

NUCLEAR- AND MISSILE-RELATED TRADE AND DEVELOPMENTS FOR SELECTED COUNTRIES, NOVEMBER 1998 - FEBRUARY 1999

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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

CHINA

Nuclear

On 31 December 1998, China signed an additional protocol to a strengthened safeguards and supervision treaty with the International Atomic Energy Agency (IAEA). The protocol stipulates that China will inform the IAEA of its cooperation with non-nuclear weapon states and its imports and exports of nuclear materials.

China Daily, [Online] <http://www.chinadaily.com>, 2 January 1999, in Northeast Asia Peace and Security Network (NAPSNet) Daily Report, [Online] <http://www.nautilus.org>, 7 January 1999.

According to a *Wall Street Journal* report, China pilfered secret design information related to the W88 warhead, the most modern US nuclear warhead. The W88 is used on submarine-launched Trident II ballistic mis-

siles. According to US officials, the prime suspect responsible for the information transfer is an American scientist working at the Los Alamos National Laboratory. The incident, which is still being investigated by the FBI, occurred in the mid-1980s, but was not discovered until 1995. According to US officials, the loss of data on the W88 warhead is the most significant case in a 20-year espionage effort by China that targeted US nuclear laboratories. China has not yet developed a weapon system employing the W88 information. However, US analysts believe that China tested a warhead with characteristics similar to the W88 in the mid-1990s. It is possible that the information could help China to design smaller, more mobile nuclear weapons with multiple warheads. It is not known how much information China acquired in the transfer. It is known, however, that China did not acquire any equipment, blueprints, or advanced designs. Officials suspect that China received general, but highly secretive information about the warhead's weight, size, and explosive power, as well as its state-of-the-art

internal configuration. According to one US official, the information could save China two to ten years of warhead design efforts.

Carla Anne Robbins, *Wall Street Journal*, 7 January 1999.

According to a US Department of Commerce report to Congress, 191 of the 390 US supercomputers exported to Tier III, or high-risk, countries in 1998, went to China. These supercomputers, capable of at least 2,000 Million Theoretical Operations Per Second (MTOPS), can be used to develop sophisticated nuclear warheads and delivery vehicles.

Barbara Opall-Rome, *Defense News*, 25 January 1998, p.8.

Missile

On 10 December 1998, Afghanistan and China signed a military accord on defense cooperation and military training. Planning regarding a military accord began when China asked Afghanistan if it could examine the unexploded US cruise missiles that landed in Afghanistan during the 20 August 1998

US attack on alleged terrorist training facilities. Afghani sources say that 40 unexploded US cruise missiles landed in Afghanistan.

Kamal Azfar, *Ausaf*, 11 December 1998, pp. 1,7, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 12 December 1998.

According to House Select Committee on US National Security and Military/Commercial Concerns chairman Christopher Cox, the committee unanimously approved a secret 700-page report, which showed that the Clinton administration's export policies damaged US national security by "allowing military know-how to leak to Beijing." Cox said that the transfer to China involved dual-use technology and weapons research and development technology. The report also supported a May 1997 classified Pentagon report, which concluded that the technology transferred after the 16 February 1996 Chinese Long March rocket failure "had improved Chinese intercontinental ballistic missiles," and that "United States national security has been harmed." The investigation was launched after scientists from Hughes Electronics Corp. and Loral Space & Communications, Ltd., allegedly transferred technology to China that "significantly improved the reliability of China's nuclear missiles." The transfer occurred after President Bill Clinton loosened controls governing satellite exports. Cox said, however, that the transfer of sensitive US technology to China went beyond Hughes and Loral. The leaking of sensitive technology to China dated back two decades to a "serious and sustained" effort by the Chinese to acquire significant US military technologies. According to sources, China has stolen US military technology, especially nuclear weapons design technology from American nuclear laboratories. Cox explained that the transfer of weapons knowledge to China increased the risks of proliferation because China has a policy of selling missiles and other weapons technologies to countries like Iran. The 700-page report makes 38 recommendations that are still classified, but will be reviewed by Congress and the Clinton administration. Cox said that the committee's goal was to eliminate all trade in military items to China but

recognize the "need for US international competitiveness."

Bill Gertz, *Washington Times*, 31 December 1998, p. 1. Jeff Gerth and Eric Schmitt, *New York Times*, 31 December 1998, p. 3.

On 10 February 1999, Western diplomats corroborated a Taiwanese report, which said that China has deployed more than 100 additional ballistic missiles targeting Taiwan. However, on 12 February 1999 the US National Air Intelligence Center (NAIC) said that the report that China had produced and deployed over 100 M-9 and M-11 short-range ballistic missiles (with ranges of 375 miles and 185 miles respectively) was false. The report from the NAIC indicated that there are "fewer than 50 M-9s and M-11s deployed" targeting Taiwan. Deputy State Department spokesman James Foley said that the Clinton administration was aware of the growing deployment by China, but that it is not a new threat. US Department of Defense spokesman Michael Doubleday said that China has not increased the number of missiles aimed at Taiwan for five or six years and warned that it is incorrect to think that the missile threat has only developed in the last few months.

Toni Marshall, *Washington Times*, 12 February 1999, p. 21. John Pomfret, *Washington Post*, 11 February 1999, p. 3.

The Clinton administration has turned down the proposed sale of Hughes communication satellites, worth \$600 million, to China. According to US officials, this decision was made in part because the administration feared criticism from the Republican-controlled Congress. The decision, however, also stemmed from the administration's unease with Hughes's close ties to Chinese officials and its "tactics in getting its way with Washington regulators." In 1995, Hughes went through the Commerce Department, instead of the State Department, to give Chinese officials rocket data after a Hughes satellite was destroyed on a Chinese rocket. The ensuing investigation showed that US national security had been harmed. The Hughes deal involved the sale of communications satellites for the Asia-Pacific

Mobile Telecommunications (APMT) consortium. Hughes officials said that there is nothing abnormal or secret about the satellites. However, critics claim that the APMT commercial satellite network could "assist the Chinese military in modernizing its telecommunications," giving distant deployed units the ability to coordinate operations. Some officials are worried that the Clinton administration is changing its standards for deciding on export licenses because of past events. Emphasis may be shifting from "safeguarding specific technologies to knowing the intention of the customer, and whether a system could end up in the hands of a foreign military."

John Mintz, *Washington Post*, 24 February 1999, p. 1. David S. Cloud, Helene Cooper, and Andy Pasztor, *Wall Street Journal*, 24 February 1999.

INDIA

Nuclear

Russia has begun creating a detailed project report (DPR) for construction of India's Kudankulam nuclear power plant. A team of 1,500 Russian design engineers and safety experts recently started on the \$57 million DPR, which they hope to complete in two years. The Kudankulam plant would be located in Tamil Nadu state and consist of two Russian 1,000-MW VVER reactors. The entire Kudankulam project is expected to be completed by 2006. The uranium used in the reactors will be 4.2 to 4.3 percent enriched and will be supplied by, and returned to, Russia after it is burned. Russian Deputy Atomic Energy Minister Bulat Nigmatullin said on 5 November 1998 that the reactors are designed with modern safety features and will be covered by IAEA safeguards.

BBC, 5 November 1998. *The Hindu*, [Online] <http://www.webpage.com/hindu>, 5 November 1998. *The Hindu*, [Online] <http://www.webpage.com/hindu>, 6 November 1998.

Unnamed "highly-placed" sources in the French government said on 5 November 1998 that France had agreed to supply dual-use nuclear technology to India. France also wanted to undertake nuclear power projects with India, provided that India agreed to full-

scope International Atomic Energy Agency (IAEA) safeguards. India apparently agreed to these terms with France and made an identical arrangement with Russia.

Maheendra Ved, *Times of India*, [Online] <http://www.timesofindia.com>, 5 November 1998.

As part of a five-year-old bilateral agreement, India and Pakistan exchanged lists of their nuclear installations and facilities on 1 January 1999 to help ensure that they will not be attacked.

Sahid Ahmed Khan, *Times of India*, [Online] <http://www.timesofindia.com>, 2 January 1999.

Officials at Nuclear Power Corporation India Ltd. announced on 16 January 1999 that the second unit of the Kaiga nuclear power plant in Karnataka would be commissioned in July 1999, and that the first unit at Kaiga would be commissioned in January 2000. Construction of the nuclear power plant was delayed by three years when the dome of Unit I collapsed in May 1994. Officials from India's Atomic Energy Regulatory Board said that the domes of both units have been redesigned and are safe.

Indian Express, 17 January 1999, in FBIS-NES-99-017, 17 January 1999.

The 20-21 February 1999 talks between Indian Prime Minister Atal Behari Vajpayee and Pakistani Prime Minister Nawaz Sharif resulted in an agreement known as the Lahore Declaration. In the declaration, Vajpayee and Sharif agreed to intensify their efforts to resolve the Jammu and Kashmir dispute, take steps to prevent accidental or unauthorized use of nuclear weapons, and work towards ending terrorism. In a related memorandum of understanding, the foreign secretaries of India and Pakistan agreed to engage in consultations and confidence-building measures; give advance notification of ballistic missile tests; give immediate notification of accidental or unauthorized use of, or accidents relating to, their respective nuclear programs; and to abide by the nuclear test moratorium.

Dawn (Islamabad), [Online] <http://www.dawn.com>, 22 February 1999.

Missile

India has finalized negotiations with Russia for the purchase of six S-300PMU-1 (SA-10 "Grumble") surface-to-air missile (SAM) systems for \$1 billion. The missiles, together with India's indigenously produced low-to-medium-altitude Akash SAM system and Rajendra radar, would give India an integrated air-defense system. India's Defense Research and Development Organization (DRDO) has accelerated testing of the Akash and the shorter-range Trishul missile. Both missiles will likely begin user trials before January 1999.

Rahul Bedi, *Jane's Missiles and Rockets*, November 1998, p. 5.

Dr. A. Sivathanu Pillai, chief controller of DRDO, reported that India successfully launched the naval version of the Trishul surface-to-air missile on 12 November 1998. The Trishul was tested at Kochi and was fired at an "electronically simulated target." On 15 November 1998, India test-fired the missile from the INS *Dronacharya*. Sources reported that the second launch was successful and that all mission objectives had been met. The solid-fueled Trishul can reach speeds up to Mach 2.

The Hindu, [Online] <http://www.webpage.com/hindu>, 12 November 1998. *The Hindu*, [Online] <http://www.webpage.com/hindu>, 16 November 1998.

Indian Chief of Naval Staff Admiral Vishnu Bhagwat announced on 30 November 1998 that the naval version of India's Prithvi ballistic missile would be deployed on certain ships by 26 January 1999. He said deployment of the Prithvi would be "purely on an experimental basis."

The Hindu, 1 December 1998, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 1 December 1998.

According to a senior official from the Severnoye Design Bureau, Russia's Novator missile design bureau is developing a variant of the Biryuza (SS-NX-27) cruise missile for the Indian Navy. Reports estimate that the Biryuza has a 300-km range. The official said that the missile could be launched from India's three *I1356*-type frigates, which are scheduled to arrive from Russia by 2004. The

Biryuza could also be fitted on India's *Kilo*-class submarines. Indian Navy officials said on 23 November 1998 that India might buy the Biryuza cruise missile, but added that "the navy would not make a final decision about buying it until after it was tested by navy experts."

Douglas Barrie and Simon Saradzhyan, *Defense News*, 6 December 1998, p. 14.

DRDO officials announced on 9 December 1998 that the government had approved tests for an extended-range version of the Agni ballistic missile. DRDO head Dr. A.J.P. Abdul Kalam said that the Agni-II is scheduled to be tested in March 1999. The Agni-II will have a range of up to 2,500 km and be nuclear-capable. DRDO scientists were reportedly already working to "bring the Agni-II into full production." India is preparing a new test range in order to increase security and secrecy for the test. Indian defense sources said that the new test range is at Wheelers Island in the Bay of Bengal. Indian defense officials believe that the Agni-II will give India "critical leverage of [sic] China."

Mark Nicholson, *Washington Times*, 10 December 1998, p. A19, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 10 December 1998. Rahul Bedi, *Jane's Defence Weekly*, 16 December 1998, p. 3.

The director of India's Air Defense Artillery, A. Mukherjee, announced on 9 January 1999 that India has deployed a Russian-made air-defense system called "Tunguska." The surface-to-air missile systems have been deployed in Kashmir and Rajasthan to "provide battlefield support to tank regiments." Mukherjee said the system could track and attack multiple targets simultaneously, including helicopters, fighter aircraft, and cruise missiles.

Dawn (Islamabad), [Online] <http://www.dawn.com>, 10 January 1999.

India's Cabinet Committee on Security approved the construction of an aircraft carrier. The DRDO is developing a naval version of the Trishul surface-to-air missile, which will provide air-defense for the carrier.

The Hindu, [Online] <http://www.webpage.com/hindu>, 29 January 1999.

An Indian press report quoted Indian Defense Ministry sources as saying that India was developing an intercontinental ballistic missile (ICBM). The ICBM will have an estimated range of 8,000 km and combine technology from the Agni ballistic missile and the polar satellite launch vehicle (PSLV). The report said that "the main problem with a missile with ranges between 8,000 to 12,000 km is heat encountered during re-entry in the Earth's atmosphere. This problem has been solved with Agni-II." The Agni-II is fitted with a re-entry vehicle, which can reportedly be integrated with the PSLV program to create an ICBM.

Deutsche Presse-Agentur, 8 February 1999, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com> 8 February 1999.

JAPAN

Nuclear

On 7 November 1998, the French Ministry of National Education, Research, and Technology and the Japanese Ministry of Industry stated in a communiqué that France and Japan had agreed to increase cooperation on rapid neutron reactors (RNRs), following a 4-5 November 1998 meeting in Paris of the coordinating committee on the RNR. According to the communiqué, the committee "reaffirmed the significance of the RNR for the long-term nuclear policies of the two countries, particularly with regard to the management of long-life nuclear waste as defined by the law of 30 December 1991 in France." Research and development were identified as areas to "strengthen cooperation" between the two countries, "particularly concerning the use of plutonium to fully benefit from the energetic resources of uranium, including enriched uranium, and minor actinide elements and long-life fission products." The committee plans to meet again in Tokyo in spring 1999.

AFP (Paris), 7 November 1998, in FBIS-WEU-98-311, 7 November 1998.

On 4 December 1998, Japan signed a protocol to strengthen the IAEA's nuclear safeguards. The new protocol was approved by the IAEA in May 1997 and serves as the legal basis to enhance its ability to detect undeclared nuclear material and activities.

The agreement requires IAEA member countries to declare a wider range of nuclear-related activities than those specified under the current system and makes more facilities open to agency inspection.

Kyodo News Service, 4 December 1998, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 4 December 1998.

On 25 November 1998, the Nuclear Fusion Council of the Atomic Energy Commission of Japan (JAEC) decided on a new plan for the International Thermonuclear Experimental Reactor (ITER) project. The JAEC committee plans to formally adopt the plan and incorporate operational costs into its initial budgeted proposal for fiscal year 1999. The new plan states that JAEC will continue with engineering design activities (EDA), based on certain fixed preconditions over the course of the next three years. In deciding on a new plan, several council members stated that continuing EDA without the United States could be troublesome. In light of this, the council stated that it is urgent that Japan decide on plans to construct an experimental reactor. Some council members suggested that Japan construct a thermonuclear experimental reactor on its own. The ITER project is an international project led by Japan with the goal of achieving nuclear fusion. The United States recently withdrew from the project. The remaining members include Japan, Europe, and Russia.

Nikkei Sangyo Shimbun (Tokyo), 26 November 1998, p. 5, in FBIS FTS12301998001156, 31 December 1998.

The Tokyo Metropolitan Police Department arrested the former managing director of the Ryokosha KK and Hitachi company for conspiring to sell telecomparators to China. The sale of telecomparators violates a Japanese law established in 1992. A telecomparator is a "precision manufacturing device that is accurate to 0.2 micrometers." The device can be modified to "develop an apparatus for the extraction of weapons grade plutonium." The company allegedly used South Korea as a trans-shipment point to avoid Japanese export controls to its final destination in Harbin, China. According to the police investigation, three months after 18

telecomparators were shipped to Harbin in December 1996, Ryokosha sent technicians to offer assistance and repair the products. According to Ryokosha spokesman Teruhito Koizumi, it had known the machines, sold to a South Korean agent, were going to China, but the company was assured that the proper applications to export the telecomparators would be processed. The spokesman also said the company realized it was a mistake to send personnel to offer assistance to the end user. On 9 February 1999, Chinese Foreign Ministry spokesperson Zhang Qiyue dismissed allegations that China had attempted to purchase Japanese equipment related to nuclear weapons production.

F.J. Khergamvala, *The Hindu*, [Online] <http://www.webpage.com/hindu>, 9 February 1999. Stephanie Strom, *New York Times*, 10 February 1999, p. 8. AP (Beijing), 9 February 1999.

Missile

Japan's Mitsubishi Heavy Industries (MHI) and Ishikawajima-Harima Heavy Industries (IHI) will begin research and development for building a successor to the H2A large-scale rocket in 1999. The domestically built H2A rocket is used to launch satellites. Japan's Ministry of International Trade and Industry is expected to subsidize this project by about ¥30 billion. MHI will head the creation of a blueprint for the planned project. The companies are also interested in exploring sea-launch possibilities. Two US companies, the Hughes Group and Space Systems Loral, have already placed orders with Japanese companies for satellite launches.

Nikkei Sangyo Shimbun (Tokyo), 18 November 1998, p. 1, in FBIS-EAS-98-350, 16 December 1999.

According to Japan's Chief Cabinet Secretary Hiromu Nonaka, Japan will conduct joint research with the United States on a theater missile defense system (TMD) in 1999. The two countries will conduct research on the Navy Theater Wide Defense (NTWD) system. Nonaka said that this would be the "most effective and productive" means for Japan to defend itself and to strengthen Japan-US security ties.

Washington Times, 26 December 1998, p. A10.

On 30 December 1998, China warned Japan against launching spy satellites and joining the United States in a theater missile defense program (TMD). According to Chinese Foreign Ministry spokesman Zhu Bangzao, China is concerned that such a move on the part of Japan could start an arms race, thereby harming global strategic stability. During the week of 21-27 December, Japan announced plans to launch its first intelligence satellite by the year 2002. It has allocated \$97 million for the development of the satellites. Japan's decision to acquire intelligence satellites followed in the wake of North Korea's 31 August 1998 ballistic missile test. Japan's military and defense agencies failed to detect and track the missile's flight.

South China Morning Post, [Online] <http://www.scmp.com>, 31 December 1998.

KAZAKHSTAN

Nuclear

A February 1999 article in *Novoye Pokoleniye* details a number of unconventional business deals concluded by the management of the Ulba Metallurgy Plant. These deals involved the foreign sale of the nuclear-related dual-use materials beryllium and tantalum. The article implies that these deals were largely the result of the incompetence and corruption of Ulba management. In the fall of 1994, the plant management, desperate for a way to fund continued operations and modernization, concluded an agreement with BRGL Economic Enterprises, Ltd., an Israeli-based company headed by a Mr. Gottenstein. According to the terms of this deal, the Ulba plant, which produces most of the beryllium and tantalum output of the former Soviet Union, would give BRGL exclusive rights to distribute tantalum worth about \$100 million. The tantalum would be delivered to a Western European warehouse by the Ulba plant, which would then receive a credit in the amount of at least 40 percent of the value of the tantalum from BRGL. After the agreement was signed, Ulba sent the first shipment of 180 tons of tantalum to a Rotterdam warehouse. BRGL originally valued the material at \$130 per kilogram, but later reduced that figure to \$80 per kilogram, a price the article suggests was unreasonably low.

However, it soon became clear that BRGL would not deliver the credit as promised in the agreement, and a second shipment of 270 tons of tantalum never left Ulba. BRGL claimed to have lost \$5.5 million as a result of the agreement's failure.

Rudolf von Shlessinger, *Novoye Pokoleniye* (Almaty), 26 February 1999, p. 1. NIS Nonproliferation Project, Correspondence with Kazakhstani government official (name withheld by request), 5 March 1999.

NORTH KOREA

Nuclear

On 3 November 1998, a South Korean television broadcast alleged that nuclear materials originating in North Korea were being sold on the black market in China. According to Seoul-based SBS Television, four different materials were shown to SBS reporters in Dandong, a Chinese border city close to North Korea's Sinuiju city. The first was high-purity zinc, a key material used in the production of missiles or satellites. The selling price for 4 grams of zinc was \$10,000. SBS was also shown uranium of 96 percent purity containing some aluminum, silicon, and iron. Third, thorium in the size of a cigarette pack was shown to the reporters. Lastly, SBS was shown a bottle of lithium with a 99.998 percent purity level. Lithium is a key ingredient in the development of hydrogen bombs, and reporters speculated that the enriched lithium proved that North Korea had intensively researched hydrogen bombs as well. According to a memo written by the black marketers in Dandong, they had 2 kg of lithium and 6 kg of uranium from North Korea in their possession.

BBC Summary of World Broadcasts, 5 November 1998, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 5 November 1998.

According to US intelligence sources, North Korea is building a reactor to make weapons-grade plutonium at the underground construction site at Kumchang-ri. It is also believed that North Korea plans to "put a Chernobyl-style graphite-uranium reactor" at the underground site. The sources added that the lack of electric grids near the construction site proved that "whatever is built there must therefore produce its own elec-

tricity." With an underground plutonium facility, North Korea would be in a position to produce nuclear weapons in two to five years. A South Korean government official has alleged that South Korea and the United States have material evidence that the two underground facilities in the North Korean areas of Kumchang-ri and Taean-ri are nuclear-related.

Richard Parker and Michael Zielenziger, *San Jose Mercury News*, 17 November 1998. Yonhap News Agency (Seoul), 20 November 1998. Reuters, 19 November 1998.

According to South Korean intelligence sources, North Korea has tested nuclear weapon detonators. Satellite photos indicate that high-explosive tests have been conducted in Kusong, 30 km northwest of Yongbyon. The high-explosive tests are a precursor to the production of nuclear weapon detonators. The Kusong complex has a factory that "produces detonators" as well as warehouses and a test site.

Korea Herald, [Online] <http://www.koreaherald.co.kr>, 24 November 1998.

On 11 January 1999, North Korea reiterated its demand for \$300 million in compensation for allowing the United States to conduct a one-time inspection of its suspected nuclear-related facility at Kumchang-ri. According to an unidentified foreign ministry official, North Korea is demanding compensation because once it opens the site, it will not be able to use it for its original purpose. The United States rejected North Korea's demand for cash, but has indicated that it would consider offering food and economic compensation in exchange for access to the site. The United States has said that North Korea's continual refusal to permit access to the site could jeopardize the 1994 Agreed Framework. The North Korean demand was issued days before a third set of talks between the United States and North Korea.

CNN, [Online] <http://www.cnn.com>, 11 January 1999.

According to US special envoy for Korean peace talks Charles Kartman, the United States has made progress in reaching an agreement on inspections of North Korea's

suspected nuclear facility at Kumchang-ri. The United States has offered 500,000 tons of grain to North Korea in return for access to the underground site. North Korea has in turn stepped down from its previous demand of \$300 million in compensation for a one-time inspection and has accepted the grain offer. On 9 February 1999, US State Department spokesperson James P. Rubin affirmed the US position not to give in to the \$300 million compensation demand from North Korea.

Korean Times, [Online] <http://www.korealink.co.kr>, 10 February 1999. FBIS FTS19990210000498, 10 February 1999.

Missile

US intelligence and diplomatic sources allege that North Korea is building two new launch facilities for its medium-range Taepo-dong-1 missile at Yongo dong and Chiha-ri. Workers have already completed the bunkers for propellant fuel at the Yongo dong site and the facility could become operational as early as 1999. A similar facility is being built at Chiha-ri, which is the technical support base for North Korea's Scud missile brigade. North Korea is also believed to have stepped up production of its No-dong missiles, which could be exported to Syria, Pakistan, Iran, or Libya.

Dana Priest and Thomas Lippman, *Washington Post*, [Online] <http://www.washingtonpost.com>, 20 November 1998.

According to a Japanese Defense Agency (JDA) report, North Korea's Taepo-dong-1 launch on 31 August 1998 was that of a multi-stage missile and not a space launch vehicle. The primary objective of the test launch was to verify various technological aspects in order to develop longer-range missiles. The JDA detected three separate objects during the test flight. The JDA believes that the Taepo-dong-1 is comprised of a No-dong first stage and a Scud-B for the second stage. Japanese scientists have concluded that the Taepo-dong-1 has a range of 1,500 km. The JDA also stated that there was no indication or evidence that North Korea was entering the satellite launch business. The report also said that the test launch differed from nor-

mal ballistic launches in that the apex of the trajectory "was lower and flatter than typical ballistic missiles."

Jane's Missiles & Rockets, December 1998, p. 14.

US intelligence agencies believe that North Korea has postponed a second test of its long-range Taepo-dong-1 missile. US intelligence analysts speculate that North Korea probably has a limited number of Taepo-dong-1 missiles available for testing. Alternatively, North Korea may be waiting for better political and weather conditions. In November 1998, satellite reconnaissance showed a truck, presumably carrying two long-range ballistic missiles, leaving a missile manufacturing facility in Pyongyang for the Musudan missile base.

Bill Gertz, *Washington Times*, 31 December 1998, p. A4. *JoonAng Ilbo*, [Online] <http://www.english.joongang.co.kr>, 24 November 1998.

On 2 February 1999, CIA director George Tenet told a congressional hearing that North Korea was developing a new generation of missiles that could deliver payloads to the continental United States. Tenet said that the North Korean three-stage missile test of August 1998 put it much closer to having an intercontinental ballistic missile (ICBM). The launch demonstrated technology that will give North Korea the ability to deliver small payloads to parts of the United States, although not accurately. He also said that North Korea is developing an advanced two-stage ICBM, the Taepo-dong-2, that could deliver larger payloads to Alaska and Hawaii, while smaller payloads could reach the continental United States.

James Risen, *New York Times*, [Online] <http://www.nytimes.com>, 3 February 1999.

PAKISTAN

Nuclear

According to "reliable sources of the [Pakistani] Federal Government," Pakistan has started producing plutonium for use in hydrogen, plutonium, and neutron weapons. According to this report, Pakistan is capable of producing thermonuclear and neutron bombs. Pakistani experts claim that the

Khushab nuclear reactor is producing plutonium-239, a radioactive element used in some nuclear weapons.

The Nation (Lahore), [Online] <http://www.nation.com.pk>, 17 November 1998.

US President Bill Clinton announced on 2 December 1998 that the military and economic sanctions placed on India and Pakistan after their May 1998 nuclear tests would be waived for one year. Although he condemned the South Asia nuclear arms race, he said that he also wanted to be supportive of measures to "help the economy of Pakistan to grow, to benefit ordinary citizens."

Sean Scully, *Washington Times*, 3 December 1998, p. A4, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 3 December 1998.

Pakistani Foreign Minister Sartaj Aziz announced on 4 January 1999 that he and US Deputy Secretary of State Strobe Talbott would discuss a "five-point nonproliferation agenda" during Talbott's visit to Pakistan on 2 February 1999. The agenda would consist of matters relating to the Comprehensive Test Ban Treaty (CTBT), the Fissile Material Cut-Off Treaty (FMCT), nuclear weapons deployment, export controls, and Indian-Pakistani relations focusing on the Kashmir situation.

Pakistan Link, [Online] <http://www.pakistanlink.com>, 5 January 1999.

Pakistani Prime Minister Nawaz Sharif approved the establishment of a Nuclear Regulatory Authority on 7 January 1999. The Nuclear Regulatory Authority was created to help "eliminate the chances of the export of [Pakistan's] nuclear capability."

Pakistan, 8 January 1999, pp. 1,7, in FBIS-TAC-99-012, 12 January 1999.

Officials at the Pakistan Atomic Energy Commission (PAEC) announced on 21 January 1999 that the 330 MW Chashma nuclear power plant would start commercial power production by the end of 1999. Officials said that the final tests for the plant should be completed by August 1999.

Pakistan Link, [Online] <http://www.pakistanlink.com>, 22 January 1999.

Pakistani press reports claimed that India and Israel had established an "Electric Counter Measure (ECM) frequency operated equipment network to neutralize Pakistan's electronic network at nuclear facilities," specifically the Kahuta plant. Unnamed Pakistani experts said that this "electronic attack" on Pakistan's nuclear infrastructure could jam Pakistan's radar systems, radio, and other electronic devices.

Pakistan Link, [Online] <http://www.pakistanlink.com>, 25 January 1999.

The Pakistan Atomic Energy Commission (PAEC) announced plans for a new nuclear power plant at the Karachi nuclear power station. PAEC officials noted that the new power plant, KANUPP-2 or K-2, would be "the second operating power plant in the Muslim world." The head of PAEC, Dr. Ishfaq Ahmad, said that Pakistan's 330-MW Chashma Nuclear Power Plant (CHASHNUPP), being built with Chinese assistance, would be commissioned before the end of 1999. He also proposed plans for the construction of a second nuclear plant at Chashma, CHASHNUPP-2. Ahmad also announced the commissioning of the new Heavy Water Upgrading Plant in KANUPP, a facility that will help Pakistan achieve self-reliance in the production of heavy water for use in its nuclear power plants. He said that Pakistan has indigenously developed the technology to enrich uranium and zirconium and make spare parts for reactors.

Dawn (Islamabad), [Online] <http://www.dawn.com>, 2 February 1999. AFP, 1 February 1999, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 1 February 1999.

Missile

Dr. A.Q. Khan, Pakistan's top nuclear scientist, said on 24 November 1998 that Pakistan had started serial production of the Ghauri missile. The Ghauri is a medium-range, surface-to-surface missile with a payload of 700 kg. Khan was quoted as saying that Pakistan already has "a good stock of these missiles."

The Nation (Lahore), [Online] <http://www.nation.com.pk>, 25 November 1998.

The Japanese Defense Agency (JDA) has learned of a military link between North Ko-

rea and Pakistan. In or around 1995, the JDA intercepted a radio transmission from North Korea, which revealed that North Korea had special aircraft that flew VIPs to and from Pakistan four or five times a year. Additionally, a British intelligence organization reported that North Korean engineers had been seen at a Ghauri ballistic missile assembly site in Pakistan. These two pieces of information taken together suggest that North Korea and Pakistan jointly developed the Ghauri.

Daily Yomiuri (Tokyo), 11 December 1998, in FBIS FTS12111998000010, 11 December 1998.

According to the *Asian Wall Street Journal*, China has given technical assistance to Pakistan's M-11 short-range ballistic missile program. Pakistan has reportedly used Chinese-supplied blueprints and technology to assemble Chinese-designed ballistic missiles, which are nuclear-capable and have a range of nearly 300 km. The primary Chinese assistance has gone to a factory complex in Fatehjung, a northern Pakistani town in Punjab. China is also allegedly aiding Pakistan's ability to design and build its own ballistic missiles.

Harvey Stockwin, *Times of India*, 17 December 1998.

SOUTH KOREA

Nuclear

According to a spokesperson from South Korea's Ministry of Science & Technology, the United States has refused since the 1970s to assist South Korea in developing a closed nuclear fuel cycle because South Korea pursued a clandestine nuclear weapons program in the past. The US State Department has neither confirmed nor denied the existence of South Korea's nuclear weapons program, saying that the United States is opposed to South Korea reprocessing and enriching uranium as the Korean Peninsula is a region of tension. According to South Korean officials, the United States and South Korea have carried on their confrontation over nuclear policy indirectly through the presentation of "non-papers" and informal talks. The United States also continues to monitor South Korea's nuclear program independently of the IAEA's inspection activities. Monitor-

ing includes visits to Taejeon, which houses the Korea Atomic Energy Research Institute and other nuclear installations to look for any clues that South Korea may be pursuing a nuclear weapons program. According to a senior US official who has watched South Korea's nuclear program for two decades, "without this level of interference, South Korea would be a de facto nuclear weapons state by now."

Mark Hibbs, *Nucleonics Week*, 7 January 1999, pp. 1, 9-10.

Missile

According to the head of South Korea's Agency for Defense Development (ADD), Bae Mun-Hwan, South Korea is planning to launch its first military satellite in 2005. The Mugunghwa 4 satellite will be fitted with military communications and reconnaissance systems. Mun-Hwan said that ADD plans to purchase the required electro-optics from France. Bae Mun-Hwan also said that ADD is "developing a new medium-range surface-to-air missile to intercept aircraft and Scud-type missiles." ADD is also developing an anti-ship missile with a range of 200 km. The Harpoon-class missile will be developed by 2003 at a total cost of 100 billion won.

Jane's Defence Weekly, 11 November 1998, in Lexis-Nexis, [Online] <http://www.lexis-nexis.com>, 11 November 1998. *Korea Herald*, [Online] <http://www.koreaherald.co.kr/>, 27 November 1998.

The South Korean Ministry of National Defense has announced a "mid-term" defense plan consisting of 320 new projects at a cost of 26.7 trillion won. The projects include the purchase of an Aegis-type destroyer and an air-defense missile system comprising the US Patriot or the Russian S-300 missile defense system.

ChosunIlbo, [Online] <http://www.chosun.com>, 12 February 1999.

TAIWAN

Nuclear

URENCO, a Dutch-British-German consortium, is negotiating with the Taiwan Power Company (Taipower) to enrich uranium. According to a Taipower official, Taiwan wants

to "diversify the supply of [uranium] enrichment service." Negotiations between URENCO and Taiwan have been in progress for over a year. The official added that since the consortium members did not have a nuclear safeguards agreement with Taiwan, "URENCO needs US approval" to go ahead with the deal. The US nuclear safeguard pact with Taiwan guarantees that Taiwan's uranium is used for peaceful purposes and that the nuclear facilities receive regular IAEA safety checks. Taiwan's six nuclear reactors in three nuclear power plants import about 1,336 tons of uranium annually.

Deutsche Presse-Agentur, 9 November 1998, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 9 November 1998.

Missile

China has warned Taiwan to refrain from purchasing US Aegis-equipped destroyers or joining the US-led theater missile defense (TMD) system. China's Foreign Ministry spokesman Tang Guoqiang said that "China seriously opposes the United States selling weapons to Taiwan."

Washington Times, 4 December 1998, p. 5.

The US Congress has passed a resolution that asks Taiwan, Japan, and South Korea to jointly finance a theater missile defense project. According to Taiwan's chief of general staff, General Tank Fei, Taiwan is mainly interested in the development of a low-altitude TMD, with the possibility of including a high-altitude TMD. Taiwan's investment in a joint TMD program would be \$1 billion.

South China Morning Post, [Online] <http://www.scmp.com>, 19 November 1998.

On 24 November 1998, Chief of General Staff Tang Fei stated that Taiwan has formally applied to purchase an unspecified number of advanced Aegis-equipped guided-missile destroyers from the United States. If the sale goes through, the ships would be delivered in 2006.

AP, 24 November 1998.

According to senior Taiwanese military officials, Taiwan will purchase three to six batteries of the Patriot Advanced Capability

Level-3 (PAC-3) anti-missile system from the United States in 1999. A military official said it was unlikely that Taiwan would participate in the US Theater High Altitude Area Defense (THAAD) project, but an introduction of the TMD system would easily mesh with its already "mature system." Taiwan plans to integrate the PAC-3 with its Sky Bow anti-missile system and hopes to deploy the system around major cities on the main island. The Sky Bow has been developed by the Chungshan Institute of Technology and Science. According to a Taiwanese military official, it would be more cost-effective to expand the current deployment of the Patriot missile system into a comprehensive deployment than to invest in the US THAAD system or a national missile defense system.

Lin Dhen-hwa, *Taipei Tzu-Li Wan Pao*, 11 December 1998 p. 1, in FBIS-CHI-98-350, 16 December 1998.

Taiwan deployed a fourth Patriot surface-to-air missile battery in the greater Taipei area.

Washington Times, 29 January 1999, p. A16.

On 7 February 1999, the Taipei-based *United Daily News* reported that Taiwan is developing its own anti-missile capability. The Sky Bow II missile system will serve as a safeguard should the United States not supply Taiwan with its advanced PAC-3 air-defense missiles due to Chinese opposition or US internal political disagreements.

AP (Taipei), 8 February 1999. NAPSNet Daily Report, [Online] <http://www.nautilus.org>, 8 February 1999.

VIETNAM

Nuclear

On 19 January 1999 in Vietnam, Chairman of the Atomic Energy Commission of India R. Chidambaram and Chairman of the Vietnam Atomic Energy Commission Tran Huu Phat signed an Indo-Vietnamese cooperation agreement on peaceful applications of nuclear energy. The accord will establish a "Nuclear Training Center" in Vietnam, to be completed in 2000, and provide Vietnamese scientists and engineers the opportunity to train at nuclear facilities in India. The train-

ing center will most likely be located in Dalat.

P.S. Suryanarayana, *The Hindu*, [Online] <http://www.webpage.com/hindu>, 21 January 1999. Neel Patri, *Nucleonics Week*, 28 January 1999, p. 15.

EUROPE

ARMENIA

Nuclear

On 2 March 1999, Armenian President Robert Kocharyan signed the Law on the Use of Nuclear Energy for Peaceful Purposes, passed by the Armenian National Assembly on 1 February 1999. This new law outlines the procedures for export, import, and storage of nuclear and radioactive materials and radioactive waste. It requires licenses for organizations dealing with nuclear energy, forbids the import of radioactive waste, and prohibits the export of nuclear and radioactive materials, radioactive waste, nuclear equipment, and nuclear technology to countries that have not signed the appropriate international agreements. The law provides for radioactive waste disposal in special facilities, and according to Ashot Martirosyan, head of the Armenian Nuclear Regulatory Authority (Armgosatomnadzor), may form the legal basis for a nuclear code in the future.

Snark, 3 March 1999, in FBIS FTS19990303001731, 3 March 1999. Interfax, 1 February 1999, in FBIS FTS19990201001137, 1 February 1999.

Missile

Russia plans to deploy S-300V air-defense systems [a.k.a. Antey-2500 air-defense systems] in Armenia. The Obzor-3 and Nebo-SV radar systems, which are part of the S-300V system, can detect airborne targets at ranges up to 300 km. The effective radius of S-300V systems is 100 km against aircraft and 40 km against ballistic missiles. Russian representatives said the new systems will not become part of Armenia's inventory but will be deployed under the Integrated System of CIS Air Defense Forces. Russian Ambassador

to Armenia Anatoliy Drukov said that air-defense systems at the Russian base in Armenia would be upgraded, and while he did not confirm that S-300V systems would be deployed at the base, he did not dismiss the possibility of deploying them in Armenia in the future. In a statement released on 1 February 1999, the parliament of Azerbaijan denounced Russian arms sales to Armenia. The parliament expressed concern about the growing military cooperation between Armenia and Russia, especially the delivery of S-300 air-defense systems and MiG-29 fighter aircraft to Yerevan. Their delivery "poses a serious threat to Azerbaijan," the parliament said.

Sergey Sokut, *Nezavisimaya gazeta*, 19 January 1999. Armen Khanbabyan, *Nezavisimaya gazeta*, 16 January 1999. Interfax, 2 February 1999.

CYPRUS

Missile

Cypriot President Glavkos Clerides announced on 29 December 1998 that his government will not deploy the Russian-built S-300PMU-1 surface-to-air missile system on Cyprus. Clerides said that "I reached the decision not to deploy the missiles in Cyprus and I agreed to negotiate with the Russian government for their possible deployment in Crete." He added that his decision was not a sign of "giving in to pressure, threats and blackmail," and that he does not "criticize or renounce as wrong" his January 1997 decision to order the missile system for deployment on Cyprus.

Republic of Cyprus, [Online] <http://www.pio.gov.cy>, 30 December 1998.

GREECE

Missile

The US firm Raytheon announced on 20 January 1999 that it had won a \$1.1 billion contract to sell up to six MIM-104 Patriot surface-to-air missile systems to Greece. Greece plans to purchase initially four batteries of Patriot missiles and is expected to exercise an option for two additional batteries later in 1999. Greece will reportedly assist Raytheon in producing the Patriot systems.

CNN, [Online] <http://www.cnn.com>, 20 January 1999.

RUSSIA

Nuclear

Victor Mikhaylov, first deputy minister of atomic energy, told reporters on 29 November 1998 that Russia had made "understandings" to train Chinese and Indian nuclear physicists at Russian universities. The education programs for power station controllers, engineers, and experts were set to start in 1999. Mikhaylov said that the proposed curricula were being drafted at Russia's Institute for Physical Engineering, and annual tuition fees would be "several thousand US dollars."

RIA Novosti, 29 November 1998, in FBIS-TAC-98-333, 29 November 1998.

In an interview, Lieutenant Colonel Nikolay Sokolyuk, who heads a Russian Federal Security Service (FSB) military counterintelligence unit, describes an attempt by a former employee of the All-Russian Scientific Research Institute of Experimental Physics (VNIIEF) to divert and sell U-238 on the black market. VNIIEF, located in Sarov (formerly Arzamas-16), is one of the two nuclear weapons design facilities in Russia. According to Sokolyuk, in 1995 a former worker at VNIIEF, identified only as Yu. Grechin, attempted to divert five kg of U-238 (probably natural or depleted uranium) from the facility. The article suggests that in addition to this attempt to divert uranium, Grechin was also involved in diverting other metals from VNIIEF, which he sold to trading firms in Moscow. From his former co-workers Grechin had heard rumors that a now deceased worker at one of the production facilities at VNIIEF had collected and stored "pieces of U-238." Grechin managed to find this stockpile of U-238, which totaled about 5 kg, and remove it from the facility. He stored the material on the balcony of his apartment while trying to find a buyer. He failed to find a purchaser, but attracted the attention of the FSB, which called him in for questioning and convinced him to sign a confession. He later voluntarily turned the U-238 over to the FSB. Although he was not charged in this case, Grechin was later arrested for another attempt to divert materials from a different production facility at VNIIEF, although the report does not specify the materials involved in that case. In the

interview, Sokolyuk says that deteriorating economic conditions in Sarov are responsible for attempts by people living and working there to steal materials from the facility.

Nataliya Kocheshkova, *Gorodskoy kurer* (Sarov), 17 December 1998.

At a press conference on 18 December 1998, Major-General Valeriy Tretyakov, head of the Chelyabinsk Oblast directorate of the Federal Security Service, revealed that FSB agents had thwarted an attempt to divert 18.5 kg of "radioactive materials" from "one of the nuclear facilities of the Chelyabinsk region." Tretyakov did not specify the type of radioactive materials involved, although he added that they "might have been used for production of components for nuclear weapons," suggesting that either highly enriched uranium or plutonium may have been involved. Tretyakov also did not specify at which of the several nuclear facilities in Chelyabinsk Oblast the attempted theft took place, nor did he give the exact date of the incident, although he said it was one of the most important cases solved by his office in 1998. Tretyakov added that the theft involved employees of the nuclear facility, adding that the FSB investigation into the incident is ongoing. When asked by a journalist to comment on the state of security at nuclear facilities in Chelyabinsk Oblast—which include the Mayak Production Association, the Instrument-Making Plant at Trekhgornyy (formerly Zlatoust-36), and the All-Russian Scientific Research Institute of Technical Physics (VNIITF), located in Snezhinsk—Tretyakov expressed "concern," and said that US assistance in this area, while useful, "is far from being [the] permanent measure we need."

Yevgeniy Tkachenko, ITAR-TASS, 18 December 1998. Alevtina Nikitina, *Chelyabinskiy rabochiy*, 19 December 1998.

The head of the Chechen Security Service, Ibragim Khultygov, appeared on Chechen TV on 29 December and announced that a container "full of radioactive substances and a mine attached to it" had been found near the town of Argun (located about 15 km east of Grozny, the Chechen capital). Khultygov said that the container, which was "emitting strong radiation," was found near a railway

line. Later on 29 December, Khultygov reported that the mine attached to the container had been defused and “no longer poses a threat to local residents.” Khultygov did not specify the location to which the container was removed for defusing, nor did he identify the radioactive substance(s) involved. According to a report by AFP, Chechen officials are worried that the republic may be flooded with radioactive substances owing to the reported bombing by Russian federal troops of the Radon Special Combine located north of Grozny in 1995. A report on the Russian radio station Ekho Moskvyy on 31 December 1998 said that Chechen authorities had as yet “refused to provide any information” about the container. The radio station speculated that the incident was “not just an accident but a planned act of sabotage.”

ITAR-TASS, 29 December 1998. Sayed Isayev, ITAR-TASS, 29 December 1998. AFP, 29 December 1998. Radiostantsiya Ekho Moskvyy, 31 December 1998, in FBIS FTS19981231000246, 31 December 1998.

On 29 December 1998, Russia's Tekhsnabekhpport company shipped the first consignment of highly enriched uranium (HEU) to France. The 227.5 kg of HEU will be fabricated into fuel rods at the Cerca plant in Romans for use in the High-Flux Reactor (RHF) at the Laue-Langevin Institute in Grenoble, where Russian scientists will be able to work, and in the Orphee reactor in Saclay, operated by the French Commissariat on Nuclear Energy. The long-delayed shipment—the first shipment of fresh Russian HEU outside the country for reactors not supplied by Russia or the Soviet Union—will make it possible for Russia to offset a debt of \$3.36 million for French equipment supplied to Soviet energy research institutions, and bring hard currency to Russia's budget and the nuclear sector.

Interfax, 31 December 1998. Ann MacLachlan and Sergey Rybak, *NuclearFuel*, 11 January 1999, pp. 1, 13-15.

Russian Minister of Atomic Energy Yevgeniy Adamov traveled to Krasnoyarsk Kray on 5 January 1999 to urge the region's governor, Aleksandr Lebed, to accept Ukrainian spent nuclear fuel for storage. Adamov

stressed that in not doing so, Krasnoyarsk was endangering Russia's position in the spent fuel storage and reprocessing market. He said that the low price Ukraine was paying for nuclear fuel storage and reprocessing was part of a temporary agreement and that the fee would be increased later. According to Adamov, other nations such as China are trying to capture business in the expanding field. Adamov told deputies of the Krasnoyarsk Kray Legislative Assembly that storage and reprocessing of spent nuclear fuel is profitable and has not yet been monopolized, and that reprocessing one kilogram of spent nuclear fuel can earn up to \$1,000. Russia currently earns less than \$300 per kilogram from storing spent nuclear fuel from Ukraine.

AP, 5 January 1999, in Lexis-Nexis [Online] <http://web.lexis-nexis.com>. *BBC Summary of World Broadcasts*, 6 January 1999, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>.

In a report summarizing its work during 1997, the Russian Federal Inspectorate for Nuclear and Radiation Safety (Gosatomnadzor) informed Russian President Boris Yeltsin about several violations of Russian regulations governing the control and accounting of nuclear materials. The report pointed to an incident in which 142 grams of highly enriched uranium (enrichment level unspecified) arrived at the Mayak Production Association on 7 April 1997 in a shipping container from the Novosibirsk Chemical Concentrate Plant. According to documents accompanying the containers, they should have been empty. An investigation by Gosatomnadzor “showed that workers [at the Novosibirsk Chemical Concentrate Plant] had not followed the requirements for accounting and control of nuclear materials.” In another case, on 5 March 1997, Gosatomnadzor determined that, in violation of instructions issued by Gosatomnadzor authorizing the Mayak Production Association to transport HEU only within its own grounds, Mayak had shipped HEU removed from nuclear weapons to both the Ural Electrochemical Combine and the Novosibirsk Chemical Concentrate Plant. Overall, the report concluded that inspections in 1997 at Minatom facilities had revealed “insufficient monitoring of the requirements of nuclear

security,” including “a cumbersome and ineffective system of operational accounting for nuclear materials, based in a number of cases on the principles of paper accounting and secrecy, and not on the principle of potential danger to nuclear materials as recommended by the IAEA.” The report also complained, citing the Mayak Production Association specifically, that “some organizations are trying to escape from any government inspection of their handling of nuclear materials, including HEU.”

Voprosy bezopasnosti, 13 January 1999.

At a working meeting in Moscow on 3 February 1999, the head of the Russian State Customs Service, Valeriy Draganov, and Tapani Erling, head of the Chief Customs Directorate of the Finnish Republic, signed a protocol on “measures for customs control over nuclear and other radioactive materials being transported across the Russian-Finnish state border.” Draganov said that the agreement was the first of its kind to implement the recommendations of the IAEA, the World Customs Organization (WCO), and the G-8 on “counteracting illegal trafficking in nuclear materials.” According to these recommendations, said Draganov, bilateral agreements should be the basic mechanism for combating nuclear smuggling. The report did not include any details regarding the provisions of the agreement.

ITAR-TASS, 3 February 1999, in FBIS FTS19990203001621, 3 February 1999.

Valeriy Draganov, the head of the Russian State Customs Service, told a Moscow press conference on 3 February 1999 that Russian customs officials had stopped “about 100 attempts to illegally transport fissile and radioactive materials across the borders of the Russian Federation” during 1998. Draganov did not specify how many of these cases involved fissile materials and how many radioactive isotopes. He also noted that the customs service stopped “not only obvious nuclear materials, but also any cargo with an elevated radiation level.” This remark suggests that the 100 cases include those involving not only fissile material and radioactive isotopes, but also contaminated

materials such as radioactive scrap metal and waste, which have little proliferation significance. Draganov said that his service had blocked more attempted imports than exports of radioactive material. As an example, he pointed to a recent case in which the Western Siberian Customs District had halted an illegal import of uranium concentrate, although he did not specify the date of this incident. Again without specifying a date, Draganov also noted that customs officials had recently blocked an attempt to use "the diplomatic post" to import radioactive materials into Russia. Draganov's comments were broadly similar to, but slightly more detailed than, those he made at a 26 January 1999 news conference.

Interfax, 3 February 1999.

UKRAINE

Nuclear

Ukrainian officials reported that on 2 December 1998, Ukrainian border guards and customs officers detained two Ukrainian nationals who were attempting to cross over the border into Moldova with a lead box holding 11.5 kg of radioactive material. The officials said that "according to our preliminary information, there are no doubts the box contained nuclear fuel. It was uranium stolen from the Khmelnytska [Khmelnytsky] nuclear [power] station." This statement suggests that the material seized was low-enriched uranium in the form of ceramic fuel pellets designed for use in a power reactor. Officials at the Khmelnytsky nuclear power plant refused to comment on the seizure when contacted by the Reuters news agency. According to the Ukrainian customs officials, the smugglers had been carefully monitored and were arrested when their car was about to cross the border. The two suspects were described by officers as "more like ordinary farm workers than experienced smugglers," suggesting that they were amateur criminals. After their arrest, the suspects told officers that they had planned to market the material in Western Europe for a price of \$1.5 to 2 million. The seized material has been sent to the Khmelnytsky office of the Ukrainian Security Service (SBU) for examination. The officials said that until this case, Ukraine had

not recorded any thefts of radioactive materials from its nuclear power stations.

Pavel Polityuk, Reuters, 4 December 1998.

The Ukrainian daily *Dyen* reported on 8 December 1998 that Ukrainian customs officials had detained a Moldovan national who attempted to cross the border into Moldova with a 42-kg container of radioactive material. The type of material involved was not specified, although the container reportedly emitted radiation at a level 12 times greater than the maximum allowed by Ukrainian health regulations. The radiation level and heavy weight of the container suggest that it may have been an industrial cesium-137 source. The same article reported that Ukrainian police seized a 100-kg lead box holding a metal-working device containing a cesium-137 source in Malomykhailivka, a village in southern Ukraine. The box had been kept in storage for four years by a villager who received it from his grandson. Thefts of industrial cesium-137 sources are fairly common in the NIS. Police officials say most such thefts are carried out by amateurs who mistakenly believe the sources can be sold on the black market as nuclear technology.

AP, 8 December 1998.

MIDDLE EAST AND AFRICA

ALGERIA

Missile

Russia will deliver its first batch of Kh-35 [NATO designation SS-N-25 'Kayak'] anti-ship missiles to Algeria in 1999, a spokesman for the Zvezda-Strela research and manufacturing center, which makes the missiles, told ITAR-TASS. Algeria signed a contract earlier in 1998 to buy 98 Kh-35 anti-ship missiles for its navy. Russia will ship the missiles in two consignments (of 48 missiles each [sic]) as part of Uran compact ship missile batteries. Six Algerian missile boats, each with 16 Kh-35 missiles in four four-unit launch

arrays, will be fitted with the Uran batteries. (Each array has four hermetically sealed transport and launch containers.) The missile boats will be equipped with missile batteries in two phases during 1999, beginning first with 48 missiles on three boats and followed later by the remaining three boats. Russia will ship six automated launch control systems along with the missiles. In addition, Russia will also supply the Algerian Navy with a complex of shore equipment, which will serve as an independent service center to test the Kh-35 missiles.

Nikolay Novichkov, ITAR-TASS, 24 November 1998, in FBIS FTS19981124001240, 24 November 1998.

EGYPT

Nuclear

On 6 February 1999, Egyptian Prime Minister Kamal Ganzouri and South Korean Prime Minister Kim Jong Pil signed an agreement for increased Egyptian-South Korean economic ties and cooperation in the nuclear field. According to the agreement, South Korean experts will visit Egypt to develop plans for using nuclear energy in industrial, agricultural, and medical applications.

CNN, [Online] <http://www.cnn.com>, 6 February 1999.

Wolfgang Hofmann, executive secretary of the Comprehensive Test Ban Treaty Organization, announced that the organization will establish a \$4 million station in Egypt to monitor the ban on nuclear weapons testing.

Arieh O'Sullivan, *Jerusalem Post*, 17 February 1999, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 17 February 1999.

Missile

Egypt has requested pricing and availability information from the United States on the Patriot PAC-2 and Avenger surface-to-air missile (SAM) systems. Egypt is reportedly interested in purchasing six Patriot fire units, consisting of 48 Patriot launchers and 384 PAC-2 Guidance-Enhanced missiles, at a cost of approximately \$1 billion. A final decision on the sale is expected to take approximately one year. The Egyptian request followed concern expressed by US govern-

ment officials that Egypt might purchase the Russian-built S-300 SAM system.

Philip Finnegan, *Defense News*, 2-8 November 1998, pp. 1, 19.

IRAN

Nuclear

At a press conference on 30 November 1998, Russia's First Deputy Minister of Atomic Energy Victor Mikhaylov discussed the history of Russia's cooperation with Iran in the nuclear industry and answered questions. Mikhaylov believes it is important to complete the construction of the Bushehr nuclear power plant. However, he does not completely accept Iran's approach to how the construction should be conducted. Cooperation with Iran is important for Russia both in terms of politics and economics. In 1992-1997 Russia designed a uranium mine for Iran with an annual output of 100 to 200 million tons. Mikhaylov also said that Iran is currently seeking Russian assistance in uranium and isotope enrichment.

Kremlin International News broadcast, 1 December 1998.

Russia and Iran have agreed to expand their nuclear cooperation to include three additional VVER-640 pressurized water reactors as part of the Bushehr project. Russia is already assisting Iran with construction of a VVER-1000 nuclear reactor at Bushehr, which should be completed in 2004. So far, Russia has received \$50 million of the \$800 million deal. With the three additional VVER-640 reactors, the total cost of the Bushehr project could exceed \$4.5 billion.

Thomas Nilsen, *Bellona*, 1 December 1998, p. 20.

According to US intelligence and national security officials, China delivered telemetry equipment for testing medium-range missiles to Iran in November 1998. Iran may use the telemetry equipment to test its new Shahab-3 ballistic missiles. US intelligence officials believe that China's Great Wall Industries Co. agreed to provide Iran the entire telemetry infrastructure to support the Shahab missile development program. The transfer violates China's repeated pledges to abide by the Missile Technology Control Regime

(MTCR). According to a Chinese official, the latest transfer to Iran had dual-use applications for either short-range tactical missiles or longer-range missiles. US intelligence agencies have also uncovered new information about China's missile technology transfers to Pakistan for its new medium-range Shaheen missile. On 12 November 1998, US Undersecretary of State John Holum officially protested to Chinese leaders on the delivery of a new shipment of missile technology to Iran. According to White House spokesman P.J. Crowley, the US strongly opposes any missile cooperation with Iran. On 8 December 1998, China's Foreign Ministry declined to comment on the *Washington Times* allegation that China sold telemetry equipment to Iran. When queried on the report, Chinese Foreign Ministry spokesman Zhu Bangzao said, "China has honored its commitments by adopting effective and strict controls and there is no such issue as proliferation."

Bill Gertz, *Washington Times*, 7 December 1998, p. 8. *Washington Times*, 8 December 1998, p. 8. AFP (Paris), 8 December 1998.

Israeli intelligence and security officials have reportedly revised their estimate of how long it will take Iran to develop a nuclear weapon capability. The previous estimate of five to seven years has been re-assessed at two to three years. Uzi Arad, special advisor to Israeli Prime Minister Benjamin Netanyahu, and Minister of Industry and Trade Natan Sharansky met with US National Security Advisor Sandy Berger in mid-December 1998 to discuss the issue.

Israel Wire, [Online] <http://www.israelwire.com>, 10 December 1998.

On 12 January 1999, the White House Press Secretary announced that the US government instituted sanctions against three Russian organizations for "materially contributing to Iran's nuclear weapons and missile programs." The sanctions forbid exports and US government assistance to, or imports and US government procurements from, the following: the Scientific Research and Design Institute for Energy Technologies (NIKIET), the D. I. Mendeleev Russian Chemical-Technological University, and the Moscow Aviation Institute. The sanc-

tions apply only to the three entities, not to the Russian government or the country as a whole. The White House reaffirmed its intentions to work with Russia to help it enforce its laws and international obligations in the sphere of nonproliferation and export controls. A Russian Foreign Ministry spokesman responded on 13 January 1999 that the sanctions contradict US-Russian agreements on nonproliferation and export control and "will not go unanswered." According to the spokesman, Russian investigators have determined that the charges against the three institutes are unfounded, and that the institutes' activities are legal and comply with Russia's international nonproliferation obligations.

Statement of the White House Press Secretary, [Online] <http://www.usia.gov>, 12 January 1999. Interfax, 13 January 1999.

According to the Russian Ministry of Atomic Energy, 30 Iranian specialists are scheduled to arrive in Moscow in early February to receive training for operation of the Bushehr nuclear power plant. The Iranians will be trained at the Novovoronezh nuclear power plant. Under the terms of a Russian-Iranian contract signed in 1995, several hundred Iranians will be trained in Russia. Minister of Atomic Energy Yevgeniy Adamov said that the Bushehr plant will be fully staffed by 2000-2001. One thousand Russians work at the Bushehr site, and the first unit of the plant is 30 to 40 percent complete. Minatom has allocated \$150 million for construction of the Bushehr plant in 1999, up from \$100 million in 1998.

Interfax, 1 February 1999.

Missile

Iran tested four Dawn-4 ballistic missiles and four cruise missiles on 11 December 1998 during a series of military exercises involving 40 warships, 122 small vessels, submarines, and various aircraft.

Pakistan Link, [Online] <http://www.pakistanlink.com>, 12 December 1998.

On 2 August 1998, the commander of the Islamic Revolutionary Guards Corps (IRGC) air wing, Brigadier General Mohammad Baqer Qalibaf, revealed that the Shahab-3

ballistic missile is 16 meters in length and can carry a one-ton warhead at a cruising altitude of 250 km. US and Israeli intelligence reports had previously estimated the missile had a 750-kg payload. Iranian Defense Minister Ali Shamkhani stated that the Shahab-3 is a defensive system and is not targeting any one country.

Jane's Missiles & Rockets, January 1999, p. 5.

Israeli Defense Minister Yitzhak Mordechai delivered "secret documents" to the United States that revealed cooperation between Russian and Iranian scientists. The documents state that Russian scientists are helping Iran develop the Shahab-3 and Shahab-4 ballistic missiles. According to the documents, Israel believes that Iran will have completed their missile development by 2002 and that, by 2007, the missiles will be able to carry nuclear warheads.

Ma'ariv (Tel Aviv), in FBIS-TAC-99-020, 20 January 1999.

Iranian Defense Minister Ali Shamkhani announced on 7 February 1999 that Iran's armed forces were scheduled to test an engine for a new ballistic missile on 9 February 1999. Shamkhani said that the missile, named Shahab-4, "has no military use and will not be produced on a large scale." He also said that the Shahab-4's engine had already been tested but the test was unsuccessful because of a "mechanical problem." According to US intelligence officials, the Shahab-4 is derived from the 1950s era Soviet SS-4 'Sandel' medium-range ballistic missile. The SS-4 had a maximum range of 2,000 km and a circular error probability of approximately 2,400 m.

Kianouch Dorrane, AFP, 7 February 1999, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 7 February 1999. Clifford Beal, *Jane's Defence Weekly*, 17 February 1999.

On 11 February 1999, Israeli Defense Minister Moshe Arens accused Iran of making exaggerated claims regarding its missile capabilities. Commenting on Iran's long-range ballistic missile program, Arens said: "we know that it isn't going smoothly. I think they're exaggerating a little in the capability they say has already been achieved. But, with the help of foreigners, the Russians and oth-

ers, I think in time they can achieve operational capability."

Reuters, 11 February 1999, in *CNN*, [Online] <http://www.cnn.com>, 11 February 1999.

IRAQ

Nuclear

According to Khidhir Hamza, a 1994 Iraqi defector and former director of Iraq's program to create a nuclear weapon, Iraq is using a network of front companies and smugglers to continue creating weapons systems. Hamza said in an interview on 18 November 1998 that some of the work on weapons systems takes place outside Iraq and is shipped back into the country. "The idea is to do it outside and bring the thing back home." The front companies extend as far as Asia and Latin America. The smuggling systems often go through Turkey and are guarded by Iraqi President Saddam Hussein's security forces.

Barbara Crossette, *New York Times*, [Online] <http://www.nytimes.com>, 20 November 1998.

German authorities announced on 8 February 1999 that charges had been brought against Karl-Heinz Shaab, for allegedly supplying Iraq with technical information on uranium enrichment technology in 1989 and 1990. Shaab allegedly provided Iraq with technical details for a high-powered centrifuge and technical drawings for a gas ultra-centrifuge.

Deutsche Presse-Agentur, 8 February 1999, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 8 February 1999.

Missile

On 15 November 1998, US President Bill Clinton announced during a press conference that Iraqi President Saddam Hussein had agreed to unconditional and complete cooperation with United Nations Special Commission (UNSCOM) weapons inspectors. Clinton said that Hussein's letter of cooperation came as US and British forces were poised to attack Iraq. During his speech, Clinton said that Iraq must not interfere with the inspectors or question their expertise and must allow them "unfettered access" at all sites, "with no restrictions or qualifications." He also said Iraq must turn over all docu-

ments pertaining to the production of nuclear, chemical, and biological weapons and missiles. Clinton said Iraq must accept all relevant UN resolutions regarding its weapons of mass destruction and must agree to "resolve all outstanding issues" raised by the inspectors.

Steven Erlanger, *New York Times*, [Online] <http://www.nytimes.com>, 16 November 1998.

Abbas al-Janabi, former aide to Saddam Hussein's son Uday, defected from Iraq in February 1998. Janabi stated in a BBC interview on 18 November 1998 that the Iraqi regime was hiding chemical and biological weapons and rocket launchers by moving them whenever UN weapons inspectors approach. "Whenever there is a crisis between Iraq and the United Nations that means there is a shift operation" said Janabi. He said that Russian black marketeers keep the Iraqi regime equipped and that sanctions were overcome through a smuggling operation with Turkey and Iran under Uday Hussein's direction.

BBC News, [Online], <http://news.bbc.co.uk>, 18 November 1998.

Cable News Network (CNN) reported on 30 November 1998 that a team of Iraqi engineers visited Romania in May 1998 and tried to obtain sophisticated missile guidance equipment "through go-betweens from a company controlled by the Romanian government." The report also claimed that intelligence agencies from three countries, including the United States, were spying on the Iraqis in Romania. Former UNSCOM weapons inspector Scott Ritter said that there was "clear and irrefutable evidence of Iraq's prohibited activities" in Romania. Iraq's quest to obtain missile technology from Romania began in 1995 under a secret effort code-named "Operation Teacup." UNSCOM discovered documents at a chicken farm in Iraq in 1995 showing that the Romanian aerospace company Aerofina agreed to sell illegal missile technology to Iraq. The Romanian defense ministry said that Aerofina signed a contract with Iraq in 1995 to supply missile equipment, with a Jordanian company acting as an intermediary. The Romanian government ended all contracts and deals with Iraq in

December 1996. Two other Romanian companies, Romtehnica and Giarahad, also negotiated with Iraq.

CNN, [Online] <http://cnn.com>, 30 November 1998. BBC News, [Online] <http://news.bbc.co.uk>, 3 December 1998.

US Department of Defense officials announced on 16 December 1998 that the United States had attacked Iraq using more than 200 cruise missiles, launched from B-52 bombers and US Navy ships. Secretary of Defense William Cohen said that the attack, code-named Operation Desert Fox, was intended to "degrade" Iraq's ability to threaten its neighbors and develop weapons of mass destruction. Joint Chiefs of Staff chairman General Henry Shelton said that "we're going after everything [involved with weapons of mass destruction] from transport to manufacturing to delivery." Addressing reporters on 17 December 1998, Iraqi Foreign Minister Mohammed Said al-Sahhaf said that "Operation Desert Fox" should in fact be called "Operation Villains in the Arabian Desert." He added that the United States had completely disregarded an IAEA report that said Iraq had cooperated with IAEA inspections and had destroyed its nuclear weapons capability. He also said that the sites targeted by the air raids were civilian areas, government buildings, and factories.

CNN, [Online] <http://www.cnn.com>, 16 December 1998. Jim Garamone, DefenseLink, [Online] <http://www.defenselink.com>, 17 December 1998. CNN, [Online] <http://www.cnn.com>, 17 December 1998.

Iraqi Foreign Minister Mohammed Said al-Sahhaf announced on 7 December 1998 that Iraq was ready to test-fire several types of surface-to-surface missile (SSM) with ranges up to 150 km. He said that Iraq was producing missiles for its defense and that "a military team is now somewhere in Iraq preparing to test" the missiles, including the Samud and Ababil SSMs.

Ed Blanche, *Jane's Defence Weekly*, 16 December 1998, p. 3.

A 30 December 1998 Russian television report said that although many Iraqi installations were destroyed in the 16-19 December 1998 US and British bombings of Iraq, the

main element of Iraq's "military machine" was preserved. Russian reports said that Iraq may have concealed at least 10 al-Hussein ballistic missiles in secret underground bunkers.

NTV (Moscow), 30 December 1998, in FBIS-TAC-98-365, 31 December 1998.

According to unnamed sources based primarily in Israel, four Russian companies sold missiles and other military equipment to Iraq in 1998 in defiance of UN sanctions. Tekhmashimport, Vneshtekhnika, and Mashinoimportinvest sold Iraq manufacturing equipment for surface-to-surface missiles and navigational equipment for fighters and anti-aircraft missiles. Ramenskoye, a Russian firm specializing in aircraft and missile navigation and airflow systems, was also involved in the sales. Agreements to sell the equipment were arranged by Al Azal Trading Company Director General Raafat Abbas. Tekhmashimport (under its former name, the All-Soviet Import Company) and Vneshtekhnika have histories of involvement in clandestine technology procurement.

Jamie Dettmer, *Washington Times*, [Online] <http://www.washtimes.com>, 22 February 1999.

ISRAEL

Nuclear

Israel, the United States, and Russia began talks on establishing joint research and development projects as an incentive for Russia to end assistance to Iran's nuclear and missile programs. Israeli Minister of Trade and Industry Natan Sharansky proposed the initiative, saying that it was "on condition that the Russians would cease to cooperate with Iran in the development of nuclear weapons and long-range ground-to-ground missiles." Russian Security and Foreign Relations Council chairman Sergei Kraganov commented on the proposal, saying "if Israel genuinely wishes it, Russia will cooperate with her in developing nuclear industry."

Ora Koren, *Globes* (Tel Aviv), [Online] <http://www.globes.co.il>, 1 February 1999. Ora Koren, *Globes* (Tel Aviv), [Online] <http://www.globes.co.il>, 28 January 1999.

Missile

Israel Air Force (IAF) personnel were scheduled to begin operational training in early

December 1998 with the first battery of the Arrow anti-missile system. The training reportedly would be carried out initially by Arrow design company representatives supervised by IAF officials. IAF air-defense coordinator Brigadier General Arieh Fishbein said that he was confident Israel would have two fully operational Arrow batteries by the end of 1999.

Tamir Eshel, *Jane's Defence Weekly*, 2 December 1998, p. 22.

As a precaution against Iraqi retaliation to December 1998 US and British air strikes on Iraq, the United States deployed two batteries of the Patriot PAC-2 anti-missile system near Tel Aviv and a third battery near Haifa. The Patriot batteries were manned by US personnel. Israeli military intelligence officials assessed the probability of Iraq launching a missile attack against Israel in response to the US and British attacks as extremely low. Following the US-British bombing campaign, the Israeli government began lobbying the United States to leave two batteries of the Patriot anti-missile system deployed in Israel.

Arieh O'Sullivan, *Jerusalem Post*, [Online] <http://www.jpost.com>, 18 December 1998. Israel Wire, [Online] <http://www.israelwire.com>, 21 December 1998.

Israel's El-Op and Israel Aircraft Industries firms teamed with Core Software Technology of the United States to form a company devoted to producing and marketing imaging satellites for civilian use. The newly formed company, West Indian Space, plans to produce six to eight civilian imaging satellites based on Israel's Ofek military surveillance satellites. The first new satellite is tentatively scheduled for launch in December 1999.

Dror Marom, *Globes* (Tel Aviv), [Online] <http://www.globes.co.il>, 22 December 1998.

Israel's defense establishment plans to proceed with development of a missile-armed unmanned aerial vehicle (UAV) that will destroy enemy ballistic missile launchers before they fire their missiles. The UAV will provide an offensive complement to the Arrow anti-missile system, and will be armed with the Moav air-to-air missile under de-

velopment by Israel's Rafael defense firm. Israel Aircraft Industries will design the UAV, with Tadiran Electronic Systems furnishing its control systems. The United States has agreed to provide two-thirds of the funding for the project and has invested \$50 million thus far.

Amnon Barzilai, *Ha'aretz* (Tel Aviv), [Online] <http://www3.haaretz.co.il/eng/>, 25 December 1998.

On 12 January 1999, Israel unveiled its Strategic Defense Project simulator. The simulator was developed by Israel's Tadiran defense firm, and is designed to manage missile defense during an attack by coordinating operations between Israel's Arrow and Patriot anti-missile systems.

Amos Harel and Amnon Barzilai, *Ha'aretz* (Tel Aviv), [Online] <http://www3.haaretz.co.il/eng/>, 13 January 1999.

A US Defense Intelligence Agency (DIA) report alleges that Israel illegally transferred technology from the US-Israeli Tactical High-Energy Laser (THEL) project to China. According to the report, Israel is also suspected of undertaking efforts to obtain source codes for the THEL's fire-control system that would enable Israel to extend the weapon's range. In July 1996, the United States and Israel signed a Memorandum of Agreement (MoA) to develop the THEL, then called Nautilus, to provide Israel with a short-range weapon for destroying incoming Katyusha rockets launched by Hezbollah guerillas in Lebanon. The US-Israeli MoA restricts the transfer of technology from the THEL project to other countries; it also stipulates using software to limit its range. In 1997, suspicion arose that Israel might have provided China with THEL technology when US employees working for Israel Aircraft Industries (IAI), an Israeli defense firm involved in work on the THEL's radar, fire-control, and sensor systems, reported seeing Chinese technicians working at an IAI facility involved in the project. According to the DIA report, IAI has offered restricted weapons technology to foreign customers in the past, and "has transferred technology to China, possibly including US-supplied technology." Israel's Rafael defense firm was allegedly involved

in efforts to obtain the source codes for the THEL's fire-control computer, and reportedly obtained some restricted technology from TRW, a US subcontractor on the THEL project. According to the DIA report, after Rafael was denied access to the source codes, company representatives—including an Israeli Defense Ministry consultant—repeatedly demanded software transfers from TRW. The DIA report states that if Israel obtains the source codes, it could modify the THEL to "fire at targets other than those permitted by the Memorandum of Agreement." Spokespersons for IAI and Rafael have denied the allegations in the DIA report, and say that no technology from the THEL has been illegally transferred to China.

Bill Gertz, *Washington Times*, 27 January 1999, p. 1. Israel Wire, [Online] <http://www.israelwire.com>, 28 January 1999.

Israel and the United States have begun work to develop an interoperational capability between Israel's Arrow anti-missile system and US military radar systems. US Brigadier General Daniel L. Montgomery, executive officer of the US Army's Air and Missile Defense program, said that the two countries hope to enable the US Navy's Aegis fleet air-defense system to operate in conjunction with the Arrow. Israel's Green Pine tracking radar and Citron Tree fire-control radar systems are being used to develop the interoperational capability, known as Arrow Link 16.

Arieh O'Sullivan, *Jerusalem Post*, [Online] <http://www.jpost.com>, 12 February 1999.

LIBYA

Nuclear

In November 1998, Libyan leader Muammar Qaddafi was reportedly seeking to resume cooperation with Russia's Ministry of Atomic Energy and to have Russian experts repair auxiliary equipment at Libya's Tajura Nuclear Research Center. Qaddafi was also said to be interested in having Russia build a nuclear power plant in Libya, as planned in a 1972 accord between his country and the Soviet Union.

Bellona: Nuclear Chronicle from Russia, November/December 1998, p. 10.

SOUTH AFRICA

Nuclear

Atomic Energy Corporation (AEC) chairman Don Ncube announced that South Africa will spend 140 million rand (R) over the next five years to decontaminate and decommission its uranium enrichment and conversion facilities. Ncube reported that uranium conversion has become unprofitable for the AEC and that its accumulated debt totaled R607 million at the end of 1998.

Linda Ensor, *Business Day*, [Online] <http://www.bday.co.za>, 11 November 1998.

South Africa's Eskom energy agency is expected to decide by the end of 1999 whether to begin construction of a pebble-bed module reactor (PBMR) using high-temperature gas reactor technology and a closed-cycle gas turbine. The plant would consist of ten 115-MW units estimated to cost \$100 million each. The cost of designing and building a demonstration PBMR is estimated at \$200 million.

Ann MacLachlan and Elaine Hirou, *Nucleonics Week*, 19 November 1998, pp. 1, 13-15.

South Africa's Department of Minerals and Energy (DME) published its "White Paper on the Energy Policy of the Republic of South Africa" on 18 December 1998. The DME recommended that the South African government examine the long-term economic benefits of nuclear power and decide how to optimize the country's existing nuclear infrastructure. The DME also recommended that the government consider restructuring the South African Atomic Energy Corporation, as well as reviewing its activities and financing. The DME said that Eskom's decision on whether to construct a pebble-bed module reactor should be made in conjunction with a national energy policy. A further recommendation was to create greater transparency and participation in nuclear sector governance in order to restore public confidence in the country's nuclear policies.

Department of Minerals and Energy, [Online] http://www.polity.org.za/govdocs/white_papers/energy98/energywp98-01.html, 1 December 1998.

South Africa called for new negotiations on a fissile material production cut-off during the 19 January 1999 opening of the United Nations Conference on Disarmament. The South African delegation also proposed the formation of a committee to develop a plan for the global elimination of nuclear weapons.

Cape Times (Cape Town), 20 January 1999, in FBIS-TAC-99-020, 20 January 1999.

SYRIA

Missile

In November 1998, Russian Foreign Minister Igor Sergeyev met with Syrian President Hafez Assad, Syrian Defense Minister Mustafa Tlas, and Syrian Chief of Staff Ali Asslan. The two countries signed an agreement that could pave the way for Syria to purchase \$2 billion worth of Russian arms, despite the country's current debt of \$12 billion to Russia. Syrian leaders expressed interest in acquiring S-300PMU surface-to-air missile systems, as well as securing Russian cooperation to modernize its Soviet-built tanks and fighter aircraft.

Ed Blanche, *Jane's Defence Weekly*, 25 November 1998, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 24 November 1998. *BBC Summary of World Broadcasts*, 24 November 1998, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>, 24 November 1998.

Unidentified British intelligence sources told *The Times* of London that officials from Russia's former chemical weapons project transferred key chemical weapons technologies to Syria. Syria is suspected of having acquired technology for delivering chemical weapons, including VX nerve agent, via aerial bombs and ballistic missiles.

Michael Evans, *The Times* (London), 25 January 1999.

TURKEY

Nuclear

Turkey's embassy in Greece issued a statement saying that "Turkey categorically has no intention of producing nuclear, biological, or chemical weapons." The statement was

issued in response to Greek press reports claiming that Turkey is seeking to develop nuclear weapons.

Anatolia (Ankara), 18 January 1999, in FBIS-TAC-99-018, 18 January 1999.

ITAR-TASS reported on 2 February 1999 that Turkish agents in the western Turkish city of Bursa had seized 100 grams of "enriched uranium" from four "dealers" who had smuggled it into Turkey from Azerbaijan. According to the report, which did not specify the level of enrichment of the uranium, the smugglers had hoped to sell the uranium for \$700,000. A report by the Turkish Anatolian news agency on 3 February 1999, by contrast, reported that the Turkish police had seized "a total of 5 grams of uranium, having a market price of 115 billion Turkish lira (about \$340,000)," and did not use the term "enriched" to describe the uranium. This report named the four suspects in the case as Orhan Kahraman, Ibrahim Aslantas, Halil Aslanta and Yuksel Kucuk, saying they were arrested in Bursa and Kayseri provinces. It noted that the seized uranium had been sent to the Nuclear Research and Training Center in Kucukcekmece for analysis. This report also said the uranium had been smuggled into Turkey from Azerbaijan. The Baku newspaper *Azadlyg* reported on 3 February 1999 that the Azerbaijani National Security Ministry had refused comment on the case. The paper argued that since Azerbaijan has no uranium, the material must have originated in Russia. A report in *Izvestiya* on 4 February 1999 repeated the information found in the ITAR-TASS item of 2 February 1999, adding, "Turkish specialists have no doubt: the uranium could be used for the construction of nuclear warheads or other weapons of mass destruction." Another report in the Turkish daily *Sabah* on 5 February 1999 said that interrogation of the suspects, who were arrested by police agents posing as buyers, had revealed that Orhan Kahraman was the "gang leader," adding that the group hoped to sell the uranium in Greece. *Sabah* said the four suspects were charged with "organiz-

ing a group to smuggle nuclear substances," and transferred to the State Security Court in Istanbul.

Andrey Palariya, ITAR-TASS, 2 February 1999, in Lexis-Nexis, [Online] <http://web.lexis-nexis.com>. *Anatolia* (Ankara), 3 February 1999, in FBIS FTS19990203000586, 3 February 1999. Elkhan Shahinoglu, *Azadlyg* (Baku), 3 February 1999, pp. 1, 3, in FBIS FTS19990205000134, 5 February 1999. Gennadiy Charodeyev, *Izvestiya*, 4 February 1999. Murat Savas, *Sabah* (Ankara), 5 February 1999, p. 3, in FBIS FTS19990209000117, 9 February 1999.

Missile

Turkish Foreign Ministry spokesman Necati Uktan announced on 14 January 1999 that Turkey will purchase MIM-104 Patriot surface-to-air missiles from the United States. Uktan did not mention how many missile batteries would be purchased or where they would be deployed.

CNN, [Online] <http://www.cnn.com>, 14 January 1999.