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NUCLEAR WEAPONS PROLIFERATION: GLOBAL STATUS AMBITIONS

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Now that the US and Russia seem to be taking steps to implement Article 6 of the NPT -- the "good faith clause" in which Washington and Moscow promised to negotiate an end to their arms race -- some aspiring nuclear states may feel less threatened. Others, however, have their own reasons for obtaining "the bomb."

Aspiring nuclear powers are usually competitively opposed to other aspiring nuclear powers, which is their excuse for being aspiring nuclear powers in the first place. These dangerous ideological-political-geographical confrontations could spark a nuclear war. Such countries are not deterred by any sophisticated nuclear arsenal -- superpower or otherwise.

To understand nuclear technology, it would be helpful to know that uranium bombs are the easiest to build although they are large, heavy and expensive. They are so simple they are guaranteed to work without testing. Many scientifically immature countries such as Iraq, Pakistan and South Africa were able to construct uranium bombs. China's first bomb was uranium. A large supply of uranium bombs also appear in Russia's arsenal. Plutonium bombs, on the other hand, are more difficult to build, but once the technique is mastered the bomb can be better tailored for many needs, and they are cheaper. Plutonium bombs can be miniaturized in size and tuned to lower yields. All bombs in the US arsenal have a plutonium primary. With that information in mind it is easier to understand the various nuances of nuclear weapons proliferation.

A. THE MID-EAST.

One of the most volatile spots in the world is the Mid-East. Not only is Israel squared off against some nationalistic Arab nations, but fundamentalist Muslim states threaten their secular Muslim counterparts.

- ***Israel.***

Israel has not signed the NPT so there is no legal restriction on that country's nuclear activities. Its nuclear program dates back to the late 1940s, from as long as Israel has existed. As early as 1947 it was discovered that recoverable traces of uranium existed in the Negev Desert.

Much of the information below is paraphrased from Seymour Hersh's *The Samson Option*, an excellent history of how the Israelis developed their nuclear arsenal and how the US was bribed and blackmailed to look the other way.

a. Israel's Nuclear Beginning. Israel's Atomic Energy Commission was established in 1952, under the military and unknown to the public. In 1955, under the Eisenhower's "Atoms for Peace" program, the Israelis obtained a small research reactor. It was installed at Nahal Soreq, south of Tel Aviv. But it was too small to produce enough plutonium for a bomb and too closely monitored for bomb-making activities to take place.

France and Israel agreed in 1953 to help each other in nuclear research. France, itself, was then striving to become a nuclear power. Israeli scientists worked closely with the French in designing the French bomb. They helped France build its elaborate reprocessing plant for plutonium. They also showed France a means they developed to make heavy water and better ways to mine uranium.

In return the French, starting in early 1958, helped Israel build its Dimona complex in the Negev Desert. France supplied an EL₁₀₂ reactor and helped construct a reprocessing facility buried 40 meters (130 feet) below the surface. U-2 spy planes monitored this activity but the US did nothing to stop it.

Israeli scientists were trained at French plants and observed the first French nuclear explosion in February 1960. Later, Israel constructed a nuclear weapons assembly plant at Haifa, to the north, and heavily-fortified nuclear storage bunkers at its Tel Nof fighter base near Rehovot. Since there was so much internal opposition to an Israeli bomb, most of the work was accomplished by private funding from Jews living abroad.

b. The Yom Kippur War. By 1973 Israel had at least 20 nuclear weapons. Three or more missile launchers had been operationalized at Hirbat Zachariah and there were some mobile Jericho-1 missiles. A squadron of nuclear-capable F-4 fighter aircraft was in underground bunkers at Tel Nof Air Force Base near Rehovot. Data from US KH-11 spy satellites was shared with the Israelis and helped them to target their weapons. According to Seymour Hersh, US policy toward this amassing of Israeli nuclear weapons was "a conscious policy of ignoring reality."¹

Egypt and Syria launched a surprise attack against Israel on 6 October 1973 -- on Yom Kippur, the most sacred day on the Jewish calendar. It took Israel three days to fully mobilize. On October 8th Israel called its first nuclear alert. All completed nuclear missile launchers at Hirbat Zachariah were armed. Eight of the special F-4s at Tel Nof Air Force Base were put on 24-hour alert. Initial targets included the Syrian and Egyptian military headquarters. Israel blackmailed the US for conventional arms replacement or the Israelis would escalate to nuclear.

At this time Dimona had mastered the miniaturization of nuclear bombs to fit into 175-mm and 203-mm artillery shells. After the Yom Kippur war, Israel formed at least three battalions of nuclear-capable artillery. Each battalion eventually contained a dozen 175-mm artillery pieces with three nuclear shells apiece. The 203-mm pieces were later introduced.

c. The South African Connection. On Saturday, 22 September 1979, a US Vela satellite passing over the southern Indian Ocean picked up the double-flash of a nuclear explosion. At least two Israeli naval ships had sailed to that area previously. Israeli experts as well as South African

¹Hersh, *The Samson Option*, p. 319.

scientists observed what is believed to be the third test of a low-yield nuclear artillery shell for the Israeli Defense Force. According to Seymour Hersh, Israel "signed an agreement before the 1979 test calling for the sale to South Africa of technology and equipment needed for the manufacture of low-yield 175-mm and 203-mm nuclear artillery shells."²

d. The Sixth Nuclear Power. Mordical Vanunu exposed the Israeli nuclear program in a 5 October 1986 London *Sunday Times* article, complete with photographs. Vanunu, a nuclear technician for nine years at the Dimona plant, indicated that Israel was producing about ten nuclear weapons a year, and had already stockpiled possibly 200.

Vanunu was kidnapped in Rome and taken back to Israel to stand trial for "collection and delivery of secret information, with the intent to impair the security of the state, and acts calculated to assist an enemy in war against Israel."³ He was convicted and sentenced to 18 years in prison. Vanunu stated before his abduction that, although he broke Israeli law, his was an act of conscience intended to serve the interests of Israeli democracy and world peace by bringing public knowledge and debate to bear on Israel's entry into the nuclear weapons club. Israel has never attempted to impeach Vanunu's integrity.

e Israel's Present Nuclear Arsenal. Israel has steadily progressed as a nuclear-weapons state. Nuclear land mines were put in place in the Golan heights during the early 1980s. By the mid-1980s Dimona had made hundreds of low-yield neutron bombs. In September 1988 Israel put its first satellite into orbit as a step toward gathering its own intelligence. Israel can also produce lithium deuteride for thermonuclear hydrogen weapons and is negotiating for a waiver from US laws and international agreements so it can obtain extremely powerful computer technology. Israeli scientists are working at the cutting edge of nuclear technology and are involved with intensive research into the next generation of weaponry.

Jane's Intelligence Review reported in late 1994 that the Israeli nuclear arsenal consisted of the following:⁴

- Weapons grade plutonium is being produced at the Dimona plant.
- The Soreq Research Center, south of Tel Aviv, designs Israel's nuclear weapons.
- The Palmikim Missile Test Range south of Tel Aviv on the Mediterranean Sea tests nuclear capable missiles.
- A factory at Ba'er Yakov, west of Jerusalem, builds the nuclear capable Jericho-2 missiles.
- A missile base at Kefar Zekharya, west of Jerusalem in the Judean hills, has 50 underground bunkers housing at least 50 nuclear-tipped Jericho-2 missiles.
- Israel's nuclear weapons assembly and disassembly plant is at Yodefat, east of Haifa in the Galilee.

²Hersh, *The Samson Option*, p. 276.

³Farinella.

⁴Cited in *Chicago Tribune*, 19 November 1994, p. 14.

Jane's Intelligence Review also reports that Israel has nearly 200 nuclear weapons in its arsenal.⁵

A Russian intelligence report asserts that Israel also has a store of chemical weapons. "At the present time Israel is capable of producing toxic substances of all types, including nerve-paralyzing, blister-producing and temporarily-incapacitating substances," said the report.⁶

f. Israel's Delivery Systems. Israel is also improving the delivery systems for nuclear warheads. Air delivery could be made by a number of aircraft, including US-furnished fighters -- 75 F-4E, 63 F-15, and 205 F-16 aircraft.

Missiles for nuclear delivery are some 50 Jericho-1 SRBMs (250 nautical miles range), 50 Jericho-2 IRBMs (800 nautical miles range), and over 100 US-furnished Lance missiles (62 nautical miles range). Some analysts believe the Lance missiles are in storage and that Jericho-1 missiles are being retired since Jericho-2s started becoming operational in 1989. During the 1991 war against Iraq, Israel moved mobile nuclear missile launchers into positions to target Iraq. A full-scale nuclear alert lasted for weeks.

2. Iraq.

Iraq is an Islamic Arab nation with a secular government under the firm control of Saddam Hussein. The orthodox Sunni (Sunnite) Muslims are slightly outnumbered by fundamentalist Shia (Shiite) Muslims. The latter, along with the Kurdish population, are kept repressed to prevent a fundamentalist upheaval of government, as happened in Iran. Saddam Hussein has encouraged a fierce Arab nationalism to (1) oppose Israel's expulsion of Palestinian Arabs in order to create a Jewish home state (Zionism), (2) to repress Iran's efforts to convert Iraq to a fundamentalist Muslim state, (3) to win the centuries-old feud with Persian Iran over control of the Shatt-al-Arab River which is now Iraq's only access to the sea since the British carved Kuwait from Iraq, and (4) to return part or all of Kuwait to Iraq. This is a simplified description but it illustrates the many facets which motivate Iraq to become more powerful.

a. The Futile Grasp for a Plutonium Bomb. In December 1959 ten Iraqi students started a four-year nuclear-physics course in Moscow. A year later an agreement was signed for the Soviet government to construct a small IRT-2000 research reactor at Tuwaitha, about twelve miles southeast of Baghdad. In the meantime, gifted Iraqi students were also enrolling in Western universities to study nuclear science. The Soviet 2-megawatt reactor was completed on 6 January 1968 and was eventually upgraded to 5-megawatts. But that was still too slow for a crash nuclear program and Soviet surveillance made the accumulation of plutonium from such a program impossible.

In 1969 Iraq ratified the NPT, making its nuclear activities subject to International Atomic Energy Agency (IAEA) inspections. This made Iraq look less-ominous in its pursuit of the atom. Saddam knew that he need only give three months notice to withdraw from the treaty after the reactor and high-grade uranium fuel had been obtained.

⁵Cited in *Mercury News*, 19 November 1994, p. 4A.

⁶AW&ST, 8 November 1993, p 29.

Following the 1967 Arab-Israeli Six-Day War it became obvious that Israel was fast approaching a nuclear capability. This put new urgency behind Iraq's program. France was the most receptive to Iraq's courtship, with oil as a dowry. In December 1974 French Premier Jacques Chirac accepted then Vice President Saddam's invitation to Baghdad. There followed a series of closely-guarded secret negotiations in which Saddam got everything he wanted. The Osiris material-test reactor -- named after the ancient Egyptian god of hell and death -- surfaced as the only one available with the capacity for plutonium production suitable for an atomic bomb program. Construction began near Tuwaitha after the final agreement was signed in August 1976. Completion of this dual reactor, called Osirak, was slated for 1981.⁷

Immediately after the deal with France was finalized, Saddam started negotiations with Italy to obtain "hot cell" laboratories for extract weapons-grade plutonium. They played an important function in allowing Iraq to accommodate IAEA inspections. With several weeks notice, Iraq could move all evidence of bomb-making from the reactor site to the hot cell laboratory. By some quirk, such laboratories escaped inspection requirements.

In a surprise attack on 7 June 1981, using 14 US-made F-15 and F-16 aircraft, Israel bombed the nearly-complete Osirak reactor. Israel contended that the French-supplied plant was to produce atomic bombs for use against Israel. Many nations denounced this act but took no stronger measures against Israel, a US ally. The UN Security Council added its condemnation on June 19th. After the attack Saddam dispersed his nuclear-research facilities throughout the country and fortified them.

Destruction of the Osirak reactor set Iraq back. It appears that Osirak was never rebuilt. According to a Lawrence Livermore National Laboratory scientist, Iraqi weapons scientists began giving more attention to developing the technology for extracting weapons-grade Uranium-235 from Iraq's natural uranium supply, and from what had already been stockpiled for reactor fuel.⁸

b. Iraq's Helpers. *The Washington Post* reported on 5 May 1989 that the US Commerce Department had stopped an Iraq-bound shipment from CVC Products, Inc. of Rochester, New York of vacuum tubes which could be used in the production of nuclear fuel. CONSARC, a New Jersey company, wanted to ship high-temperature furnaces to Iraq to melt the zirconium used to clad nuclear fuel rods, but the White House stopped it. US and British officials in late-March 1990 broke up a smuggling ring by which Iraq could obtain US-made electronic devices to trigger nuclear bombs. A British company, Euromac, Inc. with offices just outside London, was involved. Euromac in September 1988 had contacted CSI Technologies, Inc. of San Marcos, California about purchasing custom-made capacitors. CSI became wary when the specifications were exactly as required for atom bomb triggers, and informed customs officials.

According to the *Financial Times*, Euromac is part of a wide network of shadowy front companies in Europe set up for the purpose of obtaining sensitive Western technology for Iraq's various nuclear/chemical/biological programs. This network was supposed to have been funded by \$1 billion of the \$2.867 billion in unauthorized loans to Iraq by the Atlanta, Georgia branch of Banca Nazionale de Lavoro (BNL -- Italy's largest state-owned bank).

⁷For a well-written description of how this program evolved, and the secrecy surrounding it, see Nakdimon.

⁸DeWitt, p.6.

Hewlett Packard in 1985-86 sold computers to a German company but allegedly knew the ultimate destination was Iraq. Hewlett Packard also sold some computer equipment directly to Iraq. Tektronix of Beaverton, Oregon, sold graphics design terminals and other equipment to Iraq.

Iraq also owns part interest in a Swiss company which is suspected of having shipped to Baghdad parts which can be used for processing nuclear materials. At least four locations are pursuing plutonium extraction and/or uranium enrichment. Iraq is a striking example that ratifying the NPT and agreeing to international inspections is not assurance that the country is not seeking the nuclear bomb.

c. Iraq's Delivery Systems. During the 1980s when Iraq was at war with Iran, French aircraft were sold to Baghdad. In February 1981 the first four of 60 Mirage fighter-bombers were delivered. In June 1983, France agreed to sell Super Entendard jet bombers to Iraq. Five Super Entendards arrived the following October. These aircraft could deliver nuclear bombs. But missiles are also in the works.

Scud-B missiles, with a range of 160 nautical miles, were supplied by Moscow. These could likewise be mounted on trucks. In mid-August 1989 an explosion leveled a secret Iraqi military plant at Hilla, about 60 miles south of Baghdad. The British Independent reported that the plant was engaged in research to extend the range of Iraq's missiles. Iraq was receiving sensitive missile technology information from West Germany, France and Italy through a sly network of European front companies. With this help, Iraq increased the Scud missile's range to 270 nautical miles, enough to reach any capital city in the Mid-East.

A US House of Representatives panel was told during September 1989 that Egypt had ended participation with Iraq and Argentina in the effort to build a medium-range missile based on Argentina's Condor-2, and that Iraq had intentions of fitting it with nuclear or chemical warheads. Although it would have a range of 750 miles, accuracy is only claimed at 250 miles or less. Two American rocket scientists were sentenced to prison on 5 December 1989 for conspiring to smuggle sensitive information to Egypt which would help the Condor-2 missile program with Iraq.

Technology and Development Group (TDG) near London, an Iraqi front company, through its subsidiary, Matrix Churchill in Coventry north of London, received a \$16 million loan commitment from BNL to supply precision lathes and other equipment to support Iraq's Condor-2 missile program. Due to US bureaucratic bungling the letters of credit were not stopped.

On 7 December 1989, Iraq announced that two days earlier it had launched a three-stage, 48-ton rocket which could put a satellite into orbit, making it the first Arab country capable of such a feat. This missile, named Tammuz, was launched from a space research center in Anbar province, west of Baghdad, and could also be used as a long-range ballistic missile. Iraq claimed it had developed two new surface-to-surface missiles with a range of 1,240 miles.

In April 1990, Saddam threatened to wipe out half of Israel with chemical weapons if it tried another attack on Iraqi facilities. According to the New York Times on 29 March 1990, Iraq had for the first time built fixed launchers for its missiles within ranges of the capitals of Israel (Tel Aviv) and Syria (Damascus).

In mid-1990 there was a request to ship a US supercomputer to a Brazilian team helping Iraq with its ballistic-missile program, and which could also be used in Iraq's nuclear program.

Lindbergh Heat Treating Company of Chicago in September 1990 had Commerce Department approval to ship seven rocket motor case sections to Brazil, although Brazil was still helping on Iraq's missile program.

Contributing to the accuracy of Iraq's missiles, including the extended-range versions of the Soviet-supplied Scud missiles, were imaging enhancement systems to analyze satellite photos and determine targets, obtained from International Imaging Systems of Milpitas, California. The company admits furnishing such systems, purportedly for civilian use, in 1981 and 1987.

In addition to the Scud-B missiles obtained from Moscow, Iraq now has a North Korean franchise to manufacture the Scud-Bs and Scud-Cs (350 nautical mile range). From the Scud technology Iraq has developed its own Al Hussein (350 nautical mile range) and Al Abbas (up to 650 nautical mile range). From the Condor technology Iraq has developed the Badr-2000 (up to 650 nautical mile range) and the Al Aabed (up to 1,000 nautical mile range).

d. Iraq Today. Since the 1991 Persian Gulf war, Saddam Hussein has played a cat and mouse game with IAEA inspectors attempting to make certain that Iraq is not pursuing a nuclear capability. But in 1993 his attitude seemed to change as the embargo against Iraqi oil, started to take its toll. In April of that year Saddam agreed that the last of its weapons-grade uranium could be removed by the United Nations. In November Iraq agreed to allow UN monitoring of its industries on a long-term basis to assure it isn't developing weapons of mass destruction (nuclear, chemical or biological). Recently there has been a serious standoff between Saddam and the UN inspectors. This may or may not have been resolved but the situation in that area is very volatile with US and British forces poised to strike at the least provocation.

3. Iran.

Iran is a Persian nation with a fundamentalist (Shiite) Muslim government. It has tried to spread its fundamentalist politics, especially in Iraq. Iran and Iraq have for decades battled over their border region and access to the Persian Gulf. Since the Iranian revolution Iraq, with a secular government of hegemonistic ambitions, has been resisting the spread of Muslim fundamentalism. The two nations fought a long war during the 1980s, primarily over that issue. Becoming a nuclear state will greatly aggravate relations with Iraq. And more, it will irritate Pakistan to the east which is believed to already possess nuclear bombs.

a. Iran's Nuclear Quest. Iran has been working through a huge network of foreign suppliers in its nuclear program. In early 1992 the US was able to block Iran's purchase of a large research reactor from China and a nuclear fuel reprocessing plant from Argentina -- a suspicious combination. But in 1993 Russia and China agreed to supply Iran with two nuclear reactors each. In late 1993 Iran was negotiating with the Czech Republic regarding nuclear technology, ostensibly for peaceful purposes. Iran has pledged to submit to international safeguards, but since IAEA inspections are scheduled in advance evidence of bomb making could be transferred to a reprocessing plant prior to the visit.

In March 1992, when former Soviet battlefield nuclear weapons were being transferred to Russia, there were unconfirmed media reports that two or three tactical weapons may be missing in

Kazakhstan. During the following October, an Associated Press dispatch said that Iran had finalized a deal with Kazakhstan in July to buy four nuclear warheads. Of course the parties concerned denied the allegations, but the source had provided accurate information in the past.

Nevertheless, it is feared that Iran will produce a nuclear bomb by the end of the 1990s. Iran ratified the NPT in 1970, one year after Iraq, but could easily withdraw on short notice. As Iraq and North Korea have demonstrated, being a signatory to the NPT legitimizes and even facilitates the production of nuclear weapons material. Iran already has a stockpile of chemical weapons.

b. Acquiring the Delivery System. For delivery vehicles Iran has received modern Backfire bombers from Russia, with a combat radius of over 2,000 nautical miles, as well as some 20 Su-24 Fencer deep strike aircraft. In March 1994 Iran was negotiating with China to buy Jian Hong-7 fighter bombers. These aircraft can fly long-range precision attack day or night in all weather.

In 1991 North Korea sold several dozen 162 nautical-mile-range Scud-B missiles to Iran. Moscow had previously sold Scud-Bs to Iran. Iran later received a franchise to build North Korea's Scud-B and Scud-C (350 nautical miles range) missiles and then developed its own 160 nautical-mile-range Iran-130 missile. Iran also wants to buy North Korea's longer-range Nodong-1 missiles which could reach Israel. So far North Korea has resisted that sale, but may be holding out for trade in oil.

In September 1997 a secret Israeli report revealed that Iran is working on four missiles with ranges from 1,300 to 10,000 kilometers (700-5,400 nautical miles).⁹ An engine test was performed on the 1,300 kilometer-range Sahib-3 in November 1997.¹⁰ It could be ready for deployment in early 1999.

Iran has also fielded cruise missiles accurate enough to threaten US naval forces. Russia and Ukraine are becoming more willing to sell missile technology prohibited by the Missile Technology Control Regime¹¹ which bans the sale of missiles with greater than 190 miles range.¹²

Iran's missile technology has been slowed recently because it lacks skilled workers, science-intensive technology, scarce materials, and sufficient funding. In mid-1993 the US asked the European Union to curtail trade with Iran to prevent the sale of weapons. Belgium, Luxembourg, Britain, France, Germany, Greece, Netherlands, Spain, and Italy had all done significant business with Iran. Denmark, Ireland and Portugal had done so on a smaller scale. Nevertheless, there is no sign that Iran is being prevented from pursuing a buildup of both conventional armaments and weapons of mass destruction.

⁹Cited in Defense News, 6 October 1997, p. 4.

¹⁰Cited in Defense News, 15 December 1997, p. 2.

¹¹The Missile Technology Control Regime (MTCR) is a 25-nation agreement designed to restrict the proliferation of missiles, unmanned aerial vehicles, and related technology for systems capable of delivering chemical, biological or nuclear payloads. Member countries agree not to export missiles capable of exceeding 300 kilometers (162 nautical miles) range or carrying a payload greater than 500 kilograms (1,100 pounds).

¹²AW&ST, 1 March 1993, p. 25.

4. *Nuclear Delivery Capability.*

Several Mid-East countries have recently obtained ballistic missiles and aircraft which could be used to deliver nuclear, chemical or biological warheads. These countries may not be actively pursuing the nuclear bomb but if Iraq or Iran obtain nuclear weapons the picture could change.

a. Saudi Arabia. It became known in March 1988 that Saudi Arabia had obtained from China the CSS-2 IRBMs (also known as the DF-3) which have an inertial guidance system and a range of 1,550 nautical miles. These are now the longest-range ballistic missiles in the Mid-East. Saudi Arabia has also assembled a large inventory of F-15 fighter aircraft from the US, which can deliver weapons of mass destruction. Saudi Arabia is not a party to the NPT.

b. Syria. Syria is also acquiring ballistic missiles which could deliver weapons of mass destruction -- nuclear, chemical or biological. It has purchased SS-21 and Scud-B missiles from Moscow (ranges up to 162 nautical miles), Scud-B and Scud-C missiles from North Korea, and M-9 missiles from China (Scud-C and M-9 have ranges up to 350 nautical miles). Syria ratified the NPT in 1969. Syria is one of 26 nations on the list of countries involved in international drug trade, and cannot receive US aid or US support for World Bank loans.

B. INDIA AND PAKISTAN.

India and Pakistan have had strained relations since the 1948 partitioning of India, when Pakistan was established. Disputes have had ethnic-religious overtones but the bottom line is borders and territory -- especially in the Kashmir region. Enmity was heightened in 1971 when India stepped in with military force to help the liberation of Bangladesh (formerly East Pakistan).

Now the competition has turned to a nuclear standoff. In May of 1990 India and Pakistan faced off on the verge of a nuclear exchange. The crisis was defused by the Bush administration but kept from Congress and the American public because of high-tech sales to Pakistan.¹³ The next time they go to war over the Kashmir, it might very well be nuclear.

1. *India.*

During border clashes with China in 1962, India fared poorly. When China conducted its first nuclear test in 1964, the balance of military force shifted unmistakably in China's favor. India decided that an accelerated nuclear program was justified. Although Pakistan was a hostile threat at that time, it was China that first motivated India's nuclear program.

a. India's Bomb Program. India purchased a nuclear reactor from Canada, and thus provided a case example of how a civilian nuclear power program can divert spent reactor fuel to a chemical reprocessing plant to make a nuclear weapon. The first Indian nuclear test was ordered in 1973, and that country exploded a 12-kiloton atom bomb underground at Pokaran in the Rajasthan Desert on 18 May 1974. It was advertised as a peaceful use for nuclear explosives -- a futile attempt to stimulate water resources -- but it served notice to both China and Pakistan that India had the

¹³See Hersh, "On The Nuclear Edge."

bomb. India then ostensibly abandoned its nuclear weapons program but threatened to restart it if Pakistan appears near to developing such weapons.

Nevertheless, India's nuclear technology reached the point in 1985 where it could produce plutonium at domestic sites free from outside inspection. By 1985 it had tons of plutonium stored without IAEA safeguards. India has not signed the NPT because it exempts from controls those countries already possessing the bomb. This plutonium storage caused international concern regarding illicit sales or acquisition by terrorists.

Pressure continued to mount in parliament for India to resume its nuclear bomb program. Then in 1985 the New Delhi government announced that its new reactor near Bombay could produce weapons-grade plutonium -- possibly enough for ten bombs. "This is a landmark in the country's atomic energy program," said then Chairman Raja Ramanna of India's Atomic Energy Commission.¹⁴ India's current nuclear capability is as follows:

- The Cirus and Dhruva reactors can theoretically produce more than 30 kilograms of weapons-grade plutonium per year; enough for four fission bombs. Other civilian reactors also produce plutonium.
- It was estimated in mid-1992 that India's stockpile of weapons-grade plutonium exceeded 300 kilograms; enough for forty or fifty atom bombs.
- Uranium enrichment has also begun at two gas centrifuge plants but the capacity is still very low.
- Research work at Bhabha Atomic Research Centre appears to be addressing fission for thermonuclear (hydrogen) bombs.

b. India's Delivery Systems. To compliment its nuclear program, India has also amassed the means of delivering weapons of mass destruction. The Agni intermediate-range ballistic missile (IRBM) will carry a one-ton warhead 2,500 kilometers (1,350 nautical miles). It can reach targets in China, Saudi Arabia, and Iran, as well as Pakistan. West German cooperation in India's space program is suspected to have helped develop this missile. Agni development is interpreted as a sign that India intends to assert its military dominance in the region.

India also has a tactical short-range ballistic missile (SRBM) called Prithvi which is nuclear-capable. The Air Force version can reach out for 250 kilometers (135 nautical miles) with a 500 kilogram (1,100 pound) warhead. A 150 kilometer (81 nautical mile) version has been developed for the army. Prithvi is a highly-mobile, single-stage weapon which can be launched from a stationary post or from a truck. It has several options for warheads and has an accuracy of 250 meters (820 feet).

Work started in 1992 on a submarine-launched version of Prithvi, called Sagarika. It will have a ramjet engine instead of liquid-fueled rockets and is expected to travel 300 kilometers (162 nautical miles). Since India has no vessel capable of launching Sagarika, a new submarine program is likely to be introduced.

¹⁴*Mercury News*, 9 August 1992, p. 18A.

Besides missiles, the Indian Air Force also has both Soviet- and French-made aircraft capable of delivering nuclear bombs. They include Jaguar-IS strike aircraft along with Mirage-2000 and MiG-29 fighters.

c. Aggravating factors. Other events are causing concern for India. China is embarked on an ambitious military modernization program, including the purchase of modern fighter planes from Russia. Military cooperation between Pakistan and China was signaled when China allegedly sold Pakistan road-mobile M-11 missiles capable of carrying a nuclear warhead for 290 kilometers (156 nautical miles), and M-9 missiles with a range of 800 kilometers (432 nautical miles). A 23 March 1994 report from India's defense ministry called for a complete reassessment of the regional threat because the quantity and sophistication of arms being acquired by Pakistan are beyond legitimate defense needs. The report also warned against the sale of F-16 fighter planes to Pakistan by the US.

Over the past decades the Indian government has maintained the position that it will keep the options open on nuclear weapons. But in March 1998 the newly-elected right-wing Bharatiya Janata Party said it would review the country's nuclear weapons policy and might "induct nuclear weapons" into the military arsenal.¹⁵

2. Pakistan.

Pakistan is another country with civilian nuclear reactors and a nuclear bomb program exists. Zulfikar Ali Bhutto launched Pakistan's nuclear weapons program in 1972, thereby creating another action-reaction cycle with India. After India exploded its bomb in 1974, the Pakistani leader said his people would eat grass before they let the Indians get ahead. Pakistan is not a signatory to the NPT.

a. Pakistan's Bomb Program. The 1973 oil "crisis" sparked a flow in cash in the Mid-East and countries such as Libya were willing to finance Pakistan's endeavor. Rising oil prices also created a boom in nuclear power stations, and enterprising countries started a uranium shortage scare to promote plutonium reprocessing plants. The extracted plutonium could be used for power plant fuel or for bombs. Pakistan ordered such a plant from France in 1975. In 1977 the US confronted France with evidence of Pakistan's intent and the sale was quietly cancelled.

Meanwhile, Pakistani scientists working at the Netherlands' Urenco plant -- a British-Dutch-German consortium -- stole plans for the gas-centrifuge enrichment of uranium. Pakistan then built a similar facility at Kahuta, about 12 miles southeast of Islamabad. Pakistan then engaged in a clandestine program of obtaining critical equipment from abroad. When it became evident that Pakistan was producing weapons-grade uranium, the US Carter administration cut off aid in 1979, but the levels of aid were too small to have much effect. When the US needed Pakistani help in getting weapons and supplies to Soviet-occupied Afghanistan, Congress in 1981 passed a \$3.2 billion economic and military assistance package for Pakistan. The rules were changed that aid would be cancelled if Pakistan developed a nuclear bomb. In effect, the US had turned its back on developing such weapons. By 1984 the Kahuta plant was operating.

¹⁵Cited in *Mercury News*, 19 March 1998, p. 4A.

In late 1986, US President Ronald Reagan certified to Congress that Pakistan did not have nuclear weapons. There is evidence, however that Pakistan was well along the way toward achieving that goal. A leaked Defense Intelligence Agency report that same year said Pakistan detonated its second high-explosive test during September 1986 as part of its continuing effort to develop an implosion trigger for a fission bomb. Intelligence reports also showed that Pakistan had enriched plutonium above the 90 percent needed for a bomb.

Although Pakistan's main effort so far appears to be on the simpler uranium bombs, it apparently has not given up on graduating to the higher technology of plutonium devices. On 31 December 1991, China announced that it was selling Pakistan a 300-megawatt nuclear reactor but that it would be subject to safeguards and inspection by the IAEA. But Pakistani Foreign Secretary Shahryar Khan said on 6 February 1992 that his country has the components and expertise to assemble a nuclear bomb -- the first time an official had publicly revealed the status of Pakistan's nuclear program.

Retired Pakistani Army Chief of Staff Mirza Aslam Beg revealed in July 1993 that his country's first successful nuclear test was conducted in 1987. Pakistan's industrial enriching plant now has the capacity to produce enough highly-enriched uranium to make 12 nuclear bombs a year. With the Iranian threat from the west as well as friction with India over the Kashmir to the east, there is no motivation for Pakistan's to slow its bomb-making effort.

b. Pakistan's Delivery Systems. Pakistan tested a ballistic missile on 25 April 1988 in its southern Thar Desert. The missile had the range to reach Bombay or New Delhi in India. Hatf-1 and Hatf-2 missiles are designed by Pakistan but with help from the Chinese. They are apparently patterned after the 290 kilometer (156 nautical mile) range Chinese M-11 missile. Pakistan tested two more short-range missiles in January 1989.

In early May 1993, US officials alluded to reports and other indications that China might be shipping road-mobile M-11 SRBMs with spare parts to Pakistan. China rebutted that it was not violating its promise to stop selling delivery systems for mass destruction.

In October 1990, US President Bush could not certify that Pakistan does not have an atomic bomb. Some \$564 million in new military and economic aid was cancelled along with \$2.7 billion in previously-authorized military aid and sales, including 71 F-16 fighter jets. But that cancellation did not occur before the US provided its staunch ally during the Afghanistan war with \$4 billion in aid, including delivery of 40 F-16 fighters which make excellent nuclear delivery vehicles. Pakistan also has French-supplied Mirage-2000 aircraft.

In August 1996, US intelligence officials concluded that construction work in the suburbs of the northern Pakistani city of Rawalpindi (near Islamabad), that it had been watching for a year, is a missile factory. It could be ready in a year or two to produce major missile components. On 2 July 1997 Pakistan test fired a 800 kilometer (432 nautical mile) range missile known as the Hatf-3. Introduction of this new medium-range ballistic missile further aggravates the arms race between India and Pakistan. Experts in India argue that the Hatf-3 is really a Chinese M-9 with a new paint job.

C. EAST ASIA.

East Asia is also an area of nuclear competition with several facets. North Korea is still at odds with South Korea and its alliance with the US and Japan. Japan fears the North Korean nuclear potential and South Korea fears that potential from both North Korea and Japan. Many in Japan also want the nuclear capability because of world status and to help become a permanent member of the United Nations Security Council. Meanwhile Taiwan still bitterly contends for recognition as the legitimate Chinese government.

1. Japan.

On 4 January 1993 the Japanese freighter Akatsuki Maru completed its 2-month voyage carrying 3,300 pounds of plutonium oxide from France to Japan -- the first of a total 50 metric tons to be transported to Japan as fuel for its experimental breeder reactor. This plutonium was originally furnished to Japan by a 1988 Implementing Agreement approving its use and shipment for 30 years. Because it has already given 30 years of prior approval, Congress cannot modify or disapprove shipments on a case-by-case basis -- its oversight powers are diminished. Under Annex 5 of that agreement, the US administration approved the shipment in September 1992. The 15,000-mile voyage commenced on 16 November 1992. Opponents to the shipment cited hijacking by terrorist groups as one of the dangers. Besides being fuel for Japan's planned series of breeder reactors, this reprocessed fuel is a first step toward weapons-grade material. The US halted its breeder reactor program in the 1970s, largely to stop the spread of weapons-grade plutonium. France has also given up on breeder reactors.

a. Japan's Nuclear Materials Programs. Because Japan does not presently have reprocessing facilities of its own, with US approval it entered into agreement with Cogema (a French government-company located at La Hague, France) and British Nuclear Fuels Limited (a government-owned company located at Sellafield, England) to reprocess Japan's spent reactor fuel. Eventually Japan expects to meet its own reprocessing needs at its Tokai and Rokkasho reprocessing facilities, plus a new plant to be built. By 2010 Japan's supply of plutonium -- recovered both at home and abroad -- will be 85 metric tons. Shortly after the turn of the century Rokkasho alone will recover 4.5 to 5 metric tons of plutonium a year.¹⁶ Rokkasho also enriches uranium.¹⁷

Dr. Atsushi Tsuchida, a Japanese physicist living in Tokyo who specializes in the physics of energy resources and the environment, has written an enlightening paper unmasking the intrigue of Japan's nuclear program.¹⁸ Much of the discourse in this section on Japan will be taken from his paper.

Threat of the Akatsuki Maru being hijacked was overblown because the low-purity plutonium created by normal reactors is not suitable for building bombs. Tsuchida feels the furor was orchestrated by nuclear-weapons proponents in both Japan and the US who would benefit. As stated by the US General Accounting Office, the shipment "raised or revived broader concerns about the

¹⁶GAO/RCED-93-154, p. 3.

¹⁷Tsuchida, p. 7.

¹⁸See Tsuchida.

growth of plutonium stocks around the world and the increasing risk of nuclear proliferation.¹⁹ With more potential "enemies" it is easier to justify more nuclear weapons.

Tsuchida points out that "even as the world waxed hysterical over the plutonium shipment, the Japanese government was quietly hatching a more ominous scheme: the reprocessing of spent fuel from its own fast breeder reactors to produce 98% pure Pu-239. [This] cannot be justified as a response to the country's chronic energy shortage. Rather, it is a clear step toward the production of tactical nuclear weapons."²⁰ Highly-pure Pu-239 is essential to building nuclear weapons light enough to be delivered.

Japan is building a Recycling Equipment Test Facility at its Tokai nuclear complex which will process the spent blankets from Japan's Jyoyo fast breeder reactor. The Jyoyo reactor was taken out of private utility company hands in late 1992 and also made a government project. The reprocessed plutonium from ordinary reactors is used in the core of a breeder reactor. Around that is a blanket of depleted uranium (U-238). When the core is irradiated, the composition of the blanket becomes 98% weapons grade Pu-239 with only 2% Pu-240 and trace amounts of other contaminants. This process takes about two years. Only the 40 kilogram blanket is to be "recycled" at Tokai, which will produce enough plutonium for 20 tactical nuclear weapons. Soon the new Monju fast breeder reactor will go on line and Japan will be able to produce enough Pu-239 for 20 tactical nuclear weapons a year.

The cycle will then be to reprocess the spent fuel from normal nuclear reactors which will then be used as the core of breeder reactors. Then the blanket from breeder reactors will be processed to make bomb-grade material.

The uranium enrichment facility at Rokkasho has also been stepped up. Besides enriched uranium, another product is the depleted uranium used for the breeder reactor blankets. Activities at Rokkasho are indispensable to Japan's bomb-making ambitions. Rokkasho will also give Japan the option of a plutonium bomb or the simpler uranium bomb which needs no testing.

Japan is also experimenting with two new types of reactor for producing bomb-grade plutonium. One is an advanced pressurized water reactor which is midway between a conventional light water reactor and a breeder reactor. The other is a special light water reactor which uses the depleted uranium blanket.

b. Nuclear Carrier Vehicles in Japan. Japan is well along on missile technology. It has space-launch vehicles which could be converted to weapons carriers. Japan has a good handle on missile technology.

Japan also has aircraft which could deliver tactical nuclear bombs. In its air force are some 70 F-4 and 179 F-15 fighter jets.

c. Japan's Constitution Permits Nuclear Weapons. Misunderstandings about Japan having a non-nuclear constitution should also be clarified. The constitution does not specifically prohibit nuclear weapons. It bans war-making capabilities in excess of what is needed for national

¹⁹GAO/RCED-93-154, p. 13.

²⁰Tsuchida, p. 1.

defense. In that light, strategic nuclear weapons would be outlawed but tactical nukes are acceptable. It is true that Japan's Atomic Energy Act allows only peaceful use of nuclear power. But it is a general law with no punitive provisions, so it lacks the teeth to prevent the Japanese military from building tactical nuclear weapons. Then there are the much heralded Three Non-Nuclear Principles which are nothing more than a proclamation and can be changed as circumstances dictate. In summary, there is no legal provision to stop Japan from being a nuclear power. Japan is a party to the NPT, but that can be abrogated on short notice. In addition, the NPT is fast losing its credibility as an instrument to prevent proliferation of nuclear weapons.

On the other hand, there are events that encourage Japan to join the nuclear club. The US has proposed that United Nations Security Council membership be upped from 15 to 20, and that Japan and Germany become permanent members. Although not by written decree, the current five permanent members are the five proclaimed nuclear powers. Membership in that council might give Japan implied authority to become a nuclear weapons state.

2. *North Korea.*

Only an armistice resulted from the Korean war. No peace treaty has ever been signed. Hostilities still exist and it is difficult to sort out truth from propaganda. This section will attempt to meld together the differing views to provide some substance for judgment.

a. Some Historical Background. The Korean war was a major war. There were more bombs dropped there than all the conventional bombs dropped on Japan during World War II. Three to six civilians died for every combatant that was killed. Figures from the South Korean Red Cross show almost a quarter million dead and a similar number wounded, with 303,213 missing. Technically the war still rages while north and south are still divided by a so-called de-militarized zone on the 38th parallel. Vietnam and Germany are now reunited but there are still two Koreas.

Each year the US military carries out joint exercises with South Korean forces in the largest military maneuvers worldwide. Called "Team Spirit," this simulated battle with North Korea practices everything from beachhead landings to nuclear strikes. US nuclear weapons were stationed in South Korea.

North Korea responds by deploying strong invasion forces along the de-militarized zone. This is then used by US and South Korean officials to justify continued maneuvers -- and so the spiral goes.

During the 1980s there had been no indication that North Korea intended to invade the South. On 13 December 1991 the two Koreas signed a non-aggression and reconciliation agreement. They each agreed to "not interfere in the internal affairs of the other" and "refrain from all acts aimed at destroying and overthrowing the other side." Both agreed to "discontinue confrontation and competition" and to cooperate in "joint development of resources," permit "free travel and contacts between citizens" and to "connect several railways and roads."²¹ The pact called for de-nuclearizing the Korean Peninsula but the details have yet to be negotiated.

²¹Cited in Swomley, p. 24.

The US removed its nuclear weapons from South Korea in late 1991 and suspended the 1992 "Team Spirit" exercise. North Korea already a party to the NPT, signed the nuclear safeguard accords which permit IAEA inspections of nuclear facilities. In the eight months between 11 May 1992 and 26 January 1993 the IAEA made six inspection team visits to North Korea. That was the situation at the beginning of 1993.

b. North Korea's Nuclear Program. North Korea has been pursuing a nuclear program since the 1950s, possibly with China's and the Soviet Union's help. It has been operating a Moscow-supplied research reactor since 1968. The transition to a military program probably took place in the late 1970s.

Since 1980 US spy planes have been monitoring the construction of an unusually large reactor near Yongbyon, about 60 miles north of Pyongyang, which was completed in 1987. The complex now comprises about 100 buildings contains two reactors and a fuel reprocessing plant. The largest reactor was expected to begin operation in late 1992 and produce enough plutonium to construct seven bombs a year. The reprocessing plant would be in operation shortly thereafter. It was expected that North Korea could have its first nuclear bomb in 1994.

North Korea became party to the NPT in 1985, possibly to make it easier to obtain nuclear materials and technology. But it did not fulfill its obligation to sign a safeguards agreement with the IAEA within 18 months, possibly to hide construction of its Yongbyon complex.

After signing the 13 December 1991 non-aggression agreement, North Korea still did not allow IAEA inspections immediately. In January 1992 North Korea cited Japan's plutonium program as reason for holding off. In April 1992 the story came out that North Korea was producing weapons-grade plutonium, but the purity of such reprocessed plutonium would make a bomb too heavy for North Korean aircraft, and they had not yet developed a missile. North Korea then signed the nuclear safeguard agreement and inspections began in May.

In early 1993 reports inspired by newly-appointed CIA director R. James Woolsey entered the media that North Korea was secretly developing nuclear weapons. Apparently there were some inconsistencies in the quantity and quality of nuclear material between what North Korea declared and IAEA findings. During its 25 February 1993 meeting the IAEA board, hoping to resolve the inconsistencies, passed a US-sponsored resolution calling for inspection of two nuclear waste sites which had not been declared. North Korea claimed these were secret military facilities with no connection to its nuclear program. "Team Spirit 1993" took place in March, using an extra 19,000 US troops and the aircraft carrier *Independence*.

On 8 March 1993 North Korea reacted by putting all its armed forces on war alert, and on March 12th gave the required three-months notice that it would withdraw from the NPT. The North Korean statement said: "Some officials of the IAEA secretariat insist stubbornly on the 'inspection' of our military bases as dictated by the United States, while ignoring our demand for inspection of the nuclear weapons and nuclear bases of the United States in South Korea."²² The IAEA Board of Governors reported North Korea's non-compliance to the UN Security Council. On 11 May 1993 the Security Council passed a resolution, with China and Pakistan abstaining, calling upon North Korea to comply with IAEA safeguard agreements.

²²Cited in Swomley, p. 25

After successfully testing its Nodong-1 IRBM (300 kilometers or 162 nautical miles range), North Korea announced on 11 June 1993 that it would stay on as a party to the NPT, at least for now. The remainder of 1993 saw a heated exchange of rhetoric and diplomatic bluffs over North Korea's stance on inspections. There was much talk of sanctions, military exercises, positioning Patriot anti-ballistic missiles in South Korea and Japan, ad infinitum. A December 1993 Los Angeles Times poll indicated that 51 percent of Americans favored "using American military force to eliminate ... suspected North Korean nuclear weapons installations" if negotiations to allow inspections fails.²³ Punctuating this media hey-day were CIA exhortations that North Korea already has one or two nuclear weapons.

When international pressure was getting heavy on North Korea during mid-February 1994, it agreed to resume IAEA inspections at the seven declared sites. But it still would not allow inspection of the two disputed waste dumps. When IAEA inspectors wanted to take a closer look at a plutonium-processing area during mid-March, inspections were again called off. That was followed by another threat to pull out of the NPT. A suspended "Team Spirit 1994" exercise then took place.

In mid-April 1994, North Korea shut down its 5-megawatt research reactor at Yongbyon and started unloading fuel. IAEA observers were allowed strict observance of fuel rod removal and storage in cooling ponds, but could not take samples for testing. The cry then went up that the purity of plutonium removed could not be measured. Actually, IAEA inspectors were monitoring the defueling and had surveillance cameras. Although they couldn't take samples to test purity, the Washington-based Arms Control Agency refutes the claim that desired information is irretrievably lost. Its senior analyst, Jon Wolfsthal, expressed "concerns that the IAEA may have been overlooking, or may have wrongly rejected, possible solutions to this problem.... It is unclear...why it wouldn't be possible at a later date to randomly sample fuel to determine the average age and burn-up rate."²⁴ Regarding using the spent fuel for nuclear weapons, US Defense Secretary Perry says the IAEA assured him it "is confident that there has been no diversion of the fuel that has been discharged."²⁵

A hot international debate then took place on whether sanctions should be imposed against North Korea or whether negotiations should continue. North Korea vociferated that sanctions would be considered an act of war, and fulminated more on pulling out of the NPT. South Koreans started stocking their larders and bracing for hostilities. Both sides amassed troops along the 38th parallel. But in spite of its hot rhetoric, North Korea did not close the door to negotiating with the US.

c. *Negotiations Win Out.* North Korea's late President Kim Il Sung said he wants a nuclear-free Korean Peninsula and is willing to resume talks with the US. He said his country wants diplomatic recognition and financial help in converting its nuclear reactors to the commercial light-water type which are less adaptable to bomb making.

In April 1994, North Korea's Deputy Permanent Representative to the United Nations, Kim Jong Su, said that his country doesn't want nuclear weapons. What it really wants is a permanent

²³*Mercury News*, 10 December 1993, p. 17A.

²⁴*Defense News*, 6 June 1994, p. 6.

²⁵*Mercury News*, 21 May 1994, p. 14A.

peace treaty with the United States. Then in early May, North Korean Foreign minister Kim Yong Nam reiterated that negotiations with the US were the key to cooperation. He told IAEA Director General Hans Blix: "I would like to assure you that if the further round of [North Korean-US] talks would take place...all the routine and ad hoc inspection activities, including the selection and storage of some fuel rods as requested by your agency, would be possible."²⁶ All of these things do sound like steps in the right direction.

Former US President Jimmy Carter laid groundwork for negotiations with the US and a North-South summit meeting to normalize relations, and he optimistically declared the crisis over. The Clinton administration, unable to ignore this turn of events, said negotiations could resume if North Korea freezes its nuclear program. The North agreed and talks began with the US in July 1994. Summit talks between North and South were set for late July.

Before negotiations with the US were barely underway, and two weeks before summit talks with South Korea, President Kim Il Sung died on July 8th. There were jitters along the 38th parallel for two months but North Korea continued its conciliatory attitude and by early August it appeared that Kim Jong Il was firmly in charge. In fact, according to Deputy Foreign Minister Kang Sok Ju, the new leader has been overseeing every aspect of government policy for the past twenty years, and North Korea is still committed to unification of the peninsula. Negotiations with the US proceeded.

On 21 October 1994 the US and North Korea signed a nuclear accord in which each side made concessions. The US would arrange for \$4 billion in international financing to construct two 1,000-megawatt light-water reactors which are less capable of producing bomb-grade plutonium. Until the first one is operating in about 2003, North Korea does not have to start dismantling existing facilities. North Korea will, however, freeze its nuclear program, halt construction of new gas-graphite nuclear reactors, and cease reprocessing the spent fuel rods removed from its research reactor.

In the meantime the US arranged an interim supply of 500,000 metric tons of fuel oil annually until the new reactors are constructed. North Korea agreed to remain in the NPT and to allow IAEA inspections, but the US agreed that inspections of the two disputed waste dumps do not have to take place for about five years. North Korea will renew diplomatic relations with South Korea and the US will establish a liaison office in Pyongyang which could eventually be upgraded to ambassadorial status, and will gradually ease trade and investment restrictions. Team Spirit 1994 was canceled but plans to bolster the 37,000 US troops in South Korea will continue until the North reduces forces along the 38th parallel.

Things have not gone smoothly in the four years since the nuclear accord was reached. There has been a hiatus in the talks and economic problems have slowed the financing of light water reactors. North Korea has since tested the Nodong-2 missile with a range of about 2,000 kilometers (1,080 nautical miles). Famine and poverty has swept the country while bureaucratic boondoggling has obstructed relief work. But recent signs are promising and talks between North and South may once again be on track.

²⁶*Defense News*, 9 May 1994, p. 3.

3. South Korea.

South Korea should be considered because it not only worries about a North Korean bomb and the Nodong missiles, it also worries about Japan. The Korean people have not forgotten Japan's brutal 36-year rule of their country prior to World War II. South Korea is a party to the NPT.

A 21 July 1992 editorial in the *Korean Daily* argued that Japan's plan for a breeder-reactor blanket processing facility, coupled with Japan's shipment of reprocessed plutonium from France, indicated more than just a program for energy resources. Recalling that Japan now participates in UN peacekeeping forces and has requested a permanent seat on the UN Security Council, the editorial continued, "If Japan next acquires the capacity to build nuclear weapons any time it wants, its transition to a political and military superpower will be complete. If this happens, we shudder at the implications for Northeast Asia."²⁷

South Korea in September 1992 announced it is buying two Canadian CANDU reactors which are capable of producing weapons-grade plutonium. Concern over Japan's plutonium program has now caused the South Korean government to announce in June 1993 that it would counter with its own fast breeder reactor program.

South Korea currently has aircraft that could deliver a nuclear bomb. Its air force operates at least 60 F-16(with plans for 120), 195 F-5, and 130 F-4 fighters.

The US stopped South Korea's nuclear weapons program in the late 1970s. But South Korean lawmaker, Rep. Suh Su Jong, chief policy analyst for the ruling Democratic Liberal Party, said South Korea was still working on plans to develop nuclear weapons as late as 1991. The importation of Canadian CANDU reactors shows that the US no longer has the muscle to restrain South Korea's ambitions, if it ever had. For whatever reasons, the US has not blocked the import of the Canadian CANDU reactors as it once did when those same reactors were previously considered.

4. Taiwan.

Since 1969, with the delivery of a large research reactor from Canada, the US has wondered about Taiwan's nuclear intentions. Then in January 1988 Colonel Chang Hsien-yi, one of Taiwan's top nuclear scientists and deputy director of the military's nuclear energy research center at Chungshan Institute of Science and Technology, defected to the US with blueprints revealing Taiwan's nuclear weapons plans. In late March of that same year, the US pressured Taiwan to stop work on a secret plutonium reprocessing plant and to shut down its Canadian-supplied reactor. Taiwan has signed and ratified the NPT (but is not a member of the UN or IAEA) and has protested that its nuclear programs were strictly for civilian use.

In early 1993 the military-controlled Chung Shan Science Institute submitted a proposal to the government for a nuclear reactor. Some scholars believe the military has an interest in the project.

Taiwan also has plans for a fourth nuclear site which was originally to have two 1,000-megawatt reactors. In early 1994, after construction was approved in the face of much opposition, the specifications were revised upward to 1,300 megawatts. This again has touched off much citizen and political opposition. Reason for the increase was to take advantage of the so-called "advanced" pressurized water reactor designs in that megawatt range. It is this type of reactor --

²⁷Cited in Tsuchida, p. 5.

halfway between a conventional reactor and a fast breeder reactor -- that Japan is experimenting with to produce bomb-grade plutonium.

Taiwan currently has 275 F-5, 10 F-104, and 42 Ching-kua fighter aircraft. The French Air Force trained Taiwanese pilots to fly the Mirage-2000 airplane. Taiwan is interested in purchasing Mirage fighter-bombers from France and F-16 fighters from the US.

The good news is that anti-nuclear consciousness seems to be growing and entering the political arena across party lines. Although the growth is most noticeable around the four nuclear plant sites, there is confidence that it will spread across the nation. The bad news is that, with great secrecy, Taiwan could build a nuclear bomb in a year or two.

D. AFRICA.

Evidence abounds of suspicious activities to become nuclear powers, or possessors of other weapons of mass destruction. There are innumerable reports of unauthorized shipments to these countries that were foiled. One must conclude from the number of unsuccessful attempts that there have been many that were successful. Africa has not been immune from this activity.

1. Algeria.

Algeria is a country experiencing a fundamentalist Muslim upheaval in a campaign of terror aimed at gaining control of government. The Islamic Salvation Front is the main fundamentalist movement. In mid-April 1994, hard-line Prime Minister Redha Malek resigned, not unexpectedly. Malek had been cracking down on radical gunmen. President Liamine Zeroual favors a dual-track approach of cracking down on terrorist but also trying to negotiate with jailed leaders. Zeroual appointed a 54-year-old technocrat, Mokdad Sifi, as the new prime minister. Sifi had previously been minister of equipment.

China has given extensive help to Algeria in constructing a nuclear reactor in a remote site south of Algiers. Western observers fear this heavily-guarded complex is for producing plutonium for a fission bomb. Algeria is not a party to the NPT.

Algeria has many combat aircraft which could be modified to deliver nuclear weapons. Already configured for ground attack are 40 MiG-23, and 10 Su-24 fighter aircraft. It also has an additional 110 MiG-21/-23/-25 fighters which could be converted to deliver nuclear weapons.

2. Libya.

Libya has taken an aggressive interest in nuclear weapons. It would like to buy a weapon or hire some former Soviet weapons scientists. US officials claim that Libyan leader Moammar Gadhaffi has offered Pakistan billions of dollars for nuclear technology. Libya ratified the NPT in 1975.

Regarding delivery vehicles, Libya is well endowed. It has a variety of missiles with ranges up to 1,200 kilometers (650 nautical miles). In the way of aircraft, Libya has 6 Tu-22 "Blinder" bombers. These were once used as a strategic medium bomber for the Soviet union. Libya also has 55 MiG-23, 58 Mirage, and 51 Su-20/-22/-24 fighters configured for attacking ground targets. In addition the Libyan Air Force has 206 other fighters -- 50 MiG-21s, 75 MiG-23s, 60 MiG-25s, and 21 Mirage.

3. South Africa.

South Africa has a large supply of natural uranium. It is widely believed that this country has developed centrifuge technology, and possibly even laser technology, to concentrate weapons-grade Uranium-235. Soviet *Cosmos* satellites in mid-1977 detected preparations for an underground nuclear test in South Africa's Kalahari desert. Soviet and US pressure dissuaded the South African government from proceeding with that test.

On 22 September 1979 a US Vela satellite (67,000 miles above the earth with nuclear-detection sensors aboard) spotted what looked like a nuclear explosion in the ocean south of Africa. New Zealand's Institute of Nuclear Science later reported a slight increase in radioactive fallout. Although vigorously denied, South Africa was accused of setting off a small nuclear blast. Israel was also suspected of being involved.

The United Nations in 1985 accused the US and other western nations of allowing South Africa to obtain equipment needed to develop nuclear weapons. There have also been allegations that Israel shared nuclear technology with South Africa in exchange for uranium. Israeli cooperation dates back to the 1970s. This covert partnership was confirmed in April 1997 by the Israeli daily newspaper, *Haaretz*.

In March 1993, then South African President F.W. deKlerk revealed that between the late 1970s and when he became president in 1989, six nuclear bombs had been built. He said those bombs were destroyed in early 1990, the uranium-enrichment plant was decommissioned, and uranium fuel was diluted to below weapons-grade. South Africa signed the NPT in July 1991 and is now adhering completely to treaty requirements.

Later, in mid-1993, South Africa cancelled its RSA-4 space launch vehicle which would provided a ballistic missile capability. That now enables the country to abide by the terms of the Missile Technology Control Regime.

E. SOUTH AMERICA.

In South America the fear of a nuclear standoff centers on Brazil and Argentina. Although neither country is party to the NPT, both countries signed the Treaty for the Prohibition of Nuclear Weapons in Latin America (also called the Treaty of Tlatelolco) in 1967. But according to Article 13, to become a party to the treaty each country must make arrangements with the IAEA for the application of safeguards. It was not until 13 December 1991 that Argentina and Brazil signed such agreements with the IAEA. Also in 1991 these two countries, along with Cuba, signed a declaration prohibiting the production and use of chemical or biological weapons.

Brazil did have a bomb program. Six months after Fernando Collor de Mello took office as president in March 1990, he learned of a secret atom bomb program that had been going on since 1975. He dismantled the project and had filled with concrete a 1,050-foot-deep hole drilled to test a bomb in the Cachimbo mountain range of the remote central Amazon.

Collor was the first popularly-elected president since the 1964 military coup, but he was suspended from office on 2 October 1992, and subsequently ousted, for alleged corruption. His successor's nuclear policy has not been revealed.

F. EUROPE.

Worries have been mounting for decades, and were raised to new heights by the breakup of the Soviet Union, about international safeguards over nuclear materials and technology. There appears to be an international black market for these commodities. Following are a few instances that came to public attention.

1. Sweden.

Sweden says it halted its nuclear program in 1957, but its nuclear scientists continued to develop defenses against a nuclear attack. This activity was used to justify the 1985 acknowledgment by Swedish research specialists that an underground plutonium bomb was detonated in 1972. The Swedish embassy in Washington confirmed the nuclear test but Sweden's defense ministry claimed the tests were only conventional explosions to test shock wave penetration of plutonium and various other metals. Sweden ratified the NPT in 1970.

2. Switzerland.

The Swiss government apparently admitted it had a 43-year nuclear program which it ended in 1988. It included a secret stockpile of uranium, attempts to buy weapons grade plutonium, and plans for 400 nuclear warheads. This was confirmed by Jurg Strussi, the Swiss government's senior military historian. "It was never our intention to build a bomb at any price but it was an option," said Strussi. "If the monopoly enjoyed by the nuclear powers was broken, if Germany developed nuclear weapons, then we would have built one to keep ourselves alive."²⁸ It is interesting that this revelation came about when Germany was elbowing for more status in the UN Security Council as a permanent member – a position presently reserved for the declared nuclear powers.

3. Norwegian Heavy Water.

Norway's Foreign Ministry confirmed in May 1988 that 15 tons of Norwegian heavy water (deuterium oxide) was missing. It was diverted in December 1983 to unknown locations from its intended destination in West Germany. Some speculate that the destination was India. Heavy water is tightly controlled because it simplifies the making of a nuclear bomb. Heavy-water reactors can run on the easily-obtained natural uranium, rather than scarce and tightly-controlled enriched uranium. The plutonium byproduct can then be reprocessed for bomb use. It takes about 20 tons of heavy water to produce enough plutonium for one bomb.

Later in May 1988, Norway was investigating whether another shipment of heavy water destined for Romania may have been diverted to an unknown destination.

4. Former Soviet Nuclear Weapons.

Since the breakup of the Soviet Union, the former USSR's strategic nuclear weapons are distributed among four republics. Some of them are now experiencing ethnic strife, and the control of nuclear weapons and materials in those volatile locations is in doubt. All nuclear weapons are now reported to have been sent to Russia but concern remains regarding their present security.

²⁸Cited in Edwards.

In addition, with the apparently well-organized and well-financed nuclear black market, there is a global fear that some weapons may fall into the wrong hands. Two former Soviet residents were arrested by German authorities in March 1992 with 2.6 pounds of uranium in their car. They were apprehended after trying to sell the radioactive material for \$1.1 million. Bavarian police suspect these two were merely couriers in a larger smuggling ring.

During the following October, a Bavarian customs official said Munich police had arrested seven black-marketeers for smuggling 4.85 pounds of weapons-grade uranium from the former Soviet Union. Two days before that, Frankfurt police arrested three people who tried to sell a police informant some radioactive material and a Soviet warhead. During 1992, German police have investigated over 100 cases involving smuggling of nuclear materials -- in 1991 there were 29 cases investigated. Government authorities in Belarus told visiting US senators in November 1991 that on numerous occasions smugglers had been caught trying to take enriched uranium into Poland. They fear other shipments may have gotten through because the border is not secure.

Russia is selling missile guidance technology, rocket engines, and other advanced weapons systems technology to the Peoples Republic of China. At first these sales seemed to be individual systems such as SU-27 fighter jets and missile guidance systems. Now there is concern about a broad spectrum of technology which will give China a leading edge in modern weaponry. The real concern arises if China passes this technology on to aspiring nuclear powers.

In early 1993 the CIA said there were no confirmed cases of nuclear weapons being offered on the black market but there have clearly been attempts to smuggle nuclear materials. Plutonium and uranium give off alpha radiation which can be shielded with aluminum foil. It would be impossible to detect a shipment so packaged with a Geiger counter. So far the smuggling attempts have been of low-grade materials. But as disassembly of weapons proceeds, weapons-grade materials will become more abundant.

The dismantling of former Soviet weapons under the START and INF treaties will generate about 500 tons of highly-enriched uranium and 96 tons of weapons-grade plutonium. To date the most difficult part of making a nuclear bomb has been the enrichment of fissionable materials. As this stockpile becomes abundant the smuggling danger will be magnified -- where will the fissionable material be safely stored and how will it be safeguarded.

The US has pledged to buy the 500 tons of highly-enriched uranium from Russia to prevent its sale to other countries. It will ostensibly be diluted to use as reactor fuel. But bringing it to the US is not necessarily making it safer. Between January 1989 and September 1990, routine DOE security inspections identified more than 2,100 security deficiencies at 39 of its contractor-operated weapons-related facilities. These are only the ones "found" during "routine" inspections.

The media over the past few years has been replete with stories of nuclear smuggling and black markets. This is a clear and present hazard because some people will make a dollar no matter what the consequences of their action.

5. *Former Soviet Nuclear Scientists.*

There are some 10,000 scientists, engineers and chemists who had been working on Soviet nuclear weapons. They have a wealth of knowledge and experience which is sought in other countries. On 8 December 1992 Russian authorities arrested 36 nuclear experts just as their aircraft

was ready to take off for North Korea, where the experts had been hired. The concern is that these experts, and others, may become mercenaries for aspiring nuclear powers in the same manner that German scientists worked for the US and USSR after World War II. Ex-Soviet scientists could fuel another nuclear arms race in some sector of the world, just as their German counterparts did about a half-century ago.

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