts mainly stem from loans contracted to meet the cost of supplying 500,000 tons of heavy oil to North Korea annually. The United States initially estimated the cost of supplying oil to North Korea at about $45 million annually. The average annual cost, however, has exceeded $60 million. The U.S. Congress allocated $21 million for the operation in 1997. Although the European Union has agreed to contribute $20 million annually, the sum is not sufficient to pay off KEDO's accumu-

lated debt. The U.S. Congress has approved $10 million in Fiscal Year 1998 for settling the debt. But no other country has contributed additional money to pay KEDO's debt. Meanwhile, accumulating interest charges are worsening KEDO's financial position.

Choson Ilbo, 8 March 1998; in FBIS-EAS-98-068, 9 March 1998.

North Korea has refused to provide the operating records from its graphite reactor and nuclear fuel reprocessing operations to the IAEA. Access to these records is central to verifying North Korea's nuclear inventory statement under the safeguard agreement reached with the IAEA in 1992. North Korea contends that it is under no obligation to release the records. Its sole responsibility under the agreement is to assure the IAEA that its nuclear activities have been frozen. According to Kim Yong Gil, a diplomat at the North Korean mission to the United Nations in New York, the United States must now fulfill its part of the bargain and take "charge of the project" to build the two light-water reactors. Western officials believe, however, that the inability of the IAEA to verify North Korea's nuclear inventory constitutes the principal stumbling block in the path of a nuclear cooperation agreement between the United States and North Korea. In the absence of a nuclear cooperation agreement, U.S. companies such as ABB-CE will not be able to export nuclear reactors and equipment as planned by the KEDO. ABB-CE, which filed an export license request with the U.S. Nuclear Regulatory Commission in December 1997, withdrew it in January 1998. Experts believe that verification problems could delay the export of U.S.-origin nuclear reactors and related equipment by as many as five years.

Mark Hibbs, *Nucleonics Week*, 12 March 1998, p. 13.

In the original 1994 Agreed Framework with North Korea, the U.S. government pledged that it would bear the entire cost for the heavy oil to be supplied to North Korea. Since then, however, the U.S. government has asked South Korea and Japan to share $20 million of the total cost of the heavy oil. According to a South Korean government official, both Minister Pak and Senior Secretary Yim have said that it will be difficult for them to accede to the U.S. request. The official also said that, "the intention of the U.S. government to shift onto the South Korean side the cost not only for the light-water reactors, but also for the heavy oil, on the pretext of the U.S. Congress denying the budget, is inappropriate."

Seoul Choson Ilbo; in FBIS-EAS-98-099, 9 April 1998. *Disarmament Diplomacy*, May 1998, p. 54.

According to North Korean officials, North Korea has suspended the freeze on its nuclear program because the United States has fallen behind on its end of the 1994 Agreed Framework. A member of the North Korean government told a visiting academic that the government plans to unseal one of the nuclear reactors and that technicians have been barred from packing the last of the reactor's spent fuel rods for shipment out of the country. On 13 May 1998, the United States said that the freeze on North Korea's nuclear program was still intact, but North Korea had temporarily suspended cleanup operations at its nuclear site in late April 1998. According to American academic Selig Harrison, he was told by North Korea's Foreign Minster Kim Yong-Nam that the Yongbyon nuclear reactor had been unsealed for maintenance on 19 April 1998. North Korea's Ambassador to China Chu Chang-jun said that his country's Soviet-era heavy water reactors were for electricity only, not for military use, plutonium, or for nuclear weapons.

Elisabeth Rosenthal, *New York Times*, 13 May 1998, p. A1. Justin Jim, Inquisit, [Online] http://www.inquisit.com/, 14 May 1998. *Inside China Today*, [Online] http://www.insidechina.com/ 15 May 1998. *NewsPage*, [Online] http://www.newspage.com/, 15 May 1998. *Hong Kong Standard*, [Online] http://www.hkstandard.com/, 15 May 1998.

According to U.S. State Department Spokesman James Rubin, the IAEA has confirmed that the seals remain in place on the Yongbyon nuclear reactor. Rubin also denied reports that the United States and KEDO are not meeting their obligations to deliver heavy fuel oil in accordance with the 1994 Agreed Framework. He stated that the United States and KEDO plan to fulfill their obligations. The spokesman for South Korea's Ministry of Foreign Affairs and Trade also said, "the maintenance of North Korea's nuclear freeze was confirmed through the IAEA."

NAPSNET, [Online] http://www.nautilus.org/, 14 May 1998. *Korean Overseas Information Service*, [Online] http://203.254.53.1/cgi-bin, 15 May 1998.

On 14 May 1998, North Korea's Ambassador to China Chu Chang Jun said that pressure was growing in his country to re-open the sealed Yongbyon nuclear power reactor. The reactor can produce plutonium that can be used to build nuclear weapons. U.S., South Korean, and Japanese experts believe, however, that North Korea's threats to reopen its nuclear weapons program are not credible, as it would be "too expensive and technologically complex."

Kevin Sullivan, *Washington Post*, [Online] http://www.washingtonpost.com/, 15 May 1998.

According to a report published in the *Nihon Keizai Shimbun*, a confidential study conducted by Japan's Defense Agency concludes that North Korea may have assembled a nuclear bomb. In the past, Japan has expressed concern that Pakistan may have transferred nuclear technology to North Korea. Japan's Defense Agency officials, however, have declined to comment on the report.

Sunday Times, [Online] http://www.Sunday-times.co.uk:80/, 4 June 1998.

According to the head of South Korea's Agency of National Security, Lee John Chan, contrary to media reports, North Korea is not trying to resume its nuclear weapons program. Furthermore, the IAEA is being allowed to supervise North Korea's adherence to the 1994 Agreed Framework.

F.J. Kergamvala, *The Hindu*, [Online]http://www.hinduonline.com, 9 June 1998.

On 28 July 1998, negotiators reached a tentative agreement on "cost-sharing arrangements for supplying two nuclear reactors to North Korea." The representatives of KEDO, the consortium responsible for building the reactors, did not specify how the $4.6 billion cost would be divided. South Korea, which originally agreed to pay 70 percent or $3.2 billion, had asked to pay a lesser amount due to the Asian financial crisis.

New York Times, 29 July 1998, p. 5.

NORTH KOREA

Missile

On 13 March 1998, U.S. and North Korean officials agreed to resume bilateral missile

talks. Negotiations were suspended after the United States granted asylum to North Korea's ambassador to Egypt Jang Sung Gil in August 1997. No specific date has been set for the resumption of negotiations.

Kyodo News, [Online] http://www.home.kyodo.co.jp, 14 March 1998.

According to Pentagon officials, North Korea has operationalized its intermediate-range Nodong ballistic missile. The Nodong was flight-tested once in 1993. In September 1997, the commander of the U.S. forces in the Pacific Admiral Joseph Prueher indicated that North Korea had begun positioning equipment for the eventual deployment of the Nodong. Pentagon sources believe that North Korea's missile force can be armed with chemical warheads, but there is uncertainty as to whether North Korea can produce biological warheads. North Korea is also believed to be working on two longer-range missiles, the Taepo-dong-1 and -2. However, no tests have been reported so far.

Bill Gertz, *Washington Times*, 10 June 1998, p. 9.

On 16 June 1998, North Korea declared that it would continue to develop, test, and export ballistic missiles. The official Korean Central News Agency said, "we will continue developing, testing and deploying missiles." Former U.S. ambassador to South Korea Donald Gregg met with officials of the North Korean delegation to the United Nations, and was told by the North Koreans that they were dissatisfied with the pace of oil deliveries from the United States. North Korea announced that "with missiles of the United States, which is at war with [North Korea] technically, aiming at our territory, we find no reason to refrain from developing and deploying missiles to counter them." It is also believed that North Korea is developing a longer-range missile than the Nodong-2 ballistic missile.

Kevin Sullivan, *Washington Post*, 17 June 1998, p. 1.

PAKISTAN

Nuclear

Foreign Minister Gohar Ayub Khan said that if India's Bharatiya Janata Party (BJP) pursues India's nuclear weapons option, as it had vowed during campaigning, "Pakistan would have to reconsider its nuclear policy." Khan said that while he hoped the BJP would not force Pakistan into an arms race and that diplomatic solutions could be found, Pakistan "would give a befitting and matching reply to any aggression from the Indian side." Khan said he would ask the new Indian government to resume talks between the two countries, planning also to continue to give "diplomatic and moral support to the people of Kashmir." Khan also expressed hope that the United Nations would help negotiate peace in Kashmir, saying that the "U.N.'s resolutions should not be selectively applied." Pakistan's top nuclear scientist, Dr. Abdul Qadeer Khan, said on 17 March that "Pakistan was capable of responding to any Indian threat in the nuclear field." Qadeer Khan said that Pakistan is "examining all aspects of the situation" after the rise of the BJP. He expressed no fear of India's missile program, saying that Pakistan's missiles could reach any part of India.

Dawn, [Online] http://dawn.com, 17 March 1998.
Dawn, [Online] http://dawn.com, 18 March 1998.

At a 9 April plenary meeting of the U.N.'s Conference on Disarmament, Pakistan's United Nations representative Khalid Aziz Banar proposed the establishment of a nuclear-weapon-free zone in South Asia. His country's proposal is part of a comprehensive approach to resolve the problems in the region, "including the resolution of disputes and the promotion of security." Bunar would like the assurances of nuclear weapon and non-nuclear weapon states alike to be "unconditional and legally binding."

Pakistan Link, [Online] http://www.pakistanlink.com, 11 April 1998.

Pakistan has successfully commissioned its first indigenously built nuclear reactor in Central Punjab. This reactor uses heavy water and will be used primarily for research purposes. It can generate electric power as well as convert Uranium-238 into Plutonium-239. Construction of the reactor began in 1985 under the supervision of Pakistan Atomic Energy Commission (PAEC) Chairman Munir Ahmed Khan. Prime Minister Nawaz Sharif said that Pakistan has now become self-reliant in the defense sector and no longer needs foreign assistance.

The Nation (Lahore), [Online] http://www.nation.con.pk, 13 April 1998.

Dr. Abdul Qadeer Khan announced on 14 April during a national news broadcast that "he needed only government permission to develop a nuclear bomb." When asked if Pakistan would detonate a nuclear explosion, he again answered that he would need only to "get permission from the government."

Dawn, [Online] http://dawn.com, 16 April 1998.
Pakistan Link, [Online] http://pakistanlink.com, 16 April 1998.

Unnamed private industry sources allege that Pakistan is making a new nuclear testing facility with the help of a U.S. firm called Holmes and Narver. The facility will be commissioned soon and will be labeled as a "Contained Firing Facility (CFF)." The design of the Pakistani CFF is similar to a facility at Lawrence Livermore National Laboratory (LLNL) in California. Construction will be supervised by "scientists of Pakistani origin who have worked in the seismic division at LLNL." The CFF is designed to withstand repetitive high explosive testing of the non-nuclear components of nuclear weapons. At the core is a firing chamber designed in a manner to "mask the blast overpressure and fragmentation effects from detonations of cased explosive charges up to about 100 kg." The firing chamber is fitted with various sensors at the diagnostic and optics ports, as well as a gamma-ray camera. The Pakistan Ordnance Factory has issued the specifications regarding the performance of the CFF. The detonations will be conducted above a steel firing surface 150 mm thick, which is embedded in the floor. The creation of such a facility indicates that Pakistan has "gone beyond the rudimentary air-dropped stage, to be able to plan the manufacture of much more highly developed munitions."

Indian Express, [Online] http://www.expressindia.com, 1 May 1998.

Prime Minister Nawaz Sharif said on 12 May, following India's underground nuclear test, that the government would take "any step necessary to protect the national secu-

rity" of Pakistan. Pakistani President Muhammad Rafiq Tarar said that Pakistan has the capability to counter India's threats. Tarar said "the proper reaction will come at some proper time." An unnamed senior government official said that Pakistan "can assemble various components lying at different places within seven days and carry out a nuclear test." Other unnamed sources said that "Pakistan had made some preparations for tests in Chagai Hills and could conceivably conduct a test within a couple of weeks."

The Nation (Lahore), [Online] http://www.nation.com.pk, 12 May 1998. *Indian Express*, [Online] http:/www.expressindia.com, 12 May 1998.

Foreign Minister Gohar Ayub Khan said on 17 May that "it's a matter of when, not if, Pakistan will test." He said the decision had already been made by the cabinet and "it will now be a political decision of when to test." The Pakistani newspaper *The Jang* reported on 17 May that preparations for a test at Chagai have been finished, and Pakistan "can test within three hours."

CNN, [Online] http://cnn.com, 17 May 1998.

The Clinton administration is discussing with members of the U.S. Congress their attempts to repeal the Pressler Amendment. The Pressler Amendment banned economic and military aid to Pakistan in 1990 because the United States suspected Pakistan of developing nuclear weapons. U.S. Congressman Frank Pallone said a direct outcome of the repeals "would be the delivery of 28 F-16 fighter-bombers to Pakistan, which was withheld eight years ago under the amendment." U.S. National Security Advisor Sandy Berger said "this is a bad policy. The repeal of the Pressler Amendment and the delivery of the F-16 fighters would only increase tension within the region."

Rediff On The Net, [Online] http://www.rediff.com, 20 May 1998.

Following high-level negotiations in Beijing between the Chinese and the Pakistani foreign ministries, Pakistani Foreign Minister Shamshad Ahmed announced that China would not impose economic sanctions on Pakistan if it decided to conduct a nuclear test. Ahmed hoped to obtain a guarantee of nuclear protection from China, however, no public promise was made. A senior researcher from a Chinese government research institute said, "China will not encourage Pakistan to conduct its own nuclear test, and China is not a country that provides nuclear umbrellas to other countries."

New York Times, [Online] http://www.nytimes.com, 21 May 1998.

U.S. Secretary of Defense William Cohen said that if Pakistan refrained from conducting a nuclear test, it would benefit from certain "incentives." Cohen did not say what the "incentives" were, but said the United States has presented Pakistan with "a whole series of proposals to deter it from exploding a nuclear device." In regard to Pakistan's already purchased F-16 fighter aircraft, Cohen said that there would not be a "quid pro quo," but "suggested that this could be part of an overall comprehensive package that would really establish a new relationship."

Dawn, [Online] http://www.dawn.com, 26 May 1998.

A Pakistani Foreign Ministry statement said on 28 May that it had received information that India was planning a preemptive attack against Pakistan's nuclear sites. The statement also said that India's High Commissioner was told that "any such act would warrant a swift and massive retaliation with unforeseen consequences." The Commissioner was told that an attack on Pakistan's nuclear facilities would be in violation of a 1988 agreement between the two countries, which prohibits an attack on each other's nuclear sites. Several Pakistani newspapers reported that Pakistan was ready to deploy its Ghauri intermediate-range ballistic missile in order to retaliate against any Indian strike. Pakistan's U.N. Ambassador Ahmad Kamal said that he had informed U.N. Secretary General Kofi Annan of the "imminent threat" of an attack. U.S. government spokesman Fred Eckhard said, "Annan has every hope that the information will prove to be incorrect." Unidentified diplomats said that U.S. officials believed that Pakistan's fear was "absurd" and that India was adhering to the 1988 agreement with Pakistan.

Reuters, [Online] http://www.dailynews.com, 28 May 1998.

Prime Minister Nawaz Sharif reported on 28 May that Pakistan had conducted five nuclear tests and had "settled the score with India." Sharif also reported that Pakistan would weaponize its Ghauri intermediate-range ballistic missile with nuclear warheads. In addition, Sharif criticized the international community's response to India's nuclear tests and said, "Pakistan was left with no choice but to detonate its own nuclear devices." Finally, while Pakistanis cheered in the streets of Islamabad, India's parliament erupted into shouting as opposition leaders blamed the government for starting a nuclear arms race.

New York Times, [Online] http://www.nytimes.com, 28 May 1998.

Pakistani scientists reported that radiation was not released into the atmosphere by the five nuclear detonations that took place on 28 May at a Pakistani nuclear test site. The scientists did not release any technical details but said, "the collective yield of all five tests were more than the 45 kt of the five Indian blasts conducted 5/11 and 5/13." *The News*, a local Pakistani newspaper, reported that the five nuclear devices were placed in shafts four days before the tests. The shafts were each 800 to 835 meters deep (2,640 to 2,755 feet).

The Nation (Lahore), [Online] http://www.nation.com, 29 May 1998.

The Russian Academy of Sciences' Geophysical Service reported on 28 May that a five kt explosion occurred in Pakistan, which registered 4.9 on the Richter scale. The service also reported that the magnitudes of both India's and Pakistan's blasts were equal.

Interfax (Moscow), 29 May 1998.

U.S. scientists reported that Pakistan's nuclear tests were detected by seismometers that track earthquakes and underground atomic tests. The preliminary magnitude was measured as 4.8 to 4.9 by two different groups, making its force equal to anywhere from 8,000 to 17,000 tons of high explosives. The scientists said that the signal detected could have been caused by several blasts occurring simultaneously or by a

single detonation. U.S. weapons experts reported that "the Pakistani test was most likely caused by one or more atom bombs, rather than a hydrogen one." Ray Kidder, a former atom bomb designer at the LLNL in California, said "there's no question that they have a weapon with a militarily important yield."

New York Times, [Online] http://www.nytimes.com, 29 May 1998.

Pakistani officials said that Pakistan's recent nuclear tests established their country as one of the world's nuclear powers. The officials also said that Pakistan would not use its nuclear weapons unless it was in response to an attack. Foreign Minister Gohar Ayub Khan said that "we have nuclear weapons, we are a nuclear power." He added that if India attacked, Pakistan would "retaliate with vengeance."

Washington Post, [Online] http://www.washingtonpost.com, 30 May 1998.

On 27 May 1998, Pakistan's Foreign Secretary Shamshad Ahmed informed the United States and the United Nations that Pakistan expected to be attacked on 28 May by Indian and Israeli warplanes flying from India. The Pakistani warning ignored U.S. statements that no Israeli aircraft were in India, and has led to speculation in the U.S. government that the rumor of the attack was fabricated by Pakistan to justify its underground nuclear tests. According to U.S. officials, reports of the anticipated attack produced panic among Chinese government officials. One U.S. intelligence official said there was a major concern that Pakistan would use the anticipated Indian-Israeli attack as a pretext for launching a Ghauri missile, possibly armed with a nuclear warhead, at India. On 1 June 1998, Israeli Prime Minister Benjamin Netanyahu's media advisor Shay Bazaq said in an interview that rumors that Israel was involved in a plan to attack Pakistan's nuclear facilities in the wake of India's May 1998 nuclear tests were "unfounded," and that Israel was in no way involved. On 30 May, the Indian charge d'affaires at the Indian Embassy in Cairo said that allegations of Israeli military aircraft landing in India in preparation for a joint Indian-Israeli attack on Pakistan's nuclear facilities were baseless, as were rumors of Indian-Israeli nuclear cooperation.

Jerusalem Channel 2 Television Network, 1 June 1998; in FBIS-TAC-98-152, 1 June 1998. MENA (Cairo), 30 May 1998; in FBIS-NES-98-151, 31 May 1998. *Ha'aretz* (Tel Aviv), 29 May 1998, p. A3; in FBIS-TAC-98-149, 29 May 1998. *Washington Times*, 1 June 1998, p. 10.

Dr. Samar Mobarik Mand, head of Pakistan's nuclear test program, said that Pakistan was able to test a thermonuclear device if the government gave the mandate to do so. Mand also said that it was important to have a fission test first, before a thermonuclear test. Since Pakistan conducted a successful fission test Mand said, "we can now proceed towards thermonuclear technology, if required." Mand reported that the accumulated yield of the five tests conducted on 28 May was 40 to 45 kt. Mand said that the test conducted on 30 May was only one device and its yield was 15 to 18 kt. He also said that the second test was of a miniaturized device that could be mounted on missiles.

The Nation (Lahore), [Online] http://www.nation.com, 1 June 1998.

A Pakistani senior government official assured all the major powers on 5 June that Pakistan would not transfer its nuclear technology to other countries. The official said that "Pakistan detonated nuclear devices only for its defense and it has no intention to transfer the technology to others." In June 1998, Israel's ambassadors to the United States and the United Nations received assurances from their Pakistani counterparts that Pakistan would not transfer nuclear technology or materials to Iran or to other Middle Eastern countries. Israeli officials had feared that Iranian Foreign Minister Kamal Harrazi's visit to Pakistan shortly after its May 1998 nuclear weapons tests was a sign that Pakistan was preparing to sell nuclear technology to Iran.

Israel Wire, [Online] http://www.israelwire.com, 11 June 1998. *Pakistan Link*, [Online] http://www.pakistanlink.com, 5 June 1998.

U.S. Under Secretary of State Stuart Eizenstat told a congressional hearing on 3 June that the Clinton administration did not want the sanctions imposed on Pakistan to be as strict as the ones imposed on India. Eizenstat said that the administration had not reached a decision on whether "the Glenn Amendment required imposition of identical sanctions against both countries or gave the President discretion to differentiate." Eizenstat said the administration wanted to impose sanctions but did not want to push India and Pakistan into "the behavior of rogue regimes."

Dawn, [Online] http://www.dawn.com, 5 June 1998.

U.S. intelligence officials were closely observing Pakistan's economy, fearing that economic sanctions might force the Pakistani government to sell its nuclear technology. A congressional aid said that "while it might not be Pakistani policy to proliferate, there might be an individual willing to do so." David Albright of the U.S.-based Institute for Science and International Security said that Pakistan had enough enriched uranium for 16 to 20 weapons. However, regional experts said that Pakistan would not be in a position to sell its fissile material, having depleted a large quantity of its stockpile in its recent tests.

Hong Kong Standard, [Online] http://www.hkstandard.com, 20 June 1998.

Paul Beaver, a spokesman for Jane's Information Group, reported that five senior Pakistani nuclear scientists had defected. Beaver said that Pakistan's Inter Services Intelligence Unit (ISI) tried to stop the scientists from fleeing but they escaped to various countries including the United Kingdom, France and Germany. Beaver also said that the scientists defected to the West "after a disagreement over the first use of nuclear weapons." The Pakistan government immediately dismissed the reports. The Pakistani foreign office said that "the reports were without foundation." Pakistan's Foreign Office also denied media reports that accused Pakistan of planning a pre-emptive strike against India before it conducted its nuclear tests.

Indian Express, [Online] http://www.expressindia.com, 30 June 1998.

Missile

Western diplomats and Pakistani intelligence sources announced that Pakistan is preparing to test-launch its new Ghauri surface-to-surface ballistic missile at the Gwadar Bay

base on the coast of the Arabian Sea. Intelligence sources said that Pakistan's original test launch had been cancelled due to diplomatic pressure from the United States and the United Kingdom. However, an unnamed source said, "there is no question of Pakistan backing down on the missile question. The test will go ahead whatever the cost for relations with the West."

Sunday Times, [Online] http://www.sundaytimes.com, 22 March 1998.

A Pakistani Foreign Ministry spokesman said Pakistan successfully test-launched the Ghauri medium-range surface-to-surface missile on 6 April. The Ghauri, with a range of 1,500 km and a payload of 700 kg, is capable of carrying a nuclear warhead. A Pakistani Foreign Office spokesman reported that the missile had hit its "target at a range of 1,100 km without any error." The Foreign Ministry also reported that "this test represents a step forward in Pakistan's indigenous missile capability through the dedication and commitment of our scientists and engineers." It would appear that "Pakistan has revived symbolically the regional rivalry between Hindu and Muslim," because the missile was named after an Afghan Muslim king who defeated a Hindu ruler in the 12th century. Pakistan said that development of the Ghauri was an entirely indigenous effort. Prime Minister Nawaz Sharif said, "our scientists, by their high sense of commitment and skill, have shown that Pakistan has mastered complex technologies.

Times Of India, [Online] http://www.timesofindia.com, 7 April 1998. Amit Baruah, *The Hindu*, [Online] http://www.hinduonline.com, 7 April 1998. *The Times*, [Online] http://www.sunday-times.co.uk, 7 April 1998.

China has denied providing any technical assistance to Pakistan in developing the Ghauri medium-range ballistic missile. Chinese Foreign Ministry spokesman Zhu Bangzao said, that "it would be unreasonable for the United States to investigate" the alleged development link.

Inquisit, [Online] http://www.inquisit.com, 7 April 1998.

India said that Pakistan's testing of the Ghauri, a new medium-range ballistic missile, was part of a "clandestinely" acquired missile program. India's Defence Minister George Fernandes claimed that China aided Pakistan with missile technology. Defense analyst K. Subrahmanyam agreed with Fernandes and stated that the Ghauri missile could either be Chinese or North Korean in origin. China's Foreign Ministry spokesman denied any technological role in Pakistan's test of the Ghauri. In addition, a spokesman for Pakistan's Foreign Office said that China's M-11 had "no relevance" to the Ghauri and that the Pakistanis developed the Ghauri indigenously.

The News Pakistan, [Online] http://www.jang-group.com, 8 April 1998. *The Nation* (Lahore), 8 April 1998.

U.S. government officials reported that Pakistan's new Ghauri medium-range ballistic missile was based on technology smuggled from North Korea. U.S. officials also reported that the liquid-fueled missile is a version of North Korea's Nodong. Malik Zahoor Ahmed, a spokesman at Pakistan's embassy, denied allegations that North Korea had aided Pakistan in the Ghauri's development and said it was built with indigenous technology.

New York Times, 11 April 1998.

Dr. Abdul Qadeer Khan said on 15 April that Pakistan is ready to launch its indigenous satellite "within no time" upon the orders of Prime Minister Nawaz Sharif. He said that Pakistan was equipped with all the necessary technology to launch its own satellite into space. Khan told reporters that the Ghauri was a completely indigenous ballistic missile completed at the Kahuta Research Laboratories, which is headed by Khan and primarily known for its nuclear research.

Indolink, [Online] http://www.indolink.com, 17 April 1998. *Pakistan Link*, [Online] http://www.pakistanlink.com, 17 April 1998.

Analysts believe that North Korea may be Pakistan's silent partner in the development of intermediate-range ballistic missiles. Pakistan tested its Ghauri intermediate-range ballistic missile (1,500 km range) on 6 April. North Korean and Pakistani cooperation in the development of ballistic missiles is supposed to have begun during the Iran-Iraq war when North Korea apparently supplied 160 Scud Mod B missiles (known as Hwasong-5 in North Korea) to Iran. North Korean and Pakistani missile engineers and experts worked together on Iran's ballistic missile program. North Korea sold drilling and milling equipment to Pakistan. The two countries also launched a clandestine program to procure nuclear and missile technologies from Germany. Pakistan is also suspected of having shared nuclear technology with North Korea. Cooperation was expanded in 1988 after Benazir Bhutto became prime minister of Pakistan. Benazir Bhutto is credited with the acceleration of missile cooperation with both China and North Korea. During her tenure as prime minister, Pakistani officials are alleged to have visited North Korea's Sanum-dong missile development center to appraise the Nodong ballistic missile. In July 1992, North Korea's Deputy Foreign Minister Kim Yong-nam visited Pakistan. High on the agenda was the sale of the Scud Mod C and the Nodong ballistic missiles to Pakistan. From 29-30 May 1993, Pakistani and Iranian missile specialists witnessed the firing of a Nodong and three Scud Mod B/C missiles in North Korea. Benazir Bhutto's subsequent visit in December 1993 to Pyongyang probably led to the inception of the Ghauri. North Korea supplied Pakistan with major components including fuel tanks and rocket engines for the Ghauri. According to intelligence sources, Chinese assistance has been indirect and mainly confined to areas of soft engineering such as guidance. It is also likely that North Korea served as a conduit for Chinese ballistic missile component transfers to Pakistan. On 24 April 1998, the U.S. State Department determined that missile-related transfers between North Korea's Changgwang Sinyong Corporation and Pakistan's Khan Research Laboratories had led to the development of the Ghauri and imposed sanctions on the two organizations.

Jane's Defence Weekly, 20 May 1998, pp. 16-17.

SOUTH KOREA

Nuclear

South Korea has decided to base its future nuclear power expansion plans on ABB-CE's licensed pressurized water reactors (PWR) instead of the pressurized heavy water reactors (PHWR) supplied by the

Atomic Energy of Canada Ltd. (AECL). This is evident from the data on nuclear fuel requirements compiled by Korea Electric Power Co. (KEPCO). According to KEPCO's projections, fuel requirements for AECL's PHWRs will peak at 400 metric tons of uranium in 2000 and then drop to 300 tons by 2015. In contrast, the demand for enriched uranium for the PWRs is expected to double by 2010 and increase another 20 percent by 2015. The decision to build more PWRs reflects the need to build more cost-efficient energy production units because of difficulties expected in the further licensing of reactor sites. The 1,000 MW and 1,300 MW PWRs are larger than the 700 MW PHWRs. As one South Korean official put it, "we want to make sure that we get as many megawatts per square meter installed at these sites as possible." South Korea is also trying to export its PWRs abroad to help alleviate its foreign exchange crisis. In contrast to ABB-CE, which has licensed its reactor design technology to South Korea, AECL has only contracted the construction of PHWRs to local equipment makers. According to a western diplomatic official, however, Canada could persuade South Korea to purchase more PHWRs under a package deal. The deal would involve a comprehensive licensing agreement for the PHWRs, pricing the PHWRs below the PWRs, and offering non-nuclear goods sought by South Korea. The U.S. State Department may also promote AECL's reactors, as it would like South Korean cooperation in the U.S. Department of Energy's Dupic fuel-cycle. Dupic has been proposed as an alternative to the reprocessing of spent fuel and is supported by the United States in principle.

Mark Hibbs, *Nucleonics Week,* 23 April 1998, pp. 16-17.

Missile

After a six-day visit to South Korea, Russia's First Deputy Defense Minister and State Secretary Nikolay Mikhaylov declared that there would be an expansion in "military relations between the ministries of defense and general staffs" of South Korea and Russia. Military cooperation between Russia and South Korea did not begin until 1994. It was partly forced by circumstances as Moscow used arms deliveries to settle the former Soviet Union's debt with Seoul. However, Russia is now trying to carve out a niche for itself in the lucrative South Korean arms market. South Korea has expressed interest in Sukhoi and MiG combat aircraft, the S-300 air-defense system, anti-ship cruise missiles, and surveillance satellites.

Sergey Golotyuk and Yuriy Golotyuk, *Russkiy Telegraf,* 3 June 1998.

TAIWAN

Nuclear

Taiwan's Institute of Nuclear Research (INER) has clarified that it will build a new light water research reactor at Lungtan, near Taipei. It will not convert the 40 MW (thermal) Canadian-supplied heavy water moderated reactor that was shut down after the U.S. alleged it was being used to develop nuclear weapons. Taiwan has already decommissioned and dismantled this reactor. The light water reactor will use low-enriched uranium (LEU) fuel and will run on low pressure. The entire project is expected to cost $100 million. According to INER officials, Taiwan is in no position to build nuclear weapons. The military that was responsible for the nuclear weapons drive during the 1960s and 1970s has been "kicked out" of INER. The military's exclusion was formally assured by an executive decree in 1988, after it tried to pursue the plutonium route to nuclear weapons.

Mark Hibbs, *Nuclear Fuel,* 23 March 1998, pp. 7-8.

The Dutch cabinet has agreed that Urenco, the international consortium based in Almelo, can supply two nuclear plants in Taiwan with LEU. Urenco's members include Germany, the United Kingdom, and the Netherlands. Negotiations are still under way between Taipower and Urenco over the exact conditions of the order. Urenco also recently signed a contract with a Chinese nuclear company. The economic and foreign ministers of the Netherlands said in a letter that the "transaction can only take place if there are sufficient guarantees that Taiwan will abide by the provisions of the so-called Non-Proliferation Treaty." Since most countries do not recognize Taiwan as a separate state, Taiwan is not a member of the treaty. The Netherlands also does not recognize Taiwan. Therefore, the transaction will be orchestrated through the United States and the IAEA. The United States is prepared to mediate the Urenco order and regular inspections will be carried out by the IAEA.

Rotterdam NRC Handelsblad; in FBIS-WEU-98-176, 25 June 1998.

Missile

The Chungshan Institute of Science and Technology (CITS) has modified the Tien-Kung surface-to-air missile and will test it in an anti-ballistic missile mode in May 1998. In January 1998, tests were completed for the target missile to be used in the test. According to a Taiwanese defense official, the key to developing a successful anti-ballistic missile defense lies in fielding several early warning radar installations with a range of about 1,000 km. The CITS has proposed that Taiwan acquire such radar systems. Taiwan's Ministry of National Defense, however, has not yet approved the plan. The CITS has also achieved a breakthrough in the development of supersonic cruise missiles. It has succeeded in using the Hsiung-feng anti-ship missile as a test-bed to integrate a ramjet engine with the rocket section of the missile. The development plan has been dubbed the "Chien-Tien Plan" and the new missile is called Hsiung-Feng-3. Taiwan recently tested the missile. However, it is too long to be deployed on fighter aircraft and warships. Taiwan hopes that the Hsiung Feng-3 will strengthen its defenses against China. The missile will be configured for aircraft launch. The CITS is also pushing for the development of short-range air-to-air missiles. The missiles to replace the Tien-Chien-1(Sky Sword) will become operational by the year 2010.

AFP; in FBIS-CHI-98-095, 5 April 1998. *Taipei Chung-Kuo Shih-Pao,* 25 February 1998, p. 1; in FBIS-CHI-98-060, 1 April 1998.

EUROPE

BELARUS

Nuclear

The "Law on Export Control," adopted in February 1998, is the new legal basis for

export controls in Belarus. Developed in cooperation with the United States and drawing on legislation adopted or pending in Poland, the Czech Republic, Germany, the United States, and Russia, the law is designed to fully conform to international requirements. The law stipulates export control objectives, principles, general rules and regulations, objects, authorities, and principles of interagency coordination, and provides for pre-license and post-shipment end-use checks, as well as civil and criminal penalties for violations. The legislation also requires the president and the Council of Ministers to adopt and publish lists of controlled items, which will be harmonized with international regimes. These lists are likely to be similar to Russian lists adopted in 1996, and will establish those countries to which exports of these items are prohibited. The government has also enacted an "Order on Improving Control Over Transfer of Specific Goods (Technologies and Services) Across the Customs Border," which includes new regulations on licensing and end-use checks.

Press Release of the Embassy of the Republic of Belarus to the United States of America, 26 February 1998. Andrei Makavchik, *The Monitor*, Fall 1997/Winter 1998, pp. 35-37.

Missile

Together with Russia, Ukraine, and Kazakhstan, the Belarusian military is realizing several programs to develop and manufacture modern space rocket systems, air-defense and anti-missile defense systems, elements for high-accuracy weapons, and unique optical equipment. One of Belarus' major customers is Moldova, to which it recently exported ammunition and Grad multiple launch rocket systems [NATO designation BM-21]. Belarus has also sent Peru several Tunguska 9M311 SAM systems [NATO designation SA-19 'Grison'] and 9M313 SAM systems [NATO designation 'Gauntlet'], both of which are capable of targeting low- and medium-altitude aircraft.

Yuriy Strigelskiy, *Belapan Military Review*, No. 11, 2-10 March 1998; in FBIS-UMA-98-069, 10 March 1998.

CYPRUS

Missile

On 27 March, Italian Ambassador to Cyprus Francesco Bascone announced Italy's decision to suspend further deliveries of Aspide surface-to-air (SAM) missiles to Cyprus.

I Simerini (Nicosia), 30 March 1998, p. 18; in FBIS-WEU-98-089, 30 March 1998.

On 7 April, Italian Deputy Foreign Minister Pierro Fassino denied reports that Italy had imposed a weapons embargo on Cyprus. He said implementation of the Aspide missile agreement was halted so the Italian government could examine whether delivering the missiles would contribute to further militarization of Cyprus. In response, Cyprus' Ministry of Defense initiated consultations with Russia for purchase of medium-range SAMs in the event Italy does not delivery the Aspides to the island.

Andhreas Skordhis, O Logos Television Network (Nicosia), 7 April 1998; in FBIS-WEU-98-097, 7 April 1998. Makarios Dhrousiotis, *Elevtherotipia* (Nicosia), 7 April 1998, p. 1; in FBIS-WEU-98-097, 7 April 1998.

An unidentified Russian diplomat said on 11 June that Russia would postpone delivery of its $436 million sale of S-300PMU-1 SAMs to Cyprus until late October or November 1998 for technical reasons.

Defense News, 15 June-21 June 1998, p. 2.

CZECH REPUBLIC

Nuclear

On 28 April, the Czech Supreme Court increased the sentences of three people convicted in September 1997 of smuggling 2.72 kg of highly enriched uranium from Belarus into the Czech Republic. The three were apprehended after the December 1994 seizure of the uranium in Prague. Former Czech Army officer Zdenek Cech, who was previously sentenced to 2.5 years by the Prague Municipal Court for his role in the smuggling case, had his sentence increased to nine years. Cech had previously been released on time served during the investigation and trial and will now presumably have to return to prison. Jiri Sindlauer, a Czech police official, had his sentence increased from 1.5 to three years, and Jaroslav Wagner, a nuclear physicist, had his sentence increased to nine years from eight. The court ruled that the evidence in the case justified the conviction of the three and the lengthening of their sentences.

CTK (Prague), 28 April 1998.

GEORGIA

Nuclear

In a secret operation code-named "Auburn Endeavor," the United States and Britain have collaborated to remove 8.8 pounds (4.0 kg) of highly enriched uranium (HEU) and 1.76 pounds (0.8 kg) of highly radioactive spent fuel from the research reactor at the Institute of Physics in Mtskheta, in the former Soviet republic of Georgia. The uranium and spent fuel will be transported to the Dounreay nuclear complex in Scotland, where the spent fuel will be reprocessed and the residual nuclear waste stored. The uranium was brought to the Mtskheta reactor during the Soviet era. The operation involves placing the HEU fuel into special drums and packing the highly radioactive spent fuel into a 40-ton cask. The United States has sent transport planes from Europe to Georgia with forklifts and other equipment to handle the materials. Georgia will receive $125,000 for the material, and the United States is expected to pay approximately $2 million in transport costs. Although operation "Auburn Endeavor" does not involve Russian assistance, Washington has informed Moscow of the plan. According to one senior Clinton administration official, "it [Auburn Endeavor] is a successful example of multilateral diplomacy to counter a proliferation threat."

Michael Gordon, *New York Times*, [Online] http://www.nytimes.com, 21 April 1998.

GERMANY

Nuclear

In its final report, issued 23 June, a German parliamentary committee concluded that there is no reason to believe that the German security service staged an August 1994 incident in which plutonium was smuggled on a commercial flight from Moscow and seized in a dramatic operation at the Munich airport. Following public outcry over the in-

cident, opposition politicians in the German parliament had charged that Bernd Schmidbauer, German Federal Chancellor Helmut Kohl's intelligence coordinator, had himself provided the plutonium to the alleged smugglers in order to boost Kohl's chances of winning the 1994 general election in Germany. Summarizing the results of its investigation, however, the committee said "the accusation of 'staging for political reasons' is not backed up by anything." The committee concluded that the plan for selling the plutonium was probably formulated by a man named "Fernandez," a Spaniard now in jail, who refused to testify before the committee. The committee did conclude, however, that Munich authorities had known of the plan to smuggle the plutonium to Germany in advance, and instead of attempting to secure the material in Moscow, had allowed it to be put on a commercial airline flight. Committee member Max Standler said that "this kind of plutonium transport entailed a high risk of damage, and should not be repeated." Kohl testified before the committee in November 1997 and denied that either he or Schmidbauer knew details of the operation in advance.

Reuters, 23 June 1998.

ITALY

Nuclear

A sting operation conducted by Italian paramilitary police has led to the seizure of a 10 kg uranium fuel rod and the arrest of 14 people implicated in a Mafia nuclear weapons ring. The uranium fuel rod is 70 centimeters long and contains 200 grams of Uranium-238 and 38 grams of Uranium-235, indicating an enrichment level of 20 percent. The rod was initially reported to have originated from the Soviet Union, but the stamped numbering on the outside of the bar indicates that it was in fact produced in the United States. According to environmental experts investigating the incident, it is one of nine uranium fuel rods produced by the U.S. company General Atomic in 1971 for use in the Triga II research reactor in Kinshasa, Zaire (now the Democratic Republic of Congo). Following a lead they had been given from an informant in a separate investigation, members of the Italian Finance Police's Central Investigating Service (SCICO) infiltrated a Mafia nuclear ring by posing as Italian businessmen representing an undisclosed Middle Eastern country. Members of the smuggling ring reportedly offered to sell components for eight nuclear missiles to the undercover agents for 200 billion lire. Instead, SCICO undercover agents offered to pay 23 billion lire for a total of nine uranium fuel rods, and the illicit deal was finally struck between an undercover agent and the uranium peddlers in a Rome cafe in February 1998. Italian Finance Guards then seized the uranium rod in a warehouse in Rome after an undercover agent posing as a nuclear scientist tested the radioactivity of the rod. Among those arrested were four Sicilians with ties to the Catania Gang in eastern Sicily and seven Romans with ties to the Magliana Gang, the Roman arm of the Cosa Nostra. Investigators say that Salvatore Tringale, an affiliate of the Santapaola clan, masterminded the plan. Two members of the nuclear smuggling ring were arrested as they were driving to a bank in Switzerland to collect the arranged payment. Italian police are currently searching for two additional suspects and the remaining eight uranium fuel rods. The Cosa Nostra reportedly obtained the uranium fuel rods after the ouster of President Mobutu from Zaire in May 1997, but investigators have yet to determine exactly how they were smuggled into Italy.

Bruce Johnston, *Sunday Telegraph*, [Online] http://www.telegraph.co.uk, 22 March 1998. *Corriere della Sera* (Milan), 21 March 1998; in FBIS-WEU-98-080, 21 March 1998. Rai Uno Television Network (Rome), 20 March 1998; in FBIS-WEU-98-079, 20 March 1998. Rai Uno Television Network (Rome), 20 March 1998; in FBIS-WEU-98-079, 20 March 1998. *Ansa* (Rome), 20 March 1998; in FBIS-WEU-98-079, 20 March 1998. *La Republica* (Rome), 21 March 1998; in FBIS-WEU-98-080, 21 March 1998.

ROMANIA

Nuclear

On 30 March, U.S. Secretary of Defense William Cohen and Romanian Defense Minister Constantin Ionescu signed an accord designed to stop the transport of chemical, biological, or nuclear arms and components from Romania to rogue nations or terrorist groups. Under the agreement, the United States will provide equipment, expertise, and training to Romanian border control officials to help detect any transit of weapons of mass destruction out of Romania. Ionescu asserted that, despite published reports, there is no evidence of any attempt to sell or transfer nuclear material or chemical and biological weapons through Romania. Romania does not possess any weapons of mass destruction, but Ionescu expressed his confidence that Romania can serve an important function for nonproliferation in the region. Ionescu called the agreement "a very important step forward" and said that he hoped the agreement might help Romania's bid for NATO membership. This is the first agreement of its kind signed between the United States and an Eastern European country.

Central Europe Online, [Online] http://www.centraleurope.com, 31 March 1998. *Disarmament Diplomacy*, 1 April 1998, p. 53. RFE/RL NewsLine, [Online] http://www.rferl.org/newsline/1998, 1 April 1998. *Defense News*, 30 March 1998, p. 2.

RUSSIA

Nuclear

Interfax reported on 20 May 1998, that the Russian Federal Security Service (FSB) has distributed lists to several Russian government agencies of foreign companies "proved to be involved in military programs for developing weapons of mass destruction (WMD) and their delivery vehicles". According to Interfax, the lists were supplied to the Ministry of Atomic Energy, the Ministry of Economics, the Ministry of Trade and Industry, the Ministry of Science and Technology, the Russian Space Agency, and several other agencies. According to the report, the list names several North Korean, Pakistani, Iranian, and Libyan companies known to be involved in military WMD development programs. The report did not specify if any companies from other countries are also included on the lists. According to the press service of the FSB, Russian government agencies were told that they should "refrain from export deals with the listed foreign companies" if they involved materials and technologies that could be used for the development of WMD and related delivery vehicles. The FSB noted that the lists were compiled and distributed in accor-

dance with Russia's national security doctrine, approved by President Yeltsin on 17 December 1997, which termed preventing WMD proliferation a key priority of national security policy. Additional unspecified foreign companies were added to the list on 28 May, according to an FSB press release. Another FSB press release, issued on 11 June, added to its list of foreign companies engaged in military programs aimed at developing WMD. The press release noted that among the companies added was Iran's Sanam Industries Group, which tried to obtain data "on the latest Russian development work in missile, space, aviation, nuclear and laser technologies and vigorously established contacts with people in the defense industry." The press release noted that Sanam's operations in Russia had been "closed down" by the FSB in January 1998. It also noted that training of Iranian students from Sanam at the Baltic Technical University in St. Petersburg had been suspended pending the outcome of an investigation into "whether the cooperation between the two institutions can be continued."

Interfax, 20 May 1998. Interfax, 28 May 1998. Interfax, 11 June 1998.

At a press conference on 16 June, General Eugene Habiger, commander of the U.S. Strategic Command, briefed reporters on a trip to Russia the previous week in which he visited five nuclear weapons storage sites. Habiger told journalists that he did not have any "serious concerns" with security at the five facilities and lauded the Russian military for the degree of openness shown during his visit. Habiger visited the SS-19 base at Kozelsk (Kaluga Oblast), a national nuclear weapons storage depot in Saratov Oblast, the strategic bomber base at Engels (Saratov Oblast), the SS-25 base in Irkutsk (Irkutsk Oblast), and a naval nuclear weapons storage site near Severomorsk (Murmansk Oblast). At each of the five sites, General Habiger was shown the safety and security measures used by the Russian military at facilities with nuclear weapons. At Kozelsk, he was shown an operational SS-19 missile in its silo with its six nuclear warheads. Habiger said that unlike U.S. ICBMs, which are guarded largely by technological measures, the Russian military has two armed security guards assigned to each operational ICBM silo, in addition to the launch control crew. General Habiger described the security at Kozelsk as "impressive" and "excellent."

DOD News Briefing, General Eugene Habiger, Commander of U.S. Strategic Command, Tuesday, [Online] http://www.defenselink.mil, 16 June 1998. USIA Press Release, [Online] http://usiahq.usis.usemb.se, 24 June 1998.

Missile

On 7 April 1998, the Russian Federal Security Service (FSB) reported several cases in which it has successfully apprehended suspects attempting to smuggle restricted items from Russia. In Krasnoyarsk, a Russian tried to export several kilograms of ultra-fine zirconium oxide powder, a dual-use item, to the West. The FSB completed the investigation and the powder has been turned over to the courts. In St. Petersburg, investigators blocked the export of a silicon carbide sample, also dual-use. In Tula, the FSB apprehended two Russian employees of a scientific research institute, who were trying to conduct negotiations with a foreign company to develop electronic devices for self-guided missiles. In Moscow, investigators expelled Aziz Masud, a member of an Iranian military delegation, for trying to receive aviation technology from a Russian citizen. The FSB public relations office stated that they recognize that proliferation of weapons and dual-use items, particularly to Russia's neighbors, poses one of the greatest threats to Russian national security. In March 1998, the U.S. State Department issued a list of 20 Russian companies believed to have connections with the Iranian missile program. These companies now require special permission from the United States before participating in any joint nonproliferation projects. The United States has already denied funding for three entities on the list due to proliferation concerns: the Baltic State Technical University in St. Petersburg, Russia's Central Aerodynamic Institute (TsAGI), and the Moscow Aviation Institute. In April 1998, U.S. Senator Trent Lott scheduled a late May 1998 vote on a bill to place sanctions on Russian companies cooperating with Iran's missile program.

Howard Diamond, *Arms Control Today*, April 1998, p. 26. Gennadiy Charodeyev, *Izvestiya*, [Online] http://www.online.ru/rproducts/izvestiya-izvestiya-year/30-May-98/31.rhtml, 30 May 1998. *Georgian Times*, 7 May 1998, p. 5. Michael R. Gordon, with Eric Schmitt, *New York Times*, 25 April 1998, p. 1.

Russia's Raduga missile design bureau will use the cash from China's purchase of the 3M-80 Moskit [NATO designation SS-N-22 'Sunburn'] supersonic anti-ship missiles to develop a next-generation hypersonic anti-ship weapon. According to the Russian press, export clearance for the missile depended on Raduga using the sales revenue to develop the missile's replacement. Raduga has displayed the experimental rocket/ramjet GELA, which is part of the new Mach 3-5 missile. In addition, the design bureau has conducted a small number of test launches, with mixed results, from a Tu-95 Bear bomber. Altair is developing the new missile's guidance system. In addition to developing a next-generation weapon, Raduga's chief designer, Igor Seleznev, says that his bureau is offering a range increase for the Russian Navy's 3M-80s. The missile's effectiveness can be increased 1.7 times, Seleznev noted. The maximum range of a Moskit is 90 to 120 km, but with an upgrade this can be extended to 150 km, and the addition of a ventral fuel tank can extend the range to 200 km Seleznev said. He also said that upgrading the Russian Navy's 3M-80s is cheaper than buying an equal number of new anti-ship missiles. According to Seleznev, Raduga is fully equipped to overhaul the 3M-80s. Raduga is currently producing the first batch of 50 Moskit missiles, which China will receive as part of its purchase of two Sovremennyy-class destroyers (Project 956). The Progress plant at Arsenev is producing the missile's export variant, the 3M-80E. Although the Russian Navy first deployed the Moskit in 1982, no Western country has succeeded in developing a supersonic anti-ship missile with performance comparable to the 3M-80. Seleznev said that at a recent airshow in Zhukovskiy, Moscow Oblast, security officers prevented several attempts by foreigners to steal data on the alignment and

functioning of the Moskit's injectors. Raduga is also in the final stages of development of the Kh-101, a conventional precision attack air-launched cruise missile.

Flight International, 29 April-5 May 1998. ITAR-TASS, 16 April 1998; in Inquisit, [Online] http://www.inquisit.com, 16 April 1998.

Russia has announced the development of the new advanced anti-missile and anti-aircraft system, the Antey-2500, on the international arms market. In an attempt to attract buyers, Russia invited military attaches from 10 countries to the first official presentation of the new system. The system's general designer, Veniamin Yefremov, conducted the presentation before representatives from China and Persian Gulf countries. Russian President Boris Yeltsin has given authority to Antey, the system's producer, to "sell them [abroad] directly." The system is designed to combat all types of air attacks, including strategic bombers and ballistic missiles from a range of 2,500 km (the system's name refers to its range). According to Yefremov, the defense system is the only weapon in the world capable of fulfilling such a mission. The Antey-2500 system "can fire 48 missiles on 24 targets at once or 16 ballistic vehicles with a low reflective surface." The Russian newspaper *Krasnaya zvezda* states that the reflective surface need be only two centimeters in size for the Antey-2500 to track the ballistic target. *Kommersant-daily* reported that the Antey-2500 can fire at 24 targets, flying at a distance of 40 to 200 km with an altitude 25 to 30 km, and at a velocity of up to 4,500 meters per second. In addition, *Kommersant-daily* said the new system's key feature is its full-sector view radar system, which can track a target without losing sight of it, unlike a "circular scan" system which can take nine to 12 seconds to completely scan the battle region and during that time can lose the target. According to Yefremov, the Russian army has already been equipped with the Antey-2500. Yefremov said 30 countries in the world possess ballistic missiles and only the Antey-2500 system is able to "ensure reliable protection" against them. He also said that sales of the Antey-2500 will not jeopardize Russia's national security because the design bureau "has already developed systems that will leave today's [systems] several years behind."

Kommersant-daily reported that the air-defense system was formerly named the S-300VM. However, Antey changed the name to avoid confusion with the S-300PMU [NATO designation SA-10 'Grumble'], which is made by the Moscow financial-industrial group Oboronitelnyye Sistemy (Defensive Systems). The Antey-2500 is modeled after the land-based S-300V surface-to-air missile (SAM), but represents the next generation of SAMs. The system uses new Antey 9M82M [NATO designation SA-12B 'Giant'] and Antey 9M83M [NATO designation SA-12A 'Gladiator'] missiles. One Antey-2500 battery can reportedly protect an area of 1,000-2,500 square kilometers from different types of ballistic missiles, or a 125,000 square kilometer area from enemy aircraft. Mounted on a mobile truck chassis, the SAMs require only five minutes for battlefield deployment, and do not require maintenance or servicing during their 10-year service life. The complete system is fully automated and is suited for any climate. In addition, the Antey system can simultaneously process (with active and passive countermeasures) up to 200 targets located at a distance of up to 300 km and designate up to 70 targets for firing. Using its navigation, orientation, and topographical systems, it automatically determines its position on the battlefield. Moreover, its mobility greatly enhances its survivability by hampering enemy reconnaissance efforts. The Antey-2500 system can also fire its missiles while the command center is up to 20 km away, making the system "practically invulnerable," *Krasnaya zvezda* reported. The *Krasnaya zvezda* report stated that the Antey-2500 is superior to the U.S. PAC-3 Patriot air-defense system [which is still in development] in practically all respects. The [PAC-1] Patriot air-defense system shot down only 35 of 98 Iraqi Scud missiles fired during the Persian Gulf War (36 percent). At government ballistic missile firing ranges, the Antey-2500 proved its effectiveness is "no less than 98 percent." At one of the latest successful tests, more than 50 Scud-type missiles and two Tu-16-type aircraft were shot down. *Krasnaya zvezda* also reported that as a sign of its "superiority," the United States has "acquired" an Antey-2500 system to study it.

Russian Public Television Network (Moscow), 27 May 1998; in FBIS-UMA-98-147, 27 May 1998. Aleksandr Yegorov, *Kommersant-daily*, 27 May 1998. Vladimir Dernovoy, *Krasnaya zvezda*, 28 May 1998.

UKRAINE

Nuclear

After a visit by U.S. Secretary of State Madeleine Albright on 6 March, Ukraine decided to withdraw from the contract it had with Russia to supply turbines for the Bushehr nuclear power station in Iran. Ukraine's withdrawal will force Russia to manufacture the turbines needed in Bushehr. Russia has responded to the news of Ukraine's withdrawal by saying that it "will in no way influence the implementation on the Russian-Iranian construction project" at Bushehr. A spokesman for the Russian Atomic Energy Ministry said that it "will place orders for equipment in other places." He said that the turbines could be produced in Russia by a turbine plant in St. Petersburg.

Russian Public Television First Channel Network (Moscow), 6 March 1998; in FBIS-SOV-98-0653/6/98, 6 March 1998.

Turboatom, the Ukrainian plant that was contracted to supply Iran with turbines for its planned Bushehr nuclear power station, wants compensation for the loss it has suffered due to Ukraine's withdrawal from the agreement to supply the turbines, said Turboatom's General Director Anatoliy Bugayets. The plant's overall losses total about $130 million, and its direct losses (the amount spent on the development of the turbine) total $5.1 million. Job losses may amount to between 5,000 and 7,000 positions.

Interfax (Moscow), 16 June 1998; in FBIS-SOV-98-167, 16 June 1998.

YUGOSLAVIA

Missile

In autumn 1997, Russia and Yugoslavia signed an agreement on permanent military and technical cooperation which included the $150-million sale of the S-300 PMU-1 (SA-10D) surface-to-air missile (SAM) sys-

tem to Yugoslavia. Under the agreement, Russia will also provide Otomat coastal defense anti-ship missile systems to Yugoslavia and deliver spare parts for Yugoslavia's OVO-KUB and NEVA SAMs. The United States and NATO reportedly sought to block the transaction, which was scheduled for completion in the first half of 1998.

Nik Kotej, *Nedeljni Telegraf* (Belgrade), 8 April 1998, pp. 2-3; in FBIS-EEU-98-099, 9 April 1998.

MIDDLE EAST AND AFRICA

EGYPT

Nuclear

In June 1998, Egyptian President Hosni Mubarak told a delegation from the Israeli group Peace Now that after the collapse of the Soviet Union, he had the opportunity to purchase "know-how and nuclear materials that would have given Egypt immediate possession of nuclear arms." Mubarak said he declined the offer because "anyone who took advantage of the opportunity would be entering an insane, dangerous arms race." He said, however, that he believed that nuclear information and weapons from the Soviet Union were available to other Middle East countries.

Uzi Benziman, *Ha'aretz*, [Online] http://www3.haaretz.co.il, 19 June 1998.

Missile

In 1996, Switzerland prevented sales of Scud missile parts from North Korea and China to Egypt. According to Urs von Daeniken, a Swiss intelligence official, two shipments were seized in late 1996 en route to Egypt via the Zurich airport. It was the first time the Swiss had discovered illegal missile shipments. Authorities re-examined the falsely labeled shipments due to the suspicious nature of the sending and receiving firms. The first shipment was sent from a North Korean arms and missile supplier and distributor to an Egyptian company linked to the production of chemical and biological weapons. The shipment was labeled as "bulldozer parts," but actually contained Russian BM-21 rocket launchers. The Egyptian army also uses these launchers. Less than a week later, a second shipment was intercepted travelling en route from China to an Egyptian military armored vehicle manufacturing firm. The shipment was labeled as "machine parts," but actually contained parts for Scud-B missiles. According to Daeniken, the parts could also be used to make North Korean Scud-C missiles.

AFP, 7 April 1998.

IRAN

Nuclear

Russia's deputy prime minister and co-chairman of the Russian-Iranian inter-governmental trade and economic commission, Vladimir Bulgak, said that Russia and Iran have a "mutual desire to develop further their trade and economic relations on a long-term and mutual basis." Included in these expanded trade relations are plans to build thermal, hydro-electric, and nuclear power stations and to construct nepheline [aramid fiber] and titanium plants in Kahnooje, Iran. Gennady Tarasov, the official spokesman for the Russian Foreign Ministry, said that both Russia and Iran are prepared to guarantee that Russo-Iranian nuclear cooperation is solely for "peaceable, civilian purposes." He said that such cooperation "is transparent and ready for any inspections." Tarasov also said that Russia and Iran are not cooperating in "any areas which would defy international standards." He dismissed as "groundless" the allegation that Russia "at the state level or at some other level" was helping Iran produce missiles or weapons of mass destruction.

RIA-Novosti, [Online] http://www.ria-novosti.com, 5 March 1998. Interfax (Moscow), 5 March 1998.

In addition to Russia's $850 million deal with Iran to build a 1,000 MW nuclear power plant at Bushehr, Russia will also build two more nuclear reactors in Iran. Announcement of the deal for the additional reactors was made on 7 March by Georgy Kaurov, a spokesman for Russia's atomic energy minister. Kaurov said Russia "agreed in principle" with Iran on the construction of two more reactors at Bushehr. Construction is not expected to begin for five years. This new deal was not a signed contract, but rather a verbal agreement. Vitaliy Nasonov, a spokesman for the Russian Atomic Energy Ministry (Minatom) said, "Russia will not sign any new documents with Iran until it has completed the contract to build the nuclear power station at Bushehr." He said Russia isn't refusing to expand cooperation with Iran entirely, just "not until the 21st century." Russia and Iran initially signed a contract on 8 January 1995 for the first reactor at Bushehr. Russia took over construction of the reactor at Bushehr in February 1998 due to delays by Iran. Kaurov said that Russia plans to speed construction of the current project and expects to finish the reactor in two-and-a-half years. Next, construction would start on two new 640 MW power reactors, "which are still being developed." The *New York Times* reported on 7 March 1998 that an unnamed American official doubts Iran will have enough money to pay for the planned reactors. "Whether they can get the first one done is iffy, and the chance of their completing the second, third, or fourth is highly unlikely."

Washington Times, 7 March 1998, p. A69. ITAR-TASS (Moscow), 6 March 1998; in FBIS-TAC-98-065, 6 March 1998. Israel Internet News Service, [Online] http://www.iinsnews.com, 12 March 1998. *Russia Today*, [Online] http://www.russiatoday.com, 6 March 1998. Michael R. Gordon, *New York Times*, 7 March 1998, p. A3.

On 12 March, Russian Prime Minister Viktor Chernomyrdin and U.S. Vice President Al Gore said that a joint U.S. and Russian group of experts will be created to monitor and address the export of sensitive nuclear and missile technologies. This effort reflects claims made by the Clinton administration that the United States is progressing in its efforts to persuade Moscow to stop the proliferation of Russian military technology to Iran. Russia said that it would not engage in nuclear cooperation with Iran other than the Bushehr nuclear power plant, which is still under construction.

Jamestown Monitor, 13 March 1998.

The United States said on 13 March that it had persuaded China to halt its deal to sell nuclear weapons-related materials to Iran. However, the United States has also learned about a potential deal between China and

Iran for anhydrous hydrogen fluoride (AHF), "a chemical that can be used in enriching uranium for nuclear weapons." U.S. State Department spokesman James Rubin said that the chemical in question is not on any international nuclear control list. Chinese officials say that no such transaction has been agreed to, nor does China have any "intention of making such a transaction." Some U.S. officials believe that the China Nuclear Energy Corporation will not deliver the chemical to Iran's Nuclear Research Center. Others believe, however, that China will continue to supply Iran with nuclear assistance. Iran denied U.S. allegations that China had ended its nuclear cooperation with Iran. Iranian Foreign Ministry spokesman Mahmad Mohammadi said, "Iran's nuclear program and cooperation with other countries is entirely peaceful, in accordance with the International Atomic Energy Agency" (IAEA). U.S. intelligence agencies announced new evidence that China tried to sell nuclear material with weapons applications to Iran within weeks of assuring the United States that it would terminate all such assistance. According to senior Clinton administration officials requesting anonymity, the China Nuclear Energy Industry Corp. in Beijing was negotiating to sell anhydrous hydrogen fluoride (AHF) to the Isfahan Nuclear Research Center in Iran, a suspected site for Iran's secret nuclear weapons program. AHF can be used to separate plutonium dioxide from spent nuclear fuel. It can also be used to convert uranium ore into uranium hexafluoride gas. Uranium enrichment facilities enrich and convert uranium hexafluoride gas into weapons-grade Uranium-235. Although China has cancelled plans to supply a uranium conversion facility to Iran, U.S. officials believe that Iran may have wanted to stockpile AHF in the hope that it would eventually be able to build such a conversion facility. According to Foreign Ministry spokesman Zhu Bangzao, "...Chinese companies have not sold and do not have any intention to sell such chemicals."

Inside China Today, [Online] http://www.insidechina.com, 16 March 1998. AFP, 15 March 1998; in *Infoseek News Channel*, [Online] http://guide-p.infoseek.com, 16 March 1998. Barton Gellman and John Pomfret, *Washington Post*, [Online] http://www.washingtonpost.com, 13 March 1998. AFP, 17 March 1998.

IAEA spokesman David Kyd announced on 16 March that the "IAEA has not detected any suspicious nuclear activities being carried out" in Iran that violate the NPT or any other laws governing nonproliferation. The IAEA team inspected the research center at Esfahan and the experimental reactor at the University of Tehran four times in the last year. The two reactors under construction at Bushehr were not inspected because no form of nuclear fuel has been transferred there yet. Kyd also stressed that the "IAEA [has] never detected any sort of suspicious activity in Iran."

IRNA (Tehran), 16 March 1998; in FBIS-NES-98-075, 16 March 1998.

Acting Russian Atomic Energy Minister Yevgeny Adamov announced on 6 April that Russia proposed building a research reactor in Iran. The contract was first drafted in 1996 and is now awaiting approval by both governments. Adamov said that the reactor would use enriched uranium of 20 percent or less and would meet IAEA requirements. Adamov also said that Russia was planning on "stepping up the pace of construction" at the Bushehr nuclear power plant. Russian officials are considering finishing the project on a "turnkey" contract basis. This will allow Russia to raise the price of the reactor from $780 million to just over $1 billion.

Washington Post, 7 April 1998, p. 18. *Monitor*, 7 April 1998. *Novyye izvestiya*, 17 March 1998, p. 5.

Israel has obtained documents confirming 1992 reports "that Iran received enriched uranium and up to four nuclear warheads from Kazakhstan, with help from the Russian underworld." Russia has maintained these documents since the early 1990s, when Iran received the nuclear warheads. U.S. congressional experts have verified the authenticity of the documents, but the documents are being studied in Israel. The U.S. Task Force on Terrorism and Unconventional Warfare released its original report on 20 January 1992. It stated that by late 1991, "there was a 98 percent certainty" that Iran already had most or all of the necessary components required for two or three aerial nuclear bombs and nuclear warheads for surface-to-surface missiles. These nuclear weapons were allegedly "made with parts purchased in the ex-Soviet Moslem republic." Shai Feldman, director of Tel Aviv University's Jaffe Center for Strategic Studies, dismissed the report, saying, "there was no evidence of any warhead transfer." U.S. and Israeli officials have been alarmed about this report due to Russia's continued assistance to Iran's nuclear and non-conventional program. The *Jerusalem Post* also obtained an Iranian document from 26 December 1991 in which the Iranian Revolutionary Guard (IRG) told the Atomic Energy Agency head, Reza Amrollahi, that "two war material[s] of nuclear nature" had arrived from Russia and were being held by the IRG. On 2 January 1992, a senior IRG official said that the nuclear warheads were being stored in the Lavizan military camp. A Russian Atomic Energy Ministry (Minatom) spokesman responded to the *Jerusalem Post* article, calling it "nonsense." He said that "all nuclear warheads in the former Soviet Union were accounted for and that it was inconceivable that any could have disappeared without the knowledge of the military." Minatom official Gennady Tarasov said, "Russia has stated on many occasions that it has never rendered Iran any assistance in creating weapons of mass destruction." He claimed that the *Jerusalem Post* article "should be viewed as one more link in the chain of unfounded and politically-motivated charges." The U.S. Department of Defense said that it has "no evidence whatsoever" that Iran received the nuclear warheads from Kazakhstan. Minatom official Georgy Kaurov said "all nuclear warheads produced in the former Soviet Union are individually registered and numbered." Kaurov also said that none have disappeared and that all warheads are "either kept in storage, or have been destroyed in accordance with agreements on nuclear weapons reduction." State Department spokesman James Rubin said that although the United States believes that Iran currently possesses no nuclear weapons, it believes Iran is seeking a nuclear weapons capability.

Jerusalem Post, [Online] http://www.jpost.com, 9 April 1998. *The Times*, [Online] http://www.sunday-times.co.uk, 10 April 1998; Interfax, 10 April 1998. *Washington Post*, [Online] http://search.

washingtonpost.com, 9 April 1998. *Jerusalem Post*, [Online] http:/www.jpost.co.il, 10 April 1998. Interfax, 13 April 1998. AFP, [Online] http://guide-p.infoseek.com, 15 April 1998.

Russia's ambassador to Iran, Kostantin Shuvalov, visited the Bushehr nuclear power plant in Iran on 12 April to inspect certain sections of the plant as well as the progress of the Russian specialists working on the plant. Shuvalov said that a completion date for the reactor would be announced at an upcoming meeting in Russia by the head of Iran's Atomic Energy Organization, Golamreza Agazadeh. Russian Atomic Energy Minister Yevgeni Adamov said on 13 April 1998 that he "will try to persuade President Boris Yeltsin to authorize the sale of an experimental nuclear reactor to Iran." Adamov said that the "experimental installation" would be a research reactor using uranium enriched to less than 20 percent.

AFP, 12 April 1998.

Two U.S. congressmen, Jim Saxton and Bill McCollum, say they have closely followed Iran's military programs and that Iran "has obtained nuclear weapons as well as established a ballistic missile command-and-control system to launch them." They have called on the Clinton administration to form a new policy on Iran in light of its nuclear weapons capability. The congressmen's statements conflict with what the Defense Department and State Department allege about Iran's nuclear program. Saxton is chairman of the House Task Force on Terrorism and Unconventional Warfare, and McCollum is a former member of the task force. Both say they have been receiving reliable information for years "that Iran has been obtaining nuclear weapons parts and supplies from the former Soviet republics in Central Asia." McCollum said that Iran's policy indicates that "it already has nuclear weapons and is now trying to acquire a delivery system to launch them." McCollum supports his claims by citing the acquisition of ballistic missiles and the establishment and exercising of a distinct national-level command-and-control system as examples of Iran's capabilities.

Jerusalem Post, [Online] http://www.jpost.com, 16 April 1998.

Iranian Ambassador to Russia Mehdi Safari said, "Iran never intended to have nuclear weapons or any other weapon of mass destruction." He said that Iran is aware that Israel has a nuclear bomb, and that capability explains why Iran has called on the United Nations to make the Middle East a nuclear-weapon-free zone.

Interfax (Moscow), 23 April 1998.

The *Tehran Times* reported that a delegation from Iran's Atomic Energy Organization is scheduled to leave for Moscow on 12 May. The delegation will discuss with Russia's Minatom the "Bushehr nuclear power plant and the continuation of nuclear cooperation." The *Tehran Times* also reported that the Iranian delegation "was likely to visit" Beijing in June 1998 to discuss "nuclear cooperation for peaceful purposes with China."

Indian Express, [Online] http://www.expressindia.com, 11 May 1998.

Russian Atomic Minister Yevgeni Adamov said that Russia would continue to aid Iran in completing its Bushehr nuclear power plant despite U.S. opposition. Adamov also said that U.S. efforts to block Russian-Iranian nuclear cooperation stem from an "economic rivalry." He further added that Russia's nuclear assistance is in compliance with the IAEA's nuclear safeguards.

Tehran Times, [Online] http://www.netiran.com, 22 June 1998.

Missile

Senior U.S. officials announced that the United States has offered to help Russia expand its foreign satellite program. In return, Russia will discontinue its missile technology sales to Iran. U.S. officials said, "if the Russians do crack down, Washington is willing to ease limits on Russia's launching of foreign satellites." The U.S. effort to dissuade Russian institutes and companies is potentially worth "hundreds of millions of dollars to Russian companies and the Western companies that have formed partnerships with them."

New York Times, [Online] http://www.nytimes.com, 9 March 1998.

According to an official at Taiwan's Chungshan Institute of Science and Technology (CIST), Iran has expressed interest in the purchase of Taiwan's Sky Sword-1 surface-to-air missiles. Taiwan, however, has shied away from the sale for fear of jeopardizing its relationship with the United States.

Chung-Kuo Shih Pao, 9 March 1998; in FBIS-CHI-98-069, 10 March 1998.

Russian and diplomatic sources said that Russia's Federal Security Service (FSB) has recruited Russian scientists to teach their Iranian counterparts how to build missiles capable of carrying "deadly payloads" as far as 1,200 miles. Russians and foreigners said that FSB officials hired the scientists at Russian technological institutes and weapons factories. However, the scientists' contracts were negotiated in Iran in order to absolve the FSB and Russian government of responsibility. Russian officials said that Russia plans to stop recruitment and curb permission for the scientists to travel to Iran. A 16 March article in the Russian newspaper *Novaya gazeta* described Russian assistance to Iran's ballistic missile program. All of the scientists and government officials interviewed in the article insisted on anonymity. The author suggested that in place of buying hardware for Russia, "Iran is buying the knowledge of leading Russian experts on the production of the most modern weapons of mass destruction." The author gave an example of such assistance. After the collapse of the Soviet Union, former Soviet weapons experts who had previously worked at secret government facilities moved to new jobs at universities. Because of their extensive knowledge of government secrets, they were denied travel passports by the FSB. However, when the same professors were invited to visit Iran by Iranian graduate students studying in Russia, the FSB not only approved their requests for travel passports, but also facilitated their travel arrangements. Upon arriving in Iran, the Russian scientists were provided lavish accommodations and attended meetings in secret facilities near Tehran. In these meetings, Iranian missile engineers allegedly asked specific questions about ballistic missiles, in an attempt to learn more about developing medium-range bal-

listic missiles and eventually inter-continental ballistic missiles. During their visit to Iran, the Russian scientists met with former colleagues now considered "top-class experts" already working in Iran in fields such as metallurgy, composite materials, and rocket engines. At the end of their stay in Iran, some scientists were offered a two-year contract to join their former colleagues with salary of $1,000 per month, large by Russian standards. The Politburo decided in 1986 to send Russian missile experts to Iran, and they have been there since 1994. Russian experts believe that Iran can shorten the process of producing large missile systems from 15 to five years by buying advanced technology, since missile production and test facilities are already in place. One Russian official interviewed in the article said that, "everything that can be sold should be sold, to anyone who will pay for it." A Russian scientist said that there are "plenty of loopholes in the law" to get around export restrictions and that "no ban can restrain world-class scientists who are being paid near the minimum wage."

Daniel Williams, *Washington Post*, [Online] http://www.washingtonpost.com, 23 March 1998. *Washington Times*, 8 April 1998, p. 15.

A U.S. federal grand jury issued an indictment against Daniel Malloy, the owner and president of International Helicopter Inc. Malloy is suspected of shipping 20 batteries, needed to power Iran's AIM-54 Phoenix air-to-air missiles, to Joseph Balakrisha Menon. Menon is the owner of Singapore-based Heli-World Aviation. The two men were indicted under the U.S. Arms Control Export Control Act. The act proscribes the sale of a number of defense items to countries that support terrorism.

New York Times, [Online] http://www.nytimes.com, 25 March 1998.

U.S. envoy Robert Gallucci met with Israeli leaders to discuss Russia's aid to Iran's medium-range ballistic missile program. Israeli sources said that Iran, "with massive aid from Russian advisers and companies," is near completion of the engine for the Shahab-3 missile. The Shahab-3 is expected to have a range of approximately 1,300 km and a payload of 700 kg. The Clinton administration does not support Israeli efforts in lobbying Congress to impose sanctions on Moscow. The Iranian Missile Proliferation Sanctions Act, already passed in the House of Representatives, punishes Russian companies that provide missile technology to Iran.

Jerusalem Post, [Online] http://www.jpost.com, 8 April 1998.

Russian intelligence forces stopped three attempts by Iran in 1997 to acquire Russian ballistic missile technology. The announcement was made by Vladimir Orlov, director of the Russian Political Research Center, during a press conference on 13 April.

RFE/RL Newsline, [Online] http://www.rfel.org/newsline, 14 April 1998.

Israel's Industry and Trade Minister, Natan Sharansky, met with Russian Prime Minister Sergey Kiriyenko in Moscow on 21 May 1998. During their meeting, Sharansky emphasized Israel's demand that Russia cease all missile technology transfers to Iran and also said that Israeli intelligence would be used to monitor the effectiveness of Russian measures to control such transfers to Iran. Kiriyenko said that Russia would not take any action in the Middle East that would affect Israel's security.

Ma'ariv (Tel Aviv), 22 May 1998; in FBIS-TAC-98-142, 22 May 1998.

According to Harvard University arms control expert Graham Allison, Israel and the United States have improperly characterized Russian ballistic missile technology transfers to Iran as a matter of deliberate Russian foreign policy. Allison believes that the transfers are instead the product of a combination of private Russian business interests and corrupt government bureaucrats. Allison believes that if it were Russian government policy to export weapons technology to Iran, complete missile and nuclear weapons systems would be transferred rather than components. Vladimir Orlov, director of the Center for Policy Studies in Russia, said that the effective implementation of Russian export controls is highly dependent upon the effectiveness of Russian customs officials.

Ha'aretz (Tel Aviv), [Online] http://www3.haaretz.co.il, 16 June 1998.

U.S. intelligence sources believe that China is continuing to cooperate with Iran in the development of ballistic missiles. Iran is trying to purchase telemetry equipment for missile testing from China's Great Wall Industries. Great Wall Industries is negotiating to sell an "entire telemetry infrastructure" for Iran's Shahab-3 and Shahab-4 medium-range missile programs. Russia recently informed the United States that Chinese and North Korean officials were spotted in Iran for a missile test. China has been cooperating with Iran in the development of the 110-mile range NP-110. China has supplied missile parts such as rocket motors and test equipment for the missile. Iran has also sought x-ray equipment, which is necessary for detecting flaws in the missile casing and for checking the status of the solid fuel in the missile boosters. The U.S. Central Intelligence Agency (CIA) has acknowledged that although assistance in the development of short-range missile systems is not a violation of the MTCR, it could eventually find applications in the development of long-range missiles.

Bill Gertz, *Washington Times*, 16 June 1998, p. 1.

IRAQ

Nuclear

Chief United Nations arms inspector Richard Butler said that inspections of the eight presidential sites in Iraq, to which Saddam Hussein previously denied U.N. inspectors access, started on 26 March. The first site inspected was the Radwaniyah Palace; U.N. officials said the inspection "went very well." The inspection team, led by U.N. Special Commission (UNSCOM) deputy executive chairman Charles Duelfer, will conduct inspections over the next two weeks. Butler said that the information collected during the current inspections will be used to determine whether follow-up inspections will be needed. Butler said that Iraqi officials have changed their attitude since the last round of talks, and that meetings are now "very constructive."

USIA, 26 March 1998; in NNN News, 27 March 1998.

United Nations arms inspectors have visited six of the eight formerly restricted presiden-

tial sites in Iraq since 26 March. They say they "have found no clues about Iraqi weapons of mass destruction so far." Charles Duelfer said that it was "hardly a surprise" when UNSCOM didn't find anything. Inspections are scheduled for 2 April at the Republican Palace compound and Al-Sijood, both in Baghdad.

CNN, [Online] http://www.cnn.com, 1 April 1998.

United Nations arms inspectors have searched each of the 1,058 buildings designated as part of the Iraqi presidential sites and have found no evidence of weapons of mass destruction. Iraqi Deputy Prime Minister Tariq Aziz said, "the visit has verified Iraq's credibility." Chief U.N. arms inspector Richard Butler said, however, that Iraq must still provide more proof to back its claims that all of its nuclear, chemical, and biological weapons have been destroyed.

New York Times, 4 April 1998, p. A4.

In a report by UNSCOM, Jayantha Dhanapala (head of the diplomatic team) and Charles Duelfer discussed open-ended access to weapons sites. Both UNSCOM members said that access to key Iraqi sites remains an unresolved problem for weapons inspectors. The problem of unfettered access arose "in connection with a problem in defining the boundaries of the Presidential palace at Radwaniyah." Although the last six months of UNSCOM inspections enhanced the inspection process, they have not produced any hard evidence to support UNSCOM's claims about undeclared weapons. UNSCOM said that inspections must continue until all outstanding questions about the weapon's programs are answered. Executive chairman of UNSCOM Richard Butler will submit a separate report to Secretary General Annan in late April 1998 that reviews the entire six-month inspection process.

Indian Express, [Online] http://www.expressindia.com, 15 April 1998. *New York Times*, 15 April 1998, p. A9.

Iraq has denied receiving nuclear weapon designs from Pakistan. However, Iraq did admit that an offer was made by a Greek person to sell nuclear weapon designs that he allegedly obtained from senior Pakistani nuclear scientist Dr. Abdul Qadeer Khan. Iraq turned down the offer because it suspected that it was an "intelligence ploy." An Iraqi spokesman for the Ministry of Culture and Information said that the U.S. allegations were the result of a premature leak to the press after the IAEA stated that Iraq no longer had any prohibited nuclear related activities.

Indian Express, [Online] http://www.expressindia.com, 8 May 1998.

Pakistani security sources said in early May 1998 that shortly before the 1990-91 Gulf War, Iraqi officials made a series of clandestine visits to Pakistan in an attempt to buy nuclear technology. The Iraqi officials approached Pakistani politicians and senior military figures, but were not welcomed. They also approached senior figures in Pakistan's nuclear program who they hoped to bribe. The Iraqis kept these visits secret from Pakistani authorities. Documents given to the IAEA by General Hussein Kamel suggest that the Iraqis were told by intermediaries that individuals in Pakistan were willing to sell nuclear technology. A note on one of the documents described an offer made by an "unidentified go-between" who allegedly "put Iraqi agents in touch with senior figures in Pakistan's nuclear program who were willing to help President Saddam Hussein's regime to manufacture a bomb." Pakistani officials denied considering a deal with Iraqi officials for nuclear technology. However, a retired intelligence officer said that Iraqi officials attempted to bribe nuclear scientists. A second Pakistani intelligence officer said he heard reports of "Iraqi agents trying to build a procurement network among hard-line Islamic elements in the country." He said that it was allegedly run out of the embassy. The IAEA is investigating a 6 October 1990 memorandum that reports a proposal from Dr. Abdul Qadeer Khan to help Iraq "manufacture a nuclear weapon." The IAEA's investigation is concentrated on Section B.15 of Iraq's intelligence service and Section S.15 of its nuclear weapons directorate. The document was included in the information turned over to the IAEA in 1995 when Saddam Hussein's son-in-law Lt. Gen. Hussein Kamel defected. Iraqi officials confirmed the authenticity of the document in December 1997, but said they "rejected the offer because they feared it was a 'sting." Pakistani officials called the matter an "act of fraud," and Khan has denied any involvement. IAEA spokesman David Kyd said that the IAEA is "pursuing leads" concerning individuals that could have been contacted in the pre-Gulf War period regarding Iraq's clandestine nuclear program. Kyd said that it was "speculation" to identify Khan directly with the memo. Some Western analysts are not surprised at the allegations of Pakistani nuclear assistance to Iraq. They say that Pakistan has often "dangled the nuclear carrot before Iraq and Iran to win financial aid and diplomatic backing." One unnamed source indicated that Pakistan may have passed classified blueprints related to the manufacturing of uranium melting furnaces or autoclaves to Iraq. Another unnamed proliferation expert said that in the 1990s Iraq switched from refining uranium through magnetic fields to the gas turbine method. The expert said, "it is the A.Q. Khan method."

Newsweek, 11 May 1998, p. 11. *India Express*, [Online] http://www.expressindia.com, 5 May 1998. *Dawn*, [Online] http://dawn.com, 6 May 1998. *Indian Express*, [Online] http://www.expressindia.com, 6 May 1998. *Sunday Times*, [Online] http://www.Sunday-times.co.uk, 10 May 1998.

Missile

U.N. Secretary General Kofi Annan said on 30 April that he "is satisfied that Iraq continues to be fully committed to the memorandum of understanding" and has no reason to think Iraq intentionally restricted UNSCOM inspectors. His comments came after reports on 28 April that searches of compounds did not entitle inspectors to an unlimited number of visits. Iraqi Foreign Minister Mohammed Saeed al-Sahaf said that surveillance of the palaces could not go on indefinitely. Iraqi Deputy Prime Minister Tariq Aziz said that since the memorandum took place, over 1,000 palaces and structures have been inspected. He said that the right of access to these site was "an absolute right to be exercised without any regard" for special procedures. Aziz said that

the inspections were for the purpose of refuting U.S. and British assertions that Iraq maintained weapons of mass destruction (WMD). However, Charles Duelfer, UNSCOM's deputy chairman, said that the inspection were "to establish a database to be used in subsequent inspections and long-term monitoring and verification."

CNN, [Online] http://www.cnn.com, 1 May 1998.

UNSCOM Chairman Richard Butler reported to the U.N. Security Council on 6 May that "Iraq has granted unrestricted and unconditional access to all those sites that the commission has wished to inspect, including sites designated by Iraq as sensitive and presidential." U.S. Ambassador Bill Richardson said "we respect the view of Ambassador Butler," however Iraq "still failed to provide access to records requested by the commission."

USIS Washington File, [Online] http://www.fas.org, 7 May 1998.

UNSCOM Chairman Richard Butler said that U.N. weapons inspectors are presenting Iraq with new information on its arms program and will demand that Iraq surrender the last of its illegal weapons. Butler said, "I now propose that we design a road map, we tell them the last remaining pieces we need to give a full account of their missile, chemical, and biological weapons," and with this information, "I will then go to the U.N.'s Security Council in October and say it's done."

Indian Express, [Online] http://www.expressindia.com, 26 May 1998.

ISRAEL

Nuclear

In a March 1998 interview conducted in Israel by Denmark's DR 2 television channel, former Israeli Prime Minister Shimon Peres disclosed that Israel began developing a "nuclear option" in the 1950s. However, Peres did not confirm that Israel possessed nuclear weapons. When asked whether Israel had ever thought about using its nuclear capability, Peres answered, "No, not for war. For peace. Our nuclear potential is to deter war so we can arrive to peace."

Washington Times, 2 May 1998, p. A6.

Egyptian nuclear specialist Tariq el-Nimar produced a report stating that Israel conducted nuclear testing in the Gulf of Eilat, with the most recent test occurring on 28 May. El-Nimar's report prompted Knesset Minister Abd el-Wahab Darawsha to send a formal request to Israeli Prime Minister Benjamin Netanyahu, asking whether Israel conducted nuclear tests. Deputy Defense Minister Silvan Shalom called the charges "baseless," noting that Israel has signed the Comprehensive Test Ban Treaty. The Israeli Seismological Institute (ISI) said it had not detected any seismological evidence of such a test. According to ISI chief Abbi Shapira, an earthquake detected in the area on 28 May had its epicenter west of Alexandria, Egypt, and was triggered by natural seismological activity. However, Israel Television Channel 1 Network reported that a series of conventional explosive tests was conducted by the Home Front Command in the Negev desert from 17 May to 6 June. It said that the largest test, which occurred on 28 May, prompted the allegation that Israel had conducted a nuclear test.

Israel Wire, [Online] http://www.israelwire.com, 16 June 1998. *Xinhua*, 18 June 1998; in CNN News, [Online] http://www.cnn.com, 18 June 1998. Yisrael Segal and Amnon Abramovich, Israel Television Channel 1 Network (Jerusalem), 19 June 1998; in FBIS-TAC-98-170, 19 June 1998.

Missile

The U.S. government rejected a contract between a U.S. firm and Israel Aircraft Industries (IAI) that would enable IAI to launch the Shavit missile from U.S. territory. The United States refused the contract because Israel is not a signatory to the Treaty on the Non-Proliferation of Nuclear Weapons, and due to concern that Israel could exploit launching rights to improve the performance of its nuclear-armed Jericho medium-range ballistic missile. IAI officials are seeking to persuade the U.S. administration to reconsider the contract denial.

Amnon Barzilai and Yerah Tal, *Ha'aretz*, [Online] http://www3.haaretz.co.il, 10 March 1998.

U.S. Defense Secretary William Cohen announced that the United States would provide funds for a third Arrow-2 anti-missile defense battery in Israel in response to "growing missile proliferation" in the Middle East. The United States will contribute two-thirds of the estimated $1.6 billion cost of the system. The Arrow was scheduled to become operational in 1998, but that date has been postponed "until at least 1999."

Barry Schweid, *Washington Post*, [Online] http://www.washingtonpost.com, 27 March 1998.

IAI and the U.S. firm Coleman Research Corporation (CRC) have signed an agreement for co-production and sale of a satellite launch vehicle (SLV). The launcher will be based on IAI's Shavit SLV and will be called the LK-1. It will be designed to carry a 500 kg payload into orbit. IAI and CRC plan to compete jointly for satellite launch contracts in the United States.

Arye Egozi, *Yedi'ot Aharonot* (Tel Aviv), p. 5, 12 June 1998; in FBIS-NEC-98-132, 12 June 1998.

On 27 June, Israeli Defense Minister Yitzhak Mordechai approved a 10-year plan to continue development and production of the joint U.S.-Israeli Arrow-2 anti-missile system. Israel Air Force (IAF) Commander Major General Eitan Ben-Eliahu said the IAF is preparing to deploy the first Arrow-2 battery, and that deployment of the second battery is to be completed by the end of 1998.

Xinhua, 28 June 1998; in CNN News, [Online] http://www.cnn.com, 29 June 1998.

LIBYA

Missile

According to a report in Germany's *Focus* news magazine, German businessman Walter Ziegler provided Libya with electronic components for its missile program. Ziegler is the manager of Globesat and was arrested in April 1998 following a four-year investigation of his activities.

ADN (Berlin), 28 June 1998; in FBIS-WEU-98-179, 28 June 1998.

SOUTH AFRICA

Nuclear

On 16 May, South Africa's SABC television news reported that a container holding a radioactive isotope had been stolen from the cargo section of Johannesburg International Airport during the week of 4 May. The isotope, which was en route to Brazil, had

been produced at the Safari reactor at Pelindaba and cannot be used to produce nuclear weapons. South Africa's Atomic Energy Corporation (AEC) said, "it was not responsible for nuclear material once it left their plant." According to the SABC, more than 30 similar containers "have gone missing" since May 1996.

SAPA, [Online] http://www.anc.org.za, 16 May 1998.

TURKEY

Missile

The Turkish news agency Anatolia reported on 15 June that the Turkish military searched a Russian cargo ship believed heading for Cyprus, seizing seven mobile missile ramps suspected to be components for the S-300 surface-to-air missile system ordered by Cyprus from Russia. The search found seven mobile missile launching pads, which Egypt confirmed that it had ordered from Ukraine. Turkish authorities allowed the ship to proceed.

BBC News, [Online] http://news.bbc.co.uk, 15 June 1998. *International Herald Tribune*, 17 June 1998, p. 5.

SOUTH AMERICA

BRAZIL

Nuclear

Brazil terminated a 1996 accord on peaceful nuclear cooperation with India to express its "profound consternation" at India's explosion of five nuclear weapons. President Fernando Henrique Cardoso said, "We are not favorable to these atomic tests, which are outside the parameters of the contemporary world." Acting foreign minister Sebastiao do Rego Barros said that Brazil would not impose economic sanctions against India, however, because such actions are alien to the Brazilian diplomatic tradition. The decision is of symbolic consequence, because the bilateral cooperation accord had not yet won congressional approval.

Odail Figueiredo, *Estado de Sao Paulo*, [Online] http://www.estado.com.br, 19 June 1998. Antonio Carlos Pereira, *Estado de Sao Paulo*, [Online] http://www.estado.com.br, 19 June 1998.