NUCLEAR PROLIFERATION: THE INDIAN PROFILE

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Part-II – Extracts

PREFACE

While addressing a joint meeting of the US Congress in July 2006, Indian Prime Minister Manmohan Singh stated that "India has an impeccable record on non-proliferation". But a cursory look into the available record of proliferation reveals that India was involved in nuclear proliferation activities. For instance, India had acquired the Western nuclear technology for peaceful purposes, but, in violation of the spirit of nonproliferation, had manufactured a nuclear device in 1974. As a consequence, South Asia has been nuclearised. Pakistan detonated a nuclear device in May 1998, as a reaction to earlier Indian nuclear explosions. It may, therefore, be instructive to study India's nuclear proliferation pursuits.

The *IPRI Factfile* relates to Indian nuclear proliferation and is divided into three parts. Part I consists of selected articles and documents on Indian nuclear proliferation from June 1998 till March 2008. Part II provides some relevant extracts, while Part III consists of details on Indian nuclear imports and exports during 1949-2002. The articles and data have been retrieved from the available print and electronic media and the sources are duly acknowledged.

April 30, 2008 Noor ul Haq

HISTORICAL DOCUMENTS REGARDING INDIA'S MISUSE OF CIVILIAN NUCLEAR TECHNOLOGY ASSISTANCE

India's 1974 nuclear weapon test explosion used plutonium produced by a Canadian-supplied reactor (CIRUS) moderated with heavy water supplied by the United States under a 1956 contract stipulating that it be used only "for research into and the use of atomic energy 'for peaceful purposes.'"

To this day, India does not deny the 1974 test device used Canadian and U.S. equipment and materials, but asserts that it did not violate the terms of its U.S. and Canadian "peaceful uses" contract requirements because the test was a "peaceful nuclear explosion."

In January 2006, the State Department said that there is "factual uncertainty as to whether U.S.-supplied heavy water contributed to the production of the plutonium used for the explosive device, and the lack of a mutual understanding between the U.S. and India on the scope of the 1956 contract language. We have since made clear that we exclude so-called 'peaceful nuclear explosions'—and any other nuclear explosive activity—from the scope of peaceful nuclear cooperation."

However, the following recently declassified documents show that the United States and Canadian governments interpreted their agreements as "precluding all nuclear explosions on the grounds that any such explosion in tantamount to a nuclear weapons test" and made this interpretation clear to India before the 1974 bomb test.

- Prospects of an Indian Nuclear Test
  Memorandum from U.S. Department of State Director of Intelligence and Research
  February 23, 1972 (To have complete look on the document please visit:
  http://www.armscontrol.org/pdf/19720223_INR_Report_Indian_Nuclear_Test.pdf)
- U.S. Government Aide Memoire Presented to Indian Atomic Energy Commission
  November 16, 1970 (To have complete look on the document please visit:
  http://www.armscontrol.org/pdf/19701116_US_Aide_Memoire_Indian_AEC.pdf)

SECURITY COUNCIL RESOLUTION 1172

Adopted unanimously by the Security Council on 6 June 1998

The Security Council,

Reaffirming the statements of its President of 14 May 1998 (S/PRST/1998/12) and of 29 May 1998 (S/PRST/1998/17),

Reiterating the statement of its President of 31 January 1992 (S/23500), which stated, *inter alia,* that the proliferation of all weapons of mass destruction constitutes a threat to international peace and security,

Gravely concerned at the challenge that the nuclear tests conducted by India and then by Pakistan constitute to international efforts aimed at strengthening the global regime of non-proliferation of nuclear weapons, and also gravely concerned at the danger to peace and stability in the region,

Deeply concerned at the risk of a nuclear arms race in South Asia, and to prevent such a race,

Reaffirming the crucial importance of the Treaty on the Non-Proliferation of Nuclear Weapons and the Comprehensive Nuclear Test Ban Treaty for global efforts towards nuclear non-proliferation and nuclear disarmament,

Recalling the Principles and Objectives for Nuclear Non-Proliferation and Disarmament adopted by the 1995 Review and Extension Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, and the successful outcome of that Conference,

Affirming the need to continue to move with determination towards the full realization and effective implementation of all the provisions of the Treaty on the Non- Proliferation of Nuclear Weapons, and welcoming the determination of the five nuclear-weapon States to fulfil their commitments relating to nuclear disarmament under Article VI of that Treaty,

Mindful of its primary responsibility under the Charter of the United Nations for the maintenance of international peace and security,

- Condemns the nuclear tests conducted by India on 11 and 13 May 1998 and by Pakistan on 28 and 30 May 1998;
- 2. Endorses the Joint Communiqué issued by the Foreign Ministers of China, France, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland and the United States of America at their meeting in Geneva on 4 June 1998 (S/1998/473);
- 3. Demands that India and Pakistan refrain from further nuclear tests and in this context calls upon all States not to carry out any nuclear weapon test explosion or any other nuclear explosion in accordance with the provisions of the Comprehensive Nuclear Test Ban Treaty;

- 4. Urges India and Pakistan to exercise maximum restraint and to avoid threatening military movements, cross-border violations, or other provocations in order to prevent an aggravation of the situation;
- 5. Urges India and Pakistan to resume the dialogue between them on all outstanding issues, particularly on all matters pertaining to peace and security, in order to remove the tensions between them, and encourages them to find mutually acceptable solutions that address the root causes of those tensions, including Kashmir;
- 6. Welcomes the efforts of the Secretary-General to encourage India and Pakistan to enter into dialogue;
- 7. Calls upon India and Pakistan immediately to stop their nuclear weapon development programmes, to refrain from weaponization or from the deployment of nuclear weapons, to cease development of ballistic missiles capable of delivering nuclear weapons and any further production of missile material for nuclear weapons, to confirm their policies not to export equipment, materials or technology that could contribute to weapons of mass destruction or missiles capable of delivering them and to undertake appropriate commitments in that regard;
- 8. Encourages all States to prevent the export of equipment, materials or technology that could in any way assist programmes in India or Pakistan for nuclear weapons or for ballistic missiles capable of delivering such weapons, and welcomes national policies adopted and declared in this respect;
- 9. Expresses its grave concern at the negative effect of the nuclear tests conducted by India and Pakistan on peace and stability in South Asia and beyond;
- 10. Reaffirms its full commitment to and the crucial importance of the Treaty on the Non-Proliferation of Nuclear Weapons and the Comprehensive Nuclear Test Ban Treaty as the cornerstones of the international regime on the non-proliferation of nuclear weapons and as essential foundations for the pursuit of nuclear disarmament;
- 11. Expresses its firm conviction that the international regime on the non- proliferation of nuclear weapons should be maintained and consolidated and recalls that in accordance with the Treaty on the Non-Proliferation of Nuclear Weapons India and Pakistan cannot have the status of a nuclear-weapon State;

- 12. Recognizes that the tests conducted by India and Pakistan constitute a serious threat to global efforts towards nuclear non-proliferation and disarmament;
- 13. Urges India and Pakistan, and all other States that have not yet done so, to become Parties to the Treaty on the Non-Proliferation of Nuclear Weapons and to the Comprehensive Nuclear Test Ban Treaty without delay and without conditions;
- 14. Urges India and Pakistan to participate, in a positive spirit and on the basis of the agreed mandate, in negotiations at the Conference on Disarmament in Geneva on a treaty banning the production of missile material for nuclear weapons or other nuclear explosive devices, with a view to reaching early agreement;
- 15. Requests the Secretary-General to report urgently to the Council on the steps taken by India and Pakistan to implement the present resolution;
- 16. Expresses its readiness to consider further how best to ensure the implementation of the present resolution;
- 17. Decides to remain actively seized on the matter.

June 6, 1998
http://cnic.jp/english/topics/plutonium/proliferation/pdffiles/UNSC1172Jun98.pdf

INDIA'S URANIUM MINES FACING DANGERS

The danger that Jaduguda mines faces can be fathomed from the fact that from 1989 to 2002 [ending June], there had been over 32 cases of uranium smuggling involving Bihar, Jharkhand, Orissa and West Bengal. Though the Union Home Ministry had been instructing these four states repeatedly for the last 10 years to lay special emphasis on crushing the uranium smugglers, the stealing of the radio active element had been going on unabated. The issue now has taken a very tricky turn with uranium smuggling getting linked with the coal: different coal cities dotting Jharkhand and West Bengal currently are acting as dumping grounds of uranium. The coal smugglers and illegal coal miners too are getting involved in the uranium smuggling due to Jaduguda's close proximity to the coal belt in these two states.

The West Bengal Police unearthed an uranium smuggling ring at the tiny coal town of Salanpur. The kingpin of uranium smuggling Maheshwar Deo Singh was also arrested. Singh had been regularly stealing uranium from the Jaduguda mines and sending them to Kathmandu in Nepal and other countries of South East Asia through special couriers'. From him, the police could get some clue of the modus operandi of the uranium smugglers. The

uranium consignments are first dumped into small coal towns immediately after their lifting from Jaduguda. From these cities, the consignments are clandestinely sent to other SAARC countries.

Amlan Home Chowdhury, August 14, 2002
http://www.dailyexcelsior.com/02aug14/edit.htm#5

INDIAN COMPANY SANCTIONED FOR PROLIFERATION

The United States levied sanctions February 4 against an Indian company and its president for aiding Iraq's chemical and biological weapons programs. Under the sanctions, imports from NEC Engineers Private Ltd. and its successors or the company's president, Hans Raj Shiv, are prohibited. In addition, the U.S. government may not buy goods or services from either the company or Shiv.

State Department spokesman Richard Boucher said the United States imposed the penalties against the entities for "knowingly and materially contributing to Iraq's chemical and biological weapons program." Boucher refused to list the specific goods involved or to confirm whether Iraq received them. He noted, however, that Indian media has reported that NEC Engineers Private "sent 10 shipments containing titanium vessels, filters, titanium centrifugal pumps, atomized and spherical aluminum powder, and titanium anodes to Iraq."

The sanctions "will remain in place for at least one year and until further notice," according to the Federal Register, which published the decision February 11. This is not the first time Shiv has been penalized; in July 2002, the United States imposed sanctions against Shiv under the Iran-Iraq Arms Nonproliferation Act of 1992. (See ACT, September 2002.)

NEC Engineers Private was originally based in India but has expanded its operations into the Middle East and Eurasia, according to the Federal Register. Shiv once lived in India but is now believed to reside in the Middle East. The State Department noted that the Indian government has worked to stem proliferation-related trade by Indian companies. Boucher said India has conducted its own investigation and has arrested two principals of NEC Engineers Private and taken steps to prevent further illicit exports, but "NEC and Shiv have shifted operations to other locations."

March 2003
http://www.armscontrol.org/act/2003_03/briefs_mar03.asp#india

U.S. PUNISHES 14 FOR IRAN ARMS TRADE

"The United States has sanctioned several Indian entities for proliferation activity. For example, Washington imposed penalties last September on two Indian individuals for transferring unspecified items to Iran that could contribute to the development of weapons of mass destruction or missiles."…

Wade Boese, November 2004
http://www.armscontrol.org/act/2004_11/Iran_Arms_Trade.asp

INDIA'S NONPROLIFERATION RECORD

Posted Wednesday September 7, 2005 under proliferation-networks, India by Jeffrey

"And the fact is that India has a record of nonproliferation, which is exceptional …

Nicholas Burns, Under Secretary of State for Political Affairs, Briefing on the Signing of the Global Partnership Agreement between the United States and India, July 19, 2005."

That was not the impression David Albright gave to attendees during the Institute for Science and International Security's briefing on fissile material stocks (co-hosted with the Carnegie Endowment for International Peace).

Corey Hinderstein produced the first satellite photograph of the Rattehalli Rare Materials Plant (RMP) where India has a small gas centrifuge pilot plant.

Then Paul asked Albright to comment on India's nonproliferation record. Albright revealed three things that I hadn't heard. He claimed:

- India openly attempts to procure prohibited items for its gas centrifuge plant. One tactic is to sell tenders to companies that then procure the items. Albright implied the government doesn't ask too many questions. (I found that India has a website where you can search the tenders. Go ahead and peruse the 297 tenders frorm the Department Of Atomic Energy, including one for Anhydrous Ammonia—essential to any well stocked meth lab.)
- In the 1980s, India used many of the same front companies as the AQ Khan network, including Trade Fin in South Africa. In theory, India might have fed some centrifuge design information back into the network in developing specifications for feed and piping systems. Also, Paul reported in 2005 that the U.S. Immigration and Customs Enforcement (ICE) announced that Asher Karni pled guilty to exporting items to India that are "controlled for nuclear non-proliferation reasons."

- Although India does have an export control list, India does not adequately enforce export controls (Albright compared India unfavorably to Germany). Albright claims to have seen dual-use items related to gas centrifuges, such as valves, for sale. The United States sanctioned several Indian firms for proliferation activity.

I can't wait for the reaction to this post on the Bharat-Rakshak bulletin boards.

September 7, 2005
http://www.armscontrolwonk.com/762/indias-nonproliferation-record

US Sanctions Indian Firms For Chem Sales

Bill Gertz reported that the United States, under the Iran Proliferation Act of 2000, will impose sanctions on nine entities—one Austrian, six Chinese and two Indian firms.

The two Indian firms are Sabero Organics Gujarat Ltd and Sandhya Organics Ltd.

The Indian government cried foul. External Affairs Ministry Spokesman Navtej Sarna denied the sale violated Indian export controls:

"We have also seen reports about imposition of sanctions on two Indian firms namely Sabero Organics Gujarat Limited and Sandhya Organics Limited under the US-Iran Proliferation Act, 2000.

The sanctions imposed by the US Government on the two Indian firms relate to transfer of some chemicals to Iran. Our preliminary assessment is that the transfer of such chemicals is not in violation of our regulations or our international obligations. Government of India's commitment to prevent onward proliferation is second to none. We have instituted a rigorous system of export controls and our track record in this regard is well known. India is working with the international community including with the US as a partner against proliferation. In this context the imposition of sanctions by the US on our firms, which in our view have not acted in violation of our laws or regulations, is not justified."

David Sanger reported that the "State Department announcement did not describe the technology exported to Iran, information that is classified."

Effrey, December 29, 2005
http://www.armscontrolwonk.com/919/indian-firms-sanctioned-for-chemical-sale-to-iran

TENDER MERCIES: ISIS ON INDIA

ISIS has released a report, India's Gas Centrifuge Program: Stopping Illicit Procurement and the Leakage of Technical Centrifuge Know-How, arguing that the Indian system of using tenders to acquire export controlled technology raises concerns about proliferation.

Since at least 1984, IRE has regularly placed inconspicuous lists of items in Indian newspapers, such as the Times of India, to invite bids from potential suppliers to RMP. This procurement process is commonly referred to as "tendering," where the tenderer is the company that bids to provide the item. Before submitting a bid, called a tender, a prospective supplier or trading agent can purchase, for a small fee, the detailed blueprints, manufacturing instructions, and specifications of a particular item.

An undesirable side effect of this process is the leakage of sensitive nuclear information. To prepare a bid, interested parties can obtain tender documents from IRE that list technical specifications of centrifuge components and centrifuge-related equipment. Although the detailed information may be stamped "proprietary" or similarly marked, this level of classification is relatively low. Company officials who possess this information could sell the item or underlying technology to other customers with the expectation that few legal consequences would result from Indian prosecutors.

A month or so ago, I noted a website that allows one to search various tenders.

Paul Adds:

Jeffrey raised this issue before in a post about India's less-than-perfect non-proliferation record.

March 10, 2006
http://www.armscontrolwonk.com/995/tender-mercies-isis-on-india

INDIA'S GAS CENTRIFUGE PROGRAM: STOPPING ILLICIT PROCUREMENT AND THE LEAKAGE OF TECHNICAL CENTRIFUGE KNOW-HOW

Indian nuclear and government officials have stated that India has an "impeccable" nonproliferation record. Officials go so far as to claim that India does not engage in illicit nuclear procurement and has an exemplary record of preventing nuclear secrets from falling into the wrong hands. ISIS has uncovered a well-developed, active, and secret Indian program to outfit its uranium enrichment program and circumvent other countries' export control efforts. In addition, ISIS has concluded that Indian procurement methods for its nuclear program leak sensitive nuclear technology.

President George W. Bush and Prime Minister Manmohan Singh proposed in July 2005 a plan for resuming "full" US-Indian nuclear cooperation that requires changes in U.S. law and the rules of the 45-nation Nuclear Suppliers Group that currently bar nuclear transfers to states--like India--that do not accept full-scope International Atomic Energy Agency Safeguards (IAEA). The findings of this report suggest that before the United States and other countries engage in nuclear cooperation with India, Indian procurement and export practices should be closely scrutinized. The Indian government should commit to stop conducting illicit procurement for its nuclear facilities, implement steps to better control its nuclear information, and improve its implementation of national and international export controls.

India Rare Earths and the Rare Materials Project

Under the direction of India's Department of Atomic Energy, Indian Rare Earths (IRE) Ltd. of Mumbai, a public-sector undertaking focused on recovering minerals and processing rare earths, procures sensitive materials and technology for a secret gas centrifuge uranium enrichment plant codenamed the "Rare Materials Project" (RMP) outside Mysore, India. The Bhabha Atomic Research Centre (BARC) operates the plant and appears to both coordinate procurements for this facility with IRE and pursue procurements for its own divisions through IRE.

RMP itself is rarely acknowledged by the Indian government as a gas centrifuge plant. The plant started in the late 1980s or early 1990s but has encountered numerous technical problems that have limited its success. RMP is believed currently to provide enriched uranium for civil research reactors, perhaps nuclear weapons, and a fledging naval reactor program that recently started a prototype naval reactor at Kalpakkam. ISIS has estimated RMP's total enrichment capacity as roughly 5,000 separative work units per year, although this estimate is highly uncertain. At this size, this plant could provide enough enriched uranium for a small naval reactor program and some highly enriched uranium for nuclear weapons, but not enough for India's twin Tarapur light water reactors. Available evidence indicates that BARC is expanding the capacity of RMP and installing more sophisticated centrifuges.

Public information about India's procurement for RMP is also shrouded in secrecy. Nonetheless, ISIS has uncovered IRE's long-standing effort to outfit the RMP by buying sensitive direct nuclear-use and dual-use items from foreign and domestic suppliers. In the case of foreign procurement, IRE, and trading companies procuring on its behalf, do not reveal that the end user is an unsafeguarded uranium enrichment plant. The trading companies may not reveal that they are purchasing for IRE or the Department of Atomic Energy. IRE's methods allow a supplier to easily avoid

knowing the true end use of an item and thus the supplier escapes responsibility for providing a dual-use item to a gas centrifuge plant.

Since at least 1984, IRE has regularly placed inconspicuous lists of items in Indian newspapers, such as the Times of India, to invite bids from potential suppliers to RMP. This procurement process is commonly referred to as "tendering," where the tenderer is the company that bids to provide the item. Before submitting a bid, called a tender, a prospective supplier or trading agent can purchase, for a small fee, the detailed blueprints, manufacturing instructions, and specifications of a particular item.

An undesirable side effect of this process is the leakage of sensitive nuclear information. To prepare a bid, interested parties can obtain tender documents from IRE that list technical specifications of centrifuge components and centrifuge-related equipment. Although the detailed information may be stamped "proprietary" or similarly marked, this level of classification is relatively low. Company officials who possess this information could sell the item or underlying technology to other customers with the expectation that few legal consequences would result from Indian prosecutors.

In addition to public advertisements, IRE has also invited tenders directly from specific companies. Little is publicly known about these solicitations for tenders, but IRE may have developed long-term relationships with certain companies, may view a particular company as the only source for an item, or might depend on a certain company when it needs an item quickly.

Based on information from knowledgeable European and US officials, IRE has received a wide variety of equipment, components, and materials for RMP from overseas companies through the IRE procurement system. In addition to acquiring from abroad many of the necessary items to build and operate RMP, IRE has sought to obtain sufficient equipment and know-how so that India could domestically manufacture many sensitive items for RMP. Although the centrifuge program has become less dependent of foreign supply over the last two decades, IRE continues to seek sensitive equipment, spare parts for previously imported equipment, and subcomponents for items assembled domestically.

Collection of Public Advertisements

To better understand IRE's procurement strategy for RMP, ISIS collected almost two hundred IRE public advertisements that were posted in the Times of India from 1984 through 2005. Each advertisement contained several specific requests for items. Many of these requests directly mentioned RMP or were likely for RMP. The latter determination was based on the type of product requested, the use of a particular procurement office, and the consistent numbering system that the office used to classify each item.

Although IRE has several different procurement offices and projects, the items discussed here originate from advertisements placed by a particular office in Mumbai. The procurement office in Mumbai uses a distinct code that sometimes mentions RMP and has requested sophisticated items that can be associated with a gas centrifuge program. The other offices invite offers for items that do not appear associated with a gas centrifuge plant and are typical of the projects publicly associated with IRE.

The Mumbai office's advertisements sometimes include BARC acronyms, such as CETG and CTD. CETG is an acronym for BARC's Chemical Engineering and Technology Group, and CTD stands for the Chemical Technology Division, a subdivision of CETG. Both CTD and CETG are associated with the centrifuge program, typically called the "high speed rotor" project by Indian officials. This is an apt allusion to a centrifuge program, because a rapidly spinning tube or rotor is the basis of a centrifuge. According to the 1996 and 1997 annual reports of BARC's Laser and Plasma Technology Division, CTD possessed "high speed rotors." Both BARC and IRE have cited CTD when soliciting bids for RMP. Because of the immense secrecy that surrounds RMP and India's gas centrifuge program, however, the exact organizational relationship between RMP and CETG or CTD is unknown.

A senior Indian BARC official who was key in the effort to purchase equipment for the RMP in Europe in the 1980s was Shri Bishweswar Bhattacharjee. He was appointed head of BARC in 2001 and was publicly recognized as former project director of RMP and leader of the team that designed, installed, and successfully commissioned the "high speed rotor" project. In the late 1990s, the BARC website listed him as the director of the CETG. Another major BARC participant in overseas procurement for RMP was T.K. Bera, who became the head of CETG after Bhattacharjee and was publicly identified in the 1990s as a senior manager of the RMP.

Specific Advertisements

Through this procurement system, IRE has sought a wide variety of equipment, components, and materials for RMP from domestic and overseas suppliers. Solicited items have included high-strength flow-formed maraging steel tubes and the machining of sensitive bellows that appear to be centrifuge rotors, maraging steel discs that could be for centrifuge end caps, and items that could be subcomponents of centrifuge bottom bearings and motor stators. Other items include displacement sensors that can measure centrifuge rotor velocity, vacuum pumping and measurement systems, specialized valves, and subcomponents of valves and vacuum pumping systems. In addition, IRE has sought many machine tools, measuring equipment, vacuum furnaces, and welding equipment that are associated with gas centrifuge manufacturing.

Appendix 1 has a sample of advertisements that either list RMP as the customer or appear to be for the gas centrifuge program at RMP. The advertisements are grouped into several categories, including construction projects, component manufacturing, vacuum equipment, uranium hexafluoride production and handling, and centrifuge manufacturing equipment.

An advertisement from late 2005 appears to be soliciting supercritical centrifuge rotors, whose design, manufacturing methods, and distribution are tightly controlled by other governments. The advertisement requests the manufacture of 1,225 millimeter long, thin-walled, flow-formed and intermediate annealed, ultra precision maraging steel tubes with an outer diameter of 150 millimeters. These tubes would be made on a sophisticated machine that "flow-forms," or thins, a tube to the required specifications. The advertisement requires the use of MDN-350 grade preforms that would be produced domestically by Mishra Dhatu Nigam Limited (MDN, commonly called Midhani). This preform is a thick tube made out of 350 grade maraging steel. This request is likely intended for a domestic manufacturer, although the advertisement does not impose such a restriction.

Other advertisements describe construction projects at RMP. Figure 1 is a commercial satellite image of what is believed to be RMP, located by using information in a 1987 IRE advertisement (see Appendix 1). Another IRE advertisement dated September 2000 specified the construction of a new pulsed power secure fence at RMP with a total length of 2,500 meters. The circumference of the outer fence of the facility in the image is about 2,500 meters.

Hiding Procurement

When IRE procures internationally for the Indian centrifuge program, it does not reveal the true end-use of items. In addition, trading companies, typically private export/import companies or wholesalers, may take steps to hide the true end use of tendered items.

In a standard enquiry made in 2005, IRE asked for dual-use measuring equipment that may be for a gas centrifuge. The IRE leaflet stated that the goods should be sent to CTD Stores, BARC, Trombay, Mumbai. Unless information about the association of CTD to RMP was sought out by the supplier, a company could have unknowingly supplied a division of BARC, an ostensibly civilian nuclear research operation, with items that could have been used in an unsafeguarded gas centrifuge program. Trading companies that purchase tender documents have contacted foreign firms to supply the items sought in the advertisements. In their interactions with overseas suppliers, these trading companies do not reveal the true end use of the items. In one instance in 2004, IRE posted public advertisements for components of measuring equipment that appear slated for use in a gas centrifuge plant. Two

Indian trading companies simultaneously attempted to procure the items overseas without revealing that the end user was IRE.

In at least one case, an Indian trading company may have used an off-shore partner to seek tendered items. The relationship between this off-shore South Asian company and the Indian trading company was obscured, and the off-shore company attempted to procure items without revealing their end use. Deceptive or illicit procurement by Indian companies is not confined to IRE. In August 2005, an Indian ordnance factory may have attempted to use both a Polish company and a Europe-based Egyptian trading firm to obtain controlled equipment, namely a three-roller four-axis CNC flow-forming machine, from a European supplier. The accompanying specifications showed that it could be used to manufacture missile casings. The Egyptian trading company requested the machine in Europe and raised the suspicions of a potential supplier. The potential supplier, who requested anonymity, stated that the request originated from Bipromasz Bipron Trading in Poland, a new European Union (EU) member eligible to receive items from other EU members without any export scrutiny by the supplier. The supplier stated that he learned that the end user was in India, although he did not provide its name. During the same month, an Indian ordnance factory posted a tender advertisement on-line that contained technical data and typographical errors that were identical to the request from the Egyptian middleman.

Ironically, India's gas centrifuge program procured through individuals who also played key roles in the illicit nuclear trading network led by the Pakistani A. Q. Khan. In the late 1980s and early 1990s, according to South African court documents, a key member of the network located in South Africa organized the production and delivery to India of flow meter units that were specifically designed for a uranium hexafluoride application, implying their use in a gas centrifuge program. When the client experienced malfunctions in the units, the seller sent one of his employees to the Indian customer to fix the units. Based on the court documents, this supplier may have provided additional sensitive items to the Indian centrifuge program, including feed and withdrawal equipment for centrifuge cascades.

Onward Proliferation

Proliferant states are known to target India's industries, according to US officials. With India's rapid industrialization, much of which is based on technology from developed countries, India's attractiveness to proliferant states can be expected to increase. India is engaged in many export promotion schemes, as its companies seek foreign markets. Onward proliferation is expected be become a serious problem.

Onward proliferation occurs when a company obtains a controlled item from overseas and retransfers it to a proliferant state or terrorist group

without proper authorizations. Proliferant states and smuggling networks use such tactics to avoid export controls in supplier states. They engage companies in a state that has poorly implemented or enforced export control laws but is a member of the Nuclear Suppliers Group or has another special status and is thus eligible to receive controlled items with relatively little scrutiny from suppliers. The Khan network used this strategy in South Africa to receive sensitive items from Europe and then retransferred the items illegally to Pakistan, Libya, and other countries. An indirect type of onward proliferation happens when companies buy, reverse-engineer, and manufacture equipment obtained from overseas and then export the duplicated equipment to foreign customers.

Items that IRE imported to outfit RMP, such as vacuum pumps, vacuum furnaces, machine tools, vacuum bellows-sealed valves, and canned motors for centrifugal pumps, could be transferred to the private sector. The canned motors and high vacuum-sealed valves are already on a BARC list of new technologies available for such transfer.

For several decades, Indian government entities and private companies have worked around international sanctions by developing their own dual-use products based on designs or reverse-engineered equipment from more industrialized states. In one case, an Indian vacuum pump company named Precise Vacuum Systems Pvt. Ltd. advertises that some of its vacuum pumps are "manufactured [based] on technology drawings of a world leader in vacuum pump technology." The company's web site says that these pumps offer high performance at a fraction of the cost of equivalent pumps obtained overseas. Reverse engineering and marketing of dual-use items is believed to be widespread in India and is expected to increase as India develops further.

Indian national export controls are the main restraints to prevent illegal or dangerous exports from Indian companies. However, India's control system is poorly implemented, and its export control officials are inexperienced. Many Indian companies are unaware of national export laws, and government outreach programs are in their infancy. With private Indian companies committed to sales both domestically and internationally, Indian export controls are inadequate to provide assurance that dangerous exports or re-exports will not occur.

Findings

Suppliers need to be suspicious of Indian procurement activities for its nuclear program, particularly for its unsafeguarded nuclear programs. In addition, India's past and current procurement practices raise troubling issues for the proposed expansion of US-Indian cooperation in nuclear or nuclear-related areas.

For India to become a responsible member of the international community, it must stop illegal or questionable overseas procurements for its nuclear program. India also needs to ensure that private trading companies are not violating or seeking loopholes in export control regimes as they procure items for Indian nuclear establishments. The Indian government needs to provide assurances that the Department of Atomic Energy and its sub-entities will not seek from abroad nuclear direct-use or dual-use items without clarifying the end-use of the item prior to sales and, if necessary, obtain export licenses or approvals listing the true end-use of the item. In addition, without such a change in procurement practices, any Indian commitment to clearly separate military and civilian nuclear facilities is not credible and is essentially unverifiable.

The government of India should change the dangerous tendering process that spreads uranium enrichment technology. It also needs to ensure that any companies and trading agents that have purchased sensitive tender documents do not sell the underlying know-how or items described in these documents to other companies or countries.

The Indian government needs to ensure that spin-offs from its gas centrifuge program do not lead to nuclear proliferation. In particular, the government needs to ensure that privatization initiatives and other efforts to sell items based on the dual-use items originally obtained or developed for the gas centrifuge program are not exported to nuclear weapons programs or other centrifuge programs. Ensuring that exports are legal and are not contributing to proliferation will remain a major challenge for India for many years.

Some of these issues should be addressed through legislation implementing the US-India proposal for "full" nuclear cooperation announced in July 2005. To encourage India to discontinue illicit nuclear procurement, Congress should include a requirement that the Executive Branch must annually certify that private or governmental Indian entities have not been found to have engaged in illicit procurement for Indian nuclear facilities and activities.

Under the U.S.-India agreement, India is expected to boost imports of a wide range of dual-use and high-tech items from supplier states including the United States. India needs to take additional steps to ensure that imported dual-use items are not retransferred or reverse-engineered and sold to states hostile to the United States for the purpose of making nuclear weapons. Because of the possibility that such items could be sold to states hostile to the United States, Congress should also require an additional Executive Branch annual certification that Indian companies or government-controlled entities have not engaged in trade that contributes to nuclear programs in countries which have not joined or have violated the Nuclear Non-Proliferation Treaty or are suspected of having a secret nuclear weapons program.

Appendix 1: Sample of IRE and BARC Advertisements, with Annotation1

RMP Site Construction

Internal Electrification, cabling, lightning protection, street lighting, etc. at RMP, Mysore; at Project Site at Rare Materials Plant (located) at 19 kms away from Mysore on Mysore-Hunsur Road, Ratnahally Complex, Yelwal P.O. (7/87, RMP/E-5/87). …

Supply, site preparation including civil, mechanical, electrical works, installation, erection, testing, commissioning of 1.5 mtrs. high wall top configuration Pulsed Power Securing fencing over the existing 2,500 mtrs. long stone perimeter wall at RMP, Yelwal, Mysore (9/18/00, PE-387-P/TPT). [This advertisement appears intended to upgrade the security of the RMP facility.]

Possible Centrifuge Component Manufacturing

Precision machining of special steel Thin Rod-R(L) with spherical tip (11/14/03, TP-83-MDD).

[This advertisement may be for making a subcomponent of the bottom bearing of a centrifuge.]

Aluminium extruded tubes of 195 mm OD and 25 mm wall thickness conforming to IS-733 (11/14/03, TP-85-MDD; 9/24/04, TP-296). Aluminium extruded tubes of 195 mm OD and 25 mm wall thickness (1/20/06, TP-719).

[These advertisements may be for the outer casing of a centrifuge. Indian Standard (IS)]

Ultra fine laser machining of intricate patterns on pellets with miniature spherical surface (1/14/04, TP-102).

[This advertisement may be for producing the spiral grooved pattern on the small ball that is part of the bottom bearing of a gas centrifuge.]

Close Die Forging, heat treatment in electric furnace, inspection and supply of "Disc II E (B2)" from free issue High Nickel alloy MDN-350 grade steel material (9/29/04, TP-277).

[This advertisement describes a grade-350 maraging steel preform that could be intended to be machined into end caps or baffles for a gas centrifuge rotor assembly.]

Manufacture and supply of (O.D.) 150mm x 1225mm long Thin Wall Flow Formed Interstage Annealed Ultra Precision Tubes made out of MDN 350 grade free issue extruded preforms as per specification (12/17/05, TP-672/TPT).

[This advertisement may be for a tube for a supercritical centrifuge rotor assembly.]

Hydro-forming of single convolution on free issue Thin Wall Flow Formed Ultra-Precision Straight Cylindrical Tubes (9/2/03, PE-558-CETG). Hydro-forming of single

1 Annotations are in brackets. Unless otherwise, all advertisements are from IRE. convolution on free issue 150 mm diameter thin wall flow formed ultra-precision straight cylindrical tubes (1/20/06, TP-702). Hydro-forming of single convolution on free issue 190 mm diameter thin wall flow formed ultra-precision straight cylindrical tubes (1/20/06, TP-692).

[These advertisements may be to solicit the production of highly sensitive bellows on centrifuge rotors.]

Fabrication, testing, inspection, packing and supply of CRGO Silicon Steel Torroidal Cores. 2,200 Nos. (10/7/97, PE-105-E); and manufacture, assembly, winding, inspection, testing, packing and delivery to our site of Strip Wound Toroidal Core Stators with Winding (6/29/04, TP-199-RMP).

[These advertisements may seek subcomponents of motor stators.]

Centrifuge Test Equipment

Non-contact displacement sensor specification: As per the enclosed document. Quantity: 700 nos. (2/16/05, posted for RMP by BARC)

[This advertisement is likely for a measuring device that can measure the rotation of a rapidly spinning tube. Such a device would be useful in the research and development of supercritical centrifuges and cascades.]

Vacuum Equipment and Items

150M3/hr Dry Vacuum Pump module consisting of five roots pumping stages in line fitted with hermetically sealed capped motor built-in nitrogen purge system control (3/31/98, PE-173-P).

[This advertisement seeks a vacuum pumping system that is similar to systems ordered earlier for RMP.]

'Helicoflex' or equivalent vacuum seals type HN-100-200 with aluminum lining and Music spring steel wire, as per specifications (1/85, RMP/P-43); ceramic to metal vacuum feedthroughs (with plugging receptacles) as per specifications (4/85, RMP/M-65); and direct coupled, vane type two-stage oil sealed rotary vacuum pumps complete with accessories (1/86, RMP/P-301).

[Various types of vacuum-related equipment, all of which have RMP in the tender number and were likely procured for use in RMP.]

Vacuum Measuring Equipment

Supply of HF compatible Pirani Gauges and Digital Pirani Meters with ON/OFF Controller (6/3/04, TP-177).

[This advertisement may be to acquire spare parts for vacuum measurement equipment used in a centrifuge cascade that is able to operate in a corrosive environment without mentioning uranium hexafluoride.]

Centrifuge Manufacturing Equipment

Tungsten inert gas (TIG) welding set consists of Rectifier, HF Control unit, Cooling system, welding torch standard accessories and spares as per specifications (4/85, RMP/P-123).

Design, manufacture and supply of 6-axis CNC Numerically controlled Filament winding machine as per specifications - one complete unit (9/24/99, PE-324-P/TPT).

[This advertisement may be for a computer-numerically controlled (CNC) machine tool to wind carbon fiber rotors.]

Universal measuring machine for high accuracy measurement with universal probe head, high speed computer, hardware and versatile application, soft-ware laboratory, as per specifications (1/85, RMP/P-63); roundness and form measuring machine as per our specifications (12/84, RMP/P-66); inspection machine (multi-gauging type) for measuring run outs of cylindrical objects as per specifications (4/85, RMP/P-113); and vertical dynamic balancing machine with analyzer accessories and spares as per the specifications (3/85, RMP/P-101).

[Various types of measuring equipment, all of which have RMP in the tender number and were likely sought for use in the manufacture and assembly of gas centrifuges.]

Uranium Hexafluoride Production and Handling

Moisture meter for measurement of water content in gases as per specifications (1/85, RMP/P-73); gas chromatographic analytical system for determination of corrosive gas mixtures comprising of fluorine (0 to 50%), hydrogen fluoride (0 to 15%), volatile fluoride (0 to 40%), and nitrogen (0 to 95%) as per specifications (2/85, RMP/P-75); and HF detectors for the automatic and continuous detection of highly toxic hydrofluoric acid vapor in the environment as per the specifications (3/85, RMP/P-92).

[Various types of measuring equipment, all of which have RMP in the tender number and were likely procured for use in the production and handling of uranium hexafluoride.]

One piece gas-tight chemical protection suits for whole-body protection fitted with face cuff made of buty 1 material and fitted with ventilation systems as per specifications. Four suits are required to be supplied (2/16/05, posted for RMP by BARC, DPS/RMP/PUR/LP/11155).

[This advertisement seeks chemical protection suits that may be intended for situations involving uranium hexafluoride or its dangerous precursors.]

Arms Control Wonk, March 10, 2006
http://www.isis-online.org/publications/southasia/indianprocurement.pdf

RICE DOWNPLAYS INDIA'S IRAN LINKS

India says Military Training Fear 'Completely Misplaced'

(CNN) -- U.S. Secretary of State Condoleezza Rice has downplayed concerns about India's links with Iran as she lobbies Congress to support the controversial nuclear cooperation agreement struck between India and the United States last month.

India has already rejected as "completely misplaced" any suggestion of a military training link with Iran.

But some U.S. lawmakers have raised questions about India's commercial and military relations with Iran, which faces possible sanctions after the U.N. Security Council issued a statement on March 29 demanding that Iran suspend its uranium enrichment program.

In a Senate hearing Wednesday on Washington's civilian nuclear deal with New Delhi, Rice said an assertion that India has been training Iranian sailors is "not right."

Rice said two Iranian warships had simply paid a port call on the southern Indian city of Kochi in March, and no military training was involved. This followed an exchange with Sen. Barbara Boxer, D-California, who told Rice the Iranian naval visit was "very disturbing" and the proposed deal with India needed to have more checks and balances.

India's Foreign Secretary Shyam Saran, who was in Washington last week for talks with U.S. lawmakers, said he told Rep. Tom Lantos, D-California, on March 30 that his concerns about the Iranian ship visits were unfounded.

Saran told reporters last Friday that it was simply a courtesy visit and any suggestion of a joint training exercise was "completely misleading," according to the Press Trust of India.

Rice acknowledged the Iranian port calls and said the United States had already made its position known.

"The United States has made very clear to India that we have concerns about their relationship with Iran," she told the Senate hearing.

Ahead of Rice's appearance, U.S. State Department spokesman Adam Ereli said the port visit by Iranian ships was "a limited type of event" and "do not suggest India training or contributing to Iran's military capabilities".

Indian media reports on March 7 quoted a navy press release as saying the two Iranian ships, carrying naval cadets, had arrived in Kochi for a "five-day training session." Kochi is the home of India's Southern Naval Command.

Historic Agreement

India's Prime Minister Manmohan Singh and U.S. President George W. Bush signed the civilian nuclear power deal on March 2 in New Delhi. The agreement was struck even though New Delhi has not signed the nuclear Non-Proliferation Treaty (NPT) and has nuclear weapons.

Singh also hosted a visit to New Delhi by Iranian Vice President Isfandiar Rahim Mashaee in late March. The two agreed to strengthen cooperation, especially in the energy sector. India is proposing to take gas from Iran via a pipeline that will pass through Pakistan.

Rice sought to assure Congress on Wednesday that the landmark plan to share nuclear technology with India for its civilian program would not undercut efforts to stop the spread of nuclear weapons, The Associated Press reported.

"Clearly, this agreement does not constrain India's nuclear weapons program. That was not its purpose," Rice told a House committee. "Neither, however, as some critics have suggested, does it enhance India's capability to build nuclear weapons."

Rice said the agreement would enhance energy security, noting India was now the world's sixth largest consumer of energy.

"Diversifying India's energy sector will help it to meet its ever increasing needs and more importantly, ease its reliance on hydrocarbons and unstable sources like Iran. This is good for the United States," she said in testimony to the House committee.

In the House and Senate, Republicans and Democrats alike expressed serious reservations over the plan and criticized what they called the Bush administration's failure to explain its details to lawmakers earlier, AP reported. "It is my view that this is in trouble here," said Rep. Gary Ackerman, D-New York, who supports the plan but criticized how the administration has handled it.

The administration needs Congress to change, or approve an exception to, the law that bans civilian nuclear cooperation with countries that have not submitted to full nuclear inspections, AP reported.

Despite concerns, some lawmakers from both political parties indicated they would back the plan because of an overall goal of strengthening the U.S.-India relationship.

"This is a very good bet for our country," AP quoted Sen. George Allen, R-Virginia, as saying.

Two senior Democrats on the Senate Foreign Relations Committee, Joseph Biden of Delaware and John Kerry of Massachusetts, signaled they were inclined to vote for the agreement, albeit reluctantly, AP reported.

April 6, 2006
http://edition.cnn.com/2006/POLITICS/04/05/india.iran.rice/index.html

SMUGGLING OF URANIUM FROM INDIA: STORIES PERSIST

An extraordinary story in the Vijay Times (Karnataka, India), by Amlan Home Choudhury, opened with the following lead:

Vijay Times, 30 April -- Jaduguda (Jharkhand):In an alarming development, smugglers are sending highly radioactive Yellow Cake or processed uranium, used in making nuclear weaponry, to Nepal through the clandestine narcotic route via the Jharkhand-Bihar-West Bengal conduit, and it is suspected that the destination might be al-Qaeda.[1]

The story went on to allege that yellowcake was so valuable, being worth between $600,000 and $900,000 per kilogram, that "smugglers are paid not in currency, but gold," principally by purchasers from the Middle East and South East Asia.[2] However, there appear to be a number of inaccuracies in the story. First, the world price for yellowcake in 2005 was roughly $30 per pound or $66 per kilo, making the black market price quoted in the article of many hundreds of thousands of dollars per kilo rather suspect.[3] Second, the product shown in the photo accompanying the article is a large piece of rock, which might be uranium ore, but is obviously not yellowcake. Nor is a possible link to al-Qaeda very likely, a link which the local press appears more ready to include in their stories on yellowcake smuggling than the international press.[4]

The story is the latest in more than thirty years of reports in the international and Indian media on supposed thefts of yellowcake from India's Jaduguda mine complex, in Jharkhand (formerly Bihar) province. "Yellowcake," or uranium concentrate, is an intermediate material in the nuclear fuel cycle. It is produced at a uranium "mill," usually co-located with a uranium mining operation, which extracts raw uranium from uranium-bearing ore, and then purifies and reconstitutes the uranium product in a solid, powdery form, known as "yellowcake," from its yellow color. Chemically known as U308, it is sold in multi-ton quantities in international commerce, as the raw material for the manufacture of fuel for nuclear power plants. It is also an essential material for the manufacture of nuclear weapons.[5]

For both civilian and military purposes, however, the material, which is only mildly radioactive, must be extensively processed in a series of highly complex facilities.[6] Because the installations needed for these later stages are so complex, their construction and operation is considered by many experts to be

beyond the capabilities of terrorist organizations. Thus yellowcake would have little utility in the hands of terrorists.

In India, yellowcake from Jaduguda is an essential raw material for both the country's nuclear energy and nuclear weapon programs.[7] Although acquisition of yellowcake from abroad has been a key element in a number of covert nuclear weapon programs in other countries, including those of Israel, Iraq, and Libya, smuggling (or open purchases of yellowcake) from India is not known to have contributed to such efforts, despite continuing allegations of the material making its way to the international black market.[8, 9, 10]

The Jaduguda mine is the best known of the uranium mines in Jharkhand.[11] Opened in 1968, the Jaduguda mine is owned and operated by the Uranium Corporation of India Limited (UCIL), a public sector enterprise under the administrative control of the Indian Department of Atomic Energy. Located in the mineral-rich east Singhbum district of Jharkhand, Jaduguda is the site of an underground mine along with an ore processing plant (mill) to produce yellowcake. From Jaduguda the yellowcake is transported to the Nuclear Fuel Complex in Hyderabad for fabrication into fuel rods for Indian nuclear power plants using natural uranium fuel. The material is also utilized in the reactors India uses to produce plutonium for its nuclear weapons. In addition, the Jaduguda complex is the likely source of uranium for India's uranium enrichment program, in which uranium is upgraded for use as fuel in certain types of nuclear reactors and/or for nuclear weapons.[12]

Reports of uranium smuggling from the Jaduguda mine are not new, and thefts from this source were mentioned in U.S. government reports dating as early as the 1970s. An Office of Technology Assessment Report to the U.S. Congress dated June 1977, for example, offers the following information:
In April 1974, a uranium smuggling operation was uncovered in India. All of the details of the incident are not available, but it appears from the rather sketchy press accounts that uranium was being removed from the Jaduguda plant in Bihar, India, and was being smuggled to Nepal. From Nepal, it was smuggled to Hong Kong where reportedly Chinese or Pakistani agents took delivery. It is believed that as much as $2.5 million worth of uranium may have been involved.[13]

More recent reports dealing with the international dimension of illicit trafficking in nuclear and radioactive materials have also pointed out that uranium ore stolen from the Jaduguda mines in India have found their way into Nepal, headed for an international black market.[14] Another report authored in the fall of 2004 on nuclear trafficking routes detailing trends in Southern Asia offers the following information:

In 2001, smuggled uranium, confiscated from suspected terrorists in Balurghat, northern West Bengal, had been removed from the Jaduguda uranium mines in Bihar state, bordering West Bengal, and was planned to be smuggled across the Bangladeshi border.[15]

It should be noted that uranium ore usually contains less than 20 percent raw uranium, which would necessitate the smuggling of very large quantities to be of utility in a nuclear weapons program. Modern yellowcake contains 60 percent or more uranium oxide by weight.

Perhaps security is less than ideal at India's uranium mills and there is some element of truth behind the continuing reports of smuggling. To date, however, a detailed and credible expose of the situation has yet to be written.

Haider Nizamani, University of British Columbia, and Arjun Dutta, Monterey Institute Center for Nonproliferation Studies

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WMD Insights, June 2006
http://wmdinsights.com/I6/I6_SA2_SmugglingOfUranium.htm

HOUSE VOTED ON INDIAN DEAL UNAWARE OF IRAN MISSILE SALES

The Bush administration will impose sanctions on two Indian firms for selling missile parts to Iran, government officials said yesterday, acknowledging privately that the secret decision should have been shared with the House before it voted this week to support U.S. plans to sell nuclear technology to New Delhi.

It is not the first time Indian companies have been sanctioned for supplying Iran's suspected weapons programs. But the timing of the sanctions, which were not revealed before the vote and are being imposed during fighting between Israel and the Iranian-backed Hezbollah militia, elicited angry responses from Democrats and arms-control experts yesterday. …

But the Bush administration's actions suggest it does not see India's record as free of blemishes.

On the same day that President Bush was in India this March to announce progress on the nuclear deal, two Iranian naval ships carrying several hundred sailors docked at the Indian port of Kochi to begin five days of joint exercises, part of an extensive agreement Tehran and New Delhi signed in 2003. The port call -- and the broader issue of India's military, scientific and economic ties with Iran -- has raised apprehension on Capitol Hill and among nuclear specialists.

"The Indians are building a port in Iran, they are building roads, they have joint military exercises," said Henry D. Sokolski, who runs the conservative-leaning Nonproliferation Policy Education Center. "The Indians, for a variety of reasons, see utility in doing risky things with Iran."

Last year, at the height of the U.S.-India negotiations, two other Indian companies were sanctioned for supplying material to Iran's suspected

chemical weapons program. The companies have protested but remain on a sanctions list in the Federal Register.

Last September, two Indian nuclear scientists were accused of providing Tehran with technology that could contribute to "the development of weapons of mass destruction." The order against one was later rescinded,

but the second remains banned from traveling to the United States.

Researcher Julie Tate contributed to this report. July 29, 2006
http://www.washingtonpost.com/wp-dyn/content/article/2006/07/28/AR2006072801615.html

INDIA'S NONPROLIFERATION RECORD REVISITED

WaPo's Dafna Linzer reports that the Congress has asked for an intelligence assessment on India's nonproliferation record, particularly its ties to Iran:

In a Jan. 23 letter to John D. Negroponte, director of national intelligence, the ranking chairmen of the House and Senate foreign relations panels asked for "an interagency assessment" of India's nuclear program, its record of proliferation and its ties to Iran. The letter was signed by Reps. Henry J. Hyde (R-Ill.) and Tom Lantos (D-Calif.) and Sens. Joseph R. Biden Jr. (D-Del.) and Richard G. Lugar (R-Ind.)—all of whom have been generally supportive of the India deal but have raised concerns about the proliferation implications and about India's relations with Iran.

The four asked Negroponte to assess how India is implementing its nonproliferation commitments, the adequacy of its export controls and the movement into and out of India of materials to make weapons of mass destruction.

I suspect the reference to Iran is a result of the two Indian firms sanctioned for "selling missile parts to Iran," sanctions that Linzer reported were kept secret until after the House voted on legislation related to the US-India nuclear deal.

Of course, the evidence for sanctions is often sketchy—the two Indian chemical firms seem to have been treated shabbily. And the more vivid reports of India-Iran military cooperation are probably false. Barbara Boxer asked SECSTATE Rice about reports of India training Iranian sailors—reports Rice denied. The ensuing CRS report, India-Iran Relations and U.S. Interests, is a nice, calm discussion of the India-Iran relationship.

Still, India refuses to adhere to the MTCR for reasons that escape me. If Indian firms make sales not in conformance with the MTCR, I'd like the US Congress to know about it.

Expanding the Definition of "Nonproliferation Record"

Perhaps more important, I think we need to expand the range of activities that constitute a state's "nonproliferation record."

I hope the forthcoming intelligence assessment addresses India's indirect support to proliferators through its own illicit procurement efforts—efforts that subvert the laws of other countries, violate the spirit (if not the letter) of India's obligations under UNSC 1540 and sustain an illicit infrastructure that could be used by other would-be nuclear weapons states.

David Albright has been critical of India's nonproliferation record, particularly India's procurement of export controlled components for its gas centrifuge program.

This kind of participation in the black market for WMD components is—to my mind—just as dirty a business as selling WMD components.

Firms involved in the illicit WMD trade wouldn't exist without customers. By sustaining the network, countries like India preserve the infrastructure for other would-be nuclear weapons states. Pakistan's AQ Khan demonstrates that the line between customer and entrepreneur can blur all too easily.

This is, of course, the argument that the Bush Administration has been making about the role that illegal drugs play in supporting terrorist groups. Surely you remember the awful Super Bowl advert. Not endorsing the drug war, just noting that the form of argument should be familiar.

India ought to understand that WMD suppliers will turn around and sell to your worst enemy: After all, India reportedly used the same merchants of death in South Africa as Pakistan. (By the way, for more on illicit procurement networks, I can't recommend a better starting point than Alex Montgomery's "Ringing In Proliferation: How to Dismantle an Atomic Bomb Network" in International Security.)

Anyway … I hope that the intelligence estimate takes this approach and defines India's nonproliferation record to include not just India's role as a supplier, but also as a supporter of illicit procurement networks.

Late Update: The Arms Control Association has posted Sharon Squassoni's latest report, India and Iran: WMD Proliferation Activities.

November 15, 2006
http://www.armscontrolwonk.com/1297/indias-nonproliferation-record-revisited

LAWMAKERS CONCERNED ABOUT U.S.-INDIA NUCLEAR TRADE DEAL

White House Hasn't Provided Long-Awaited Intelligence Assessment and Other Key Information

Congressional leaders requested a secret intelligence assessment of India's nuclear program and its government's ties to Iran in January amid concerns about a White House effort to provide nuclear technology to New Delhi. Ten months later, as the Senate prepares to vote on nuclear trade with India, the intelligence assessment has yet to be seen on Capitol Hill, congressional and intelligence sources say.

The pending nuclear deal with India would reverse years of U.S. policies aimed at preventing the spread of nuclear weapons. U.S. law forbids selling civilian nuclear technology to countries such as India that have refused to sign the Non-Proliferation Treaty. Arms-control experts, concerned that the deal would have major ramifications for U.S. efforts to stop nuclear programs in Iran and North Korea, said yesterday that the White House plan would allow India to rapidly increase its nuclear arsenal.

For the Bush administration, the deal is part of a strategy to accelerate India's rise as a regional counterweight to China. Further, officials have argued that a nuclear arsenal in the hands of democratic India, which conducted its first nuclear test in 1974, would not be a threat to the United States.

The White House wants legislation for the deal approved by the lame-duck Congress and is hoping the Senate will vote on it by Friday. The bill would carve out an India-specific exception to long-standing laws that forbid nuclear trade with countries that have not signed the NPT. Sen. Harry M. Reid (Nev.), who will become majority leader when Democrats take control of the Senate in January, has said that he wants the India bill to come up before the current Congress ends in December.

In July, the House voted in favor of a similar bill. Lawmakers did not know at the time that the Bush administration was planning to sanction two Indian firms for selling missile parts to Iran -- a fact that seemed to undercut administration assurances that India's nonproliferation record is excellent.

Democrats later accused the administration of deception, and Senate and House staff members said yesterday that they are concerned that the White House is still pushing for congressional approval without providing needed information, such as the intelligence report.

In a Jan. 23 letter to John D. Negroponte, director of national intelligence, the ranking chairmen of the House and Senate foreign relations panels asked for "an interagency assessment" of India's nuclear program, its record of proliferation and its ties to Iran. The letter was signed by Reps. Henry J. Hyde (R-Ill.) and Tom Lantos (D-Calif.) and Sens. Joseph R. Biden

Jr. (D-Del.) and Richard G. Lugar (R-Ind.) -- all of whom have been generally supportive of the India deal but have raised concerns about the proliferation implications and about India's relations with Iran.

The four asked Negroponte to assess how India is implementing its nonproliferation commitments, the adequacy of its export controls and the movement into and out of India of materials to make weapons of mass destruction.

Much of the deal rests on assurances that India will separate its nuclear and civilian facilities so that the United States can be certain that the nuclear technology it provides will go only to the civilian energy side. With a population of 1 billion, India has vast energy needs and civilian technology would help it to modernize. But the arrangement would also free up India's nuclear infrastructure so that it could be devoted solely to weapons.

The letter asked the intelligence community to gauge the extent to which the deal "may enhance India's ability to produce fissile material for weapons." The senators also asked for a full assessment of India's positions on Iran.

In a Feb. 9 response to the letter, Negroponte wrote: "We look forward to providing the necessary information in the near future." Copies of both letters were read to The Washington Post. Negroponte's office said yesterday that it could not comment on the letters or the status of the assessment.

Several congressional sources said that the National Intelligence Council provided two oral briefings, in March and April, that focused on the history of U.S.-India relations as well as the beginnings of India's nuclear program, but that the briefings did not address the specific information requested in the letter. "We expect a written intelligence product," one Republican said. Four other staff members -- two Democrats and two Republicans -- also said that they expected a complete intelligence assessment that responds point by point to the issues raised in the letter. All spoke on the condition of anonymity, fearing that public comment would put their congressional jobs at risk.

The terms of a U.S.-India accord, worked out in secret in 2005, took Congress by surprise. Congress must approve any final deal before it can be implemented. While both parties support a strategic alliance with India, some have voiced concerns about its strong ties to Iran.

Tehran and New Delhi signed an extensive agreement in 2003 and their military, scientific, political and economic ties are growing.

A report issued yesterday by the Congressional Research Service, which does in-depth analysis for Congress, said that "India's long relationship with Iran" made it unlikely that India would take a hard line on Tehran. India does not support nuclear weapons for Iran, but "its views of the Iranian threat and appropriate responses differ significantly from U.S. views."

The report also found that entities in India and Iran "appear to have engaged in very limited nuclear, chemical and missile related transfers over the years."

Dafna Linzer, *Washington Post* Staff Writer November 15, 2006
http://www.washingtonpost.com/wp-dyn/content/article/2006/11/14/AR2006111401208.html

WMD PROLIFERATION ACTIVITIES

CRS Report for Congress
Received through the CRS Web
Order Code RS22530
India and Iran: WMD Proliferation Activities
Sharon Squassoni
Specialist in National Defense
Foreign Affairs, Defense, and Trade Division
Summary

Members of Congress have questioned whether India's cooperation with Iran might affect U.S. and other efforts to prevent Iran from developing nuclear weapons. India's long relationship with Iran and its support of Non-Aligned Movement (NAM) positions on nonproliferation are obstacles to India's taking a hard line on Iran, yet the Bush Administration has asserted that U.S.-India nuclear cooperation would bring India into the "nonproliferation mainstream." India, like most other states, does not support a nuclear weapons option for Iran. However, its views of the Iranian threat and appropriate responses differ significantly from U.S. views. Entities in India and Iran appear to have engaged in very limited nuclear, chemical and missile-related transfers over the years, and some sanctions have been imposed on Indian entities for transfers to Iran, the latest in July 2006. This report will be updated as necessary.

In congressional hearings on the proposed U.S. nuclear cooperation agreement with India, Members questioned how India's cooperation with Iran might affect U.S. efforts to prevent Iran from developing nuclear weapons. India's long relationship with Iran and its support of Non-Aligned Movement (NAM) positions on nonproliferation are obstacles to India's taking a hard line on Iran, yet the Bush Administration has asserted that U.S.-India nuclear cooperation would bring India into the "nonproliferation mainstream." U.S. law requires recipients of U.S. nuclear cooperation to guarantee the nonproliferation of any U.S. material or equipment transferred. If a recipient state assists, encourages or induces a non-nuclear weapon state to engage in nuclear-weapons related activities, exports must cease. India's nonproliferation record continues to be scrutinized, as India continues to take steps to

strengthen its own export controls. Additional measures of Indian support could include diplomatic support for negotiations with Iran; support for Bush Administration efforts to restrict enrichment and reprocessing; support for multilateral fuel cycle initiatives, and for the Proliferation Security Initiative.

India's Record of Support

India, like most other states, does not support a nuclear weapons option for Iran.

However, Indian views of the threat Iran poses and appropriate responses differ from U.S. views. On September 24, 2005, India voted with 21 other states on International Atomic Energy Agency (IAEA) resolution GOV/2005/77, which found Iran in noncompliance with its safeguards agreement. However, the resolution did not refer the matter immediately to the Security Council, and India apparently was one of several states pressuring the EU-3 to keep the issue at the IAEA. According to Indian Foreign Secretary Shyam Saran, India voted for the resolution and against the majority of NAM states which abstained, because it felt obligated to do so after having pressured the EU-3 to omit reference to immediate referral to the U.N. Security Council.[1] Moreover, the official explanation of India's vote seemed designed to highlight India's differences with the United States:

In our Explanation of Vote, we have clearly expressed our opposition to Iran being declared as noncompliant with its safeguards agreements. Nor do we agree that the current situation could constitute a threat to international peace and security.

Nevertheless, the resolution does not refer the matter to the Security Council and has agreed that outstanding issues be dealt with under the aegis of the IAEA itself. This is in line with our position and therefore, we have extended our support.[2]

Nonetheless, India again voted with the United States on February 4, 2006, when the IAEA Board of Governors voted to refer Iran's noncompliance to the U.N. Security Council.[3] The Ministry of External Affairs responded to questions about its vote in this manner:

While there will be a report to the Security Council, the Iran nuclear issue remains within the purview of the IAEA. It has been our consistent position that confrontation should be avoided and any outstanding issue ought to be resolved through dialogue....

Our vote in favour of the Resolution should not be interpreted as in any way detracting from the traditionally close and friendly relations we enjoy with Iran. It is our conviction that our active role, along with other friendly countries, enabled the tabling of a resolution that recognizes the right of Iran to peaceful uses of nuclear energy for its development, consistent with its international commitments and obligations, while keeping the door open for

further dialogue aimed at resolving the outstanding issues within the purview of the IAEA.[4]

India's Prime Minister told the Indian Parliament on February 17, 2006, that "As a signatory to the NPT, Iran has the legal right to develop peaceful uses of nuclear energy consistent with its international commitments and obligations." Nonetheless, PM Singh also noted that "It is incumbent upon Iran to exercise these rights in the context of safeguards that it has voluntarily accepted upon its nuclear programme under the IAEA."[5]

India has supported the EU-3 negotiations, despite their ostensible objective of halting Iran's pursuit of sensitive nuclear technology (that is, enrichment, reprocessing and heavy water). In part, this may be because the talks offered a second avenue of negotiation that did not necessarily lead to U.N. Security Council sanctions, or because they have offered a viable discussion forum. India welcomed the U.S. decision to join the talks, stating:

India has all along advocated that issues relating to Iran's nuclear programme ought to be resolved through dialogue and that confrontation should be avoided. Against this background, the readiness of the US to join in the dialogue between EU-3 and Iran, which India has all along supported, is to be welcomed.[6]

In September 2006, however, India joined other NAM states in a statement issued at the Havana NAM summit on Iran's nuclear program. The statement "reaffirmed the basic inalienable right of all states, to develop research, production and use of atomic energy for peaceful purposes without any discrimination and in conformity with their respective legal obligations. Therefore, nothing should be interpreted in a way as inhibiting or restricting this right of States to develop atomic energy for peaceful purposes. They furthermore, reaffirmed that States choices and decisions in the field of peaceful uses of nuclear technology and its fuel cycle policies must be respected."[7]

Two other U.S. nonproliferation policies that may help underpin a solution to the Iran crisis are related to restrictions on the nuclear fuel cycle — a ban on transferring enrichment and reprocessing technologies to states that are not already technology holders, and steps toward multilateralizing the nuclear fuel cycle so that sensitive technologies are not as widespread. A key new U.S. initiative in this area is the Global Nuclear Energy Partnership, or GNEP. India, under the July 18, 2005 Joint Statement with the United States, committed to refrain from transferring enrichment and reprocessing technologies to states that do not have them, as well as to support international efforts to limit their spread. India's future support for those policies, however, may be predicated on India being considered one of those technology holders.

A recent statement from President Bush on GNEP did not recognize India as such a technology holder:

My administration has announced a new proposal called the Global Nuclear Energy Partnership. Under this partnership, America will work with nations that have advanced civilian nuclear energy programs — such as Great Britain, France, Japan, and Russia — to share nuclear fuel with nations like India that are developing civilian nuclear energy programs.... The strategy will allow countries like India to produce more electricity from nuclear power, it will enable countries like India to rely less on fossil fuels, it will decrease the amount of nuclear waste that needs to be stored and reduce the risk of nuclear proliferation.[8]

Another tool that may be utilized by those desiring to prevent Iran from developing nuclear weapons is the Proliferation Security Initiative. On November 2, 2005, Under Secretary of State R. Nicholas Burns told the Senate Foreign Relations Committee that "Indian support for the multi-national Proliferation Security Initiative (PSI) would be a boon to the participating nations' goal of tracking and interdicting dangerous terrorist and weapons of mass destruction (WMD) cargoes world-wide. We hope India will choose to join PSI."[9] In April 2006, Secretary of State Rice told the House International Relations Committee that the United States was pressing India to announce its intention to participate in the Proliferation Security Initiative. Both the House (H.R. 5682) and Senate (S. 3709) bills to create an exception for India from relevant provisions of the Atomic Energy Act refer to the desirability of getting India to join PSI, but do not make it a prerequisite for cooperation. Prime Minister Singh told the Parliament in August 2006 that the "Proliferation Security Initiative is an extraneous issue...Therefore, we cannot accept it as a condition for implementing the July Statement. Separately, the Government has examined the PSI. We have certain concerns regarding its legal implications and its linkages with the NPT."

Finally, efforts to prevent Iran from acquiring nuclear weapons rely on coordinated export controls and strong national export control systems. India has agreed to harmonize its export controls with the guidelines of the Nuclear Suppliers Group under the July 18, 2005 Joint Statement. India also passed a new law in May 2005, the Weapons of Mass Destruction and their Delivery Systems (Prohibition of Unlawful Activities) Bill.

According to Indian officials, the Act prohibits the "possession, manufacture, transportation, acquisition, development of nuclear weapons, chemical weapons or biological weapons by non-state actors."[10] It would prohibit the export of any good or technology from India "if the exporter knows it is intended to be used in a WMD program." The U.S. Commerce and State Departments have not yet assessed India's export control law and regulations,[11] which were promulgated in response to U.N.

Security Council Resolution 1540 requiring all states to take actions to criminalize proliferation, particularly to non-state actors.

Some observers have stated that India does not have the necessary regulations in place to implement the law, and that India's resources for implementation are remarkably limited.[12] A third issue is whether India will follow through in imposing penalties on violators of export control laws and regulations.

India's Nonproliferation Record

In its semi-annual, unclassified report in 2000 to Congress on the acquisition of technology relating to weapons of mass destruction, the CIA identified India, along with Iran and Pakistan, as a "traditional recipient of WMD and missile technology" that could emerge as a new supplier of technology and expertise.[13] The unclassified report also noted that "private companies, scientists, and engineers in Russia, China, and India may be increasing their involvement in WMD- and missile-related assistance, taking advantage of weak or unenforceable national export controls and the growing availability of technology." In 2001, the unclassified CIA report noted that "We are increasingly concerned about the growth of 'secondary proliferation' from maturing state-sponsored programs, such as those in India, Iran, North Korea, and Pakistan."

Reported Transfers to Iran

Entities in India and Iran appear to have engaged in very limited nuclear, chemical and missile-related transfers over the years. There are no publicly available indications of activities related to biological weapons. In the early 1990s, when Iran actively sought nuclear-related assistance and technology from many foreign sources, India appears to have played only a minor role in contrast to other states. India signed an agreement in November 1991 to provide a 10-megawatt research reactor to Tehran, but cancelled under pressure from the United States. Nonetheless, India reportedly trained Iranian nuclear scientists in the 1990s.[14] More recently, India's Foreign Minister Jaswant Singh stated in December 2003 that India "has and would continue to help Iran in its controversial bid to generate nuclear energy."[15]

From 1998 to 2003, the United States has imposed nonproliferation sanctions on several different Indian entities for chemical and biological-weapons related transfers to Iraq.[16] In 2004, the United States imposed sanctions on two Indian scientists for nuclearrelated transfers to Iran: Dr. C. Surendar (sanctions on Dr. Surendar were lifted in December 2005) and Dr. Y.S.R. Prasad. Both scientists were high-ranking officials in the Nuclear Power Corporation of India, Limited (NPCIL). Indian officials protested, stating that cooperation had taken place under the auspices of the IAEA Technical Cooperation program. Other reports suggest that the scientists, who had served as Chairman and Managing Director of the NPCIL, which runs India's

power reactors, passed information to Iran on tritium extraction from heavy water reactors.[17] In December 2005, sanctions were imposed on Sabero Organic Chemicals Gujarat Ltd. and Sandhya Organic Chemicals Pvt. Ltd. for transfers of chemical-related items to Iran. In July 2006, sanctions were imposed on two more chemical manufacturers in India for transfers to Iran — Balaji Amines and Prachi Poly Products.

In the chemical area, there is one confirmed transfer of 60 tons of thionyl chloride, a chemical that can be used in the production of mustard gas, from India to Iran in March 1989.[18] Other shipments in that timeframe reportedly were halted under U.S. pressure.

India does not appear in the CIA's unclassified nonproliferation report to Congress as a supplier of chemical-weapons-related exports to Iran since the report began publication in 1997. India signed the Chemical Weapons Convention in 1993 and deposited its instrument of ratification until 1996.

Other Considerations

One consideration in assessing a country's nonproliferation record is the extent to which its export control and procurement system helps limit or eliminate illicit transfers.

David Albright, president of the Institute for Science and International Security, has argued that three factors contribute to a flawed nonproliferation record for India in the nuclear area: a poorly implemented national export control system; an illicit procurement system for its own nuclear weapons program, and a procurement system that may unwittingly transfer sensitive information about uranium enrichment.[19] When asked formally to respond to Albright's allegations, the Administration stated it would be happy to discuss the allegations in a classified session with Members of Congress.[20]

Albright has suggested that the illicit procurement system in India has led entities to mislead suppliers about the ultimate destination of their goods. Such a system could be used to mask onward proliferation. From February 2003 to April 2006, the Department of Commerce opened 63 cases of possible Export Administration Regulations violations by U.S. firms exporting to India; 33 of those cases are still open.[21]

In response to Senator Lugar's question for the record on investigations since 1998 into potential violations of U.S. export laws, the State Department reported that in one case, a U.S. firm exported technical information to an entity in India associated with its missile program.

In another case, a U.S. firm with a subsidiary in Singapore committed 36 violations of the Export Administration Regulations by exporting various

life sciences research products to entities in the Indian Department of Atomic Energy and Indian Department of Defense.

In another case, a U.S. firm attempted the unlicensed export of biotoxins to North Korea via a firm in New Delhi.

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16 This discussion taken from a response to Questions for the Record Submitted to Secretary of State Condoleezza Rice by Senator Richard Lugar (#2), Senate Foreign Relations Committee, April 5, 2006.

17 John Larkin and Jay Solomon, "As Ties Between India and Iran Rise, U.S. Grows Edgy," Wall Street Journal, March 24, 2005.

18 Thionyl chloride is a Schedule 3 chemical under the Chemical Weapons Convention. It has military and civilian uses, and is widely used in the laboratory and in industry.

19 David Albright and Susan Basu, "Neither a Determined Proliferation Nor A Responsible State:
India's Record Needs Scrutiny," Institute for Science and International Security, April 5, 2006, available at [http://www.isis-online.org/publications/southasia/indiacritique.pdf]. See also
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20 Questions for the Record Submitted to Secretary of State Condoleezza Rice by Senator Richard Lugar (#3), Senate Foreign Relations Committee, April 5, 2006.

21 Questions for the Record Submitted to Secretary of State Condoleezza Rice by Senator Richard Lugar (#3), Senate Foreign Relations Committee, April 5, 2006.

November 8, 2006
http://fpc.state.gov/documents/organization/76840.pdf

123 AGREEMENT: A LICENCE TO PROLIFERATION

The 123 agreement is the popular name for Henry-Hyde United States-India Peaceful Cooperation Act of 2006. The media prefixed the digits '123' to the Act as it is related to Section 123 of the US Atomic Energy Act of 1954. Section 104(3) of the new law provides that the USA may choose not to terminate exports of nuclear and nuclear-related material, equipment, and technology to India, even if an Indian national was found to have been involved in proliferation of nuclear materials without knowledge of the Indian government. By this logic, it is wrong to hold Pakistan responsible for irresponsible for some irresponsible acts of Dr Qadeer. However, the agreement being 'unique', the same provision is not applicable to Pakistan.

To please India, 'the final legislation has replaced the provision for annual presidential certification in the bill with just an assessment by the president that India was compliant with its non-proliferation obligations' ("Nuclear waiver to India permanent", samachar.com, December 8, 2006). To avail itself of the lax nuclear-trade controls, India is 'planning to sell low-cost nuclear reactors to other countries by joining the NSG' (The Times of India, March 4, 2007). India is also trying to get permanent waiver from liability not to re-process the spent fuel for military use.

The agreement gives India permanent waiver for import of nuclear materials and equipment from the Suppliers' Group. It allows India to keep eight of its nuclear plants secret for military purposes (to produce about fifty bombs every year) while opening the other 14 and all future civilian power plants to international inspection India is not worried about annual 'assessment' by US president in 123 Act. The existing 'reporting' requirement under Section 601 of the Non-Proliferation Act and 620 (f) of the Foreign

Assistance Act are more stringent than 123 requirement. India has been assured that its nuclear tests of highly-enriched uranium for its nuclear submarine programme will not jeopardise the Agreement. Pakistan's reaction to US favouritism towards 'responsible' India is best epitomised by bleeding Caesar's remark 'et Brutus, c'est toi?'.

Interestingly, India's Weapons of Mass Destruction and their Delivery System Act, 2005 (effective from March 6,2005) criminalises possession of WMD and related materials only by 'unauthorised individuals and entities', not by authorised ones. India's liability for 'dissuading, isolating, and if necessary, containing and sanctioning Iran', also has been made 'non-binding'. India's proliferation record is much more pathetic than Pakistan's_ two Indian firms Balaji Amines Limited and Prachi Poly Products Limited continued business with Iran (July 2006) in violation of Iran Non-Proliferation Act of 2000 (July 2006). India sent scientists to Iran's Bushehr Plant (1980-83), floated public tenders to export centrifuge-enrichment-related technology, leaked out sensitive nuclear technology to get materials for its nuclear programme. India's NEC Engineers private Limited helped Iraq acquire nuclear equipment, material and scientific training (1970's). She trained Vietnamese nuclear scientists (2001-02). India shipped heavy water (worth $ 35,800) and nuclear-grade zircloy ($ 5,84,000) to South Korea during 1996-98, and beryllium ($ 24 million) to North Korea in 1994.

Safety of India's nuclear installations is much weaker than Pakistan's assets. An Indian parliamentary report mentioned 147 safety-related mishaps which occurred during 1995-98. In view of the furore over the report, Indian goverment stopped reporting nuclear thefts or accidents to the parliament in ensuing period. Since 1970s, there have been numerous thefts of nuclear fissile materials from India's nuclear installations _ In 1994, a shipment of beryllium (worth $ 24 million) was caught on its way to North Korea. In July 1998, eight kilograms of uranium in granular form was recovered from three Indians in Tamil Nadu. On November 5, 2000, 25 kilograms of radio-active uranium was recovered from an Indian in the Bibi Cancer Hospital. On November 7, 2000, 57 pounds of uranium were recovered from two Indians. On November 13, 2000, three uranium rods were recovered from eight Indians. On August 27, 2001, 200 grams of semi-processed uranium were recovered from two Indian nationals in Indian state of West Bengal.

India brushed off evidence about her proliferation activities and concerns about safety and security of her nuclear installations on the plea that she is not a signatory to the NPT, its multilateral export-control arrangement (NSG), Australia Group, or Wassenaar Arrangement. As such, she is not subject to the IAEA's safeguards, even if her nuclear facilities were built with foreign components. She also argues that she has signed, but not ratified the Convention on Nuclear Safety. Obviously, the 123 Agreement would enable 'responsible' India to continue her proliferation activities even more freely.

Strobe Talbott (Brookings Institution) has rightly observed that the deal had put the NPT in jeopardy (The Daily Times, July 25, 2005). Pakistan's Foreign Office has ruefully rebutted US government's claim that Pakistan was kept fully informed about the deal while it was in the works (IPRI Journal, Winter 2007, p.25). The Agreement has disturbed balance of strategic deterrence between India and Pakistan. As such, Pakistan has been forced to look up for ways and means to safeguard its vital interests in the field of nuclear capability.

Amjed Jaaved, March 3, 2007, *Daily Mail*
http://dailymailnews.com/200703/27/dmcolumnpage.html

U.S. INDICTS 4 FOR ILLEGAL TECH EXPORTS TO INDIA

The head of a U.S. electronics supplier and three employees have been indicted for shipping controlled U.S. computer technology with missile applications to India, court documents made available on Monday showed.

Cirrus Electronics founder and chief executive Parthasarathy Sudarshan will appear in the U.S. District Court in Washington, D.C., on Tuesday to face charges that include export violations, international arms trafficking and conspiracy, according to the indictment.

Sudarshan and Mythili Gopal, the company's international sales manager, were arrested in South Carolina on March 23, a U.S. Justice Department spokesman said.

The pair are accused of shipping to India heat resistant computer chips, capacitors, semiconductors, rectifiers and resistors -- all of which have applications in missile guidance and firing systems -- the indictment said.

It said the items were shipped between 2003 and 2006 to Vikram Sarabhai Space Center, Bharat Dynamics Ltd. and the Aeronautical Development Establishment -- key state agencies in India's missile and aerospace sector.

Exports to those firms in India require licenses from the U.S. Department of Commerce on national security grounds.

Sudarshan and Gopal, Indian nationals residing legally in the United States, are accused of having used false documents about the end-users to ship the prohibited computer parts to India through Cirrus offices in South Carolina and Singapore.

The indictment said Cirrus made the illicit shipments working closely with "Co-conspirator A," an unidentified Indian government official located in Washington who was not charged.

Two other Cirrus employees, Akn Prasad in Bangalore and Sampath Sundar in Singapore, have also been indicted, the documents showed.

(Additional reporting by James Vicini), April 2, 2007
http://www.reuters.com/article/technologyNews/idUSN0218455720070402

U.S. SAYS INDIA BROKE LAW TO GET WEAPONS TECHNOLOGY

The Justice Department has charged that agencies of the Indian government participated in a conspiracy to sidestep U.S. export regulations and obtain secret weapons technology from American companies over several years.

The indictment, disclosed Monday, charges that a private electronics firm, Cirrus, operating in Singapore, South Carolina and Bangalore, India, was working as an agent of the Indian government to obtain sensitive missile and weapons technology for its military programs.

It lists four company officials, including the founder, Parthasarathy Sudarshan, and a number of unnamed co-conspirators who were not charged, including one identified only as an Indian government official who worked in Washington. The indictment indicates that the defendants were buying equipment for three Indian government agencies.

The charges, coming just months after Congress approved President George W. Bush's plan to ship American nuclear reactors and fuel to India, could prove to be an embarrassment for the administration, which has made closer ties with India a top foreign policy priority.

The indictment suggests that India broke a pledge to the Bush administration more than two years ago not to flout American export laws or secretly seek sensitive weapons technology from the United States.

Although Congress has signed off on the nuclear deal, India must still reach a separate agreement on nuclear inspections with several international organizations before the deal is complete.

In a letter to the State Department in September 2004, Shyam Saran, then the Indian foreign secretary, wrote, "The government of India shall not obtain or use U.S. origin licensable items in contravention of U.S. export control laws and regulations."

The weapons sales detailed in the indictment occurred between 2003 and 2006.

The equipment was shipped to government agencies that were part of India's Ministry of Defense and Department of Space.

The defendants are charged with violating the U.S. Export Administration Act, which prohibits the export of dual-use technologies, those with both military and nonmilitary uses, without approval from the Commerce Department attesting that the technology will be used only for nonmilitary purposes.

The indictment charges that Cirrus officials sometimes forged certificates to show vendors in the United States that the sales had Commerce Department approval.

Officials at the Indian Embassy in Washington declined to comment except to say that government officials in New Delhi have pledged to look into the allegations.

Some critics of the nuclear deal reacted angrily to the indictment, criticizing the administration for pressing Congress to approve the agreement even as the Justice Department was investigating an alleged conspiracy involving Indian government officials.

Tom Casey, a State Department spokesman, said, "This is a law enforcement matter that began before our efforts to conclude a civilian nuclear cooperation agreement." He said the arrests were "not connected to our efforts to conclude an agreement."

April 3, 2007
http://www.iht.com/articles/2007/04/03/news/arms.php

INDIA AND NUCLEAR PROLIFERATION

In a letter written recently to US Secretary of State Condoleezza Rice two leading US Senators have shown their concern on India's burgeoning strategic relationship with Iran, which runs contrary to the US policy of containing and isolating Iran from the rest of the world. The Senators in their letter have also questioned India's nuclear nonproliferation credentials citing several recent incidents of proliferation of sensitive material and technology involving Indian government officials.

The contents of the letter which have partially been reported by the media indicate growing US anxiety towards Indian obstinacy of maintaining strong strategic partnership with Iran. Earlier efforts by the US to isolate Iran by coercing India to vote against Iran at the UN had generated strong anti US sentiments within India. US persistence that India severs its strategic relationship with Iran in return for exceptional treatment meted out to India by affording civil nuclear cooperation is seen by many as direct and unwarranted interference in India's foreign policy preferences. Consequently because of these US demands the fate of the 123 Agreement and with it the future of India's Congress-led coalition government has become uncertain.

For the first time US lawmakers, who are otherwise amenable to forging a strategic partnership with India by helping the latter develop its nuclear and military potential through American assistance, have come out with specific incidents of proliferation of sensitive technology involving Indian government officials. The legitimacy of the often-trumpeted US claim that India has an 'impeccable nuclear nonproliferation' record and thus warrants exceptional treatment has been questioned by members of Congress citing various sanctions and indictments of Indian officials on proliferation charges. In one of the reported incident, two Indian companies were sanctioned in

2006 by the US for selling sensitive material to Iran. On another occasion India was sanctioned by the US for nuclear proliferation violations when two former chairman of India's state-run Nuclear Power Corporation were identified as allegedly passing nuclear secrets to Iran, one of them still remains under US sanctions. American senators are also rightly concerned about India's help to Iran to improve its submarine batteries, which would enhance the lethality of these weapon systems in any future conflict with the US naval fleet present in the Persian Gulf.

In addition to these there are number of other incidents reported by the media involving Indian officials in proliferation of sensitive technologies. In April 2007, it was reported that the US Justice Department had charged Indian government agencies that participated in a scheme to bypass US export regulations and obtain secret weapons technology from American companies over a period of several years. A private company working as an agent was buying sensitive missile and weapons technology for three Indian government agencies that included the Vikram Sarabhai Space Centre and Bharat Dynamics. The company was accused of making illicit shipments working closely with a co-conspirator — an unidentified Indian government official – located in Washington. Interestingly, these incidents occurred after the Indian government had given written assurances to the US in 2004 that India would not violate US export control laws. In a letter to the State Department, Shyam Saran, the then Indian foreign secretary wrote: "The government of India shall not obtain or use US origin licensable items in contravention of the US export control laws and regulations".

Despite these blatant violations of international norms by India, the US and supporters of the India-US nuclear agreement continue to justify exceptional treatment for India because India is a responsible nuclear weapons state. Interestingly, in a recent newsmagazine in India, journalist Praful Bidwai questioned India's responsible nuclear stewardship, asking whether this could be "anything but an oxymoron". In the article titled 'Sanctifying mass destruction', he reminded the international community that India's Canadian origin CIRUS reactor was used to process US supplied heavy water for processing plutonium which was subsequently used in India's 1974 nuclear weapons test.

Regarding another claim by India of maintaining restraint, Bidwai exposed the dichotomy in India's official nuclear doctrine that envisages triad of delivery systems and at the same time professes minimum nuclear deterrent posture for India. According to him, India has refused to sign any multilateral nuclear restraint/ disarmament agreement since the mid-1960s. In the 1980s and 1990s, India also turned down at least seven Pakistani proposals of regional nuclear restraint or renunciation, including mutual or third party verification – without making a single counter proposal.

In the past, India had been championing international and universal non-discriminatory treaties on arms control and disarmament. But the India-US nuclear deal, according to him, is a bilateral arrangement meant to be imposed upon the multilateral international Atomic Energy Agency (IAEA) and the Nuclear Suppliers Group (NSG) "a procedure that India would have strongly objected to in the past". In his view, the nuclear deal is likely to facilitate qualitative and quantitative improvement in India's nuclear weapons capability, which will inevitably escalate the regional nuclear arms race.

The deal has attracted unwarranted global attention not only because it has the potential to further Indian nuclear weapons programme, but also due to the fact that by crafting country-specific exceptions driven mainly by economic expediencies, there is a great risk of the demise of the global nonproliferation regime. According to William Potter of the Centre of Nonproliferation Studies at the Monterrey Institute of International Studies in California and Jayantha Dhanapala, a former UN undersecretary-general for disarmament affairs, "despite US efforts to portray the deal as a plus for combating the spread of nuclear weapons, the terms of recently concluded 123 Agreement confirm the opposite conclusion". In a jointly-written article titled "The Perils of Nonproliferation Amnesia" they note that only three years ago President Bush had urged the Nuclear Suppliers Group (NSG) to tighten export controls, especially in sensitive fuel cycle area. However, Washington has a different agenda now and is asking the same NSG to make a country specific exception. This dissonance is not only in the policies of the leading super power, other countries have also opted to conform to the international treaties/ agreements on the principle of convenience. This dissonance is most striking with respect to Australia and South Africa — the two countries that pride themselves on model nonproliferation behaviour – reflected in part by their ratification of nuclear weapons free zones in their respective regions, the Treaty of Raratonga in South Pacific and the Pelindaba Treaty in Africa. Both treaties have explicit language prohibiting members from engaging in nuclear commerce with states lacking comprehensive safeguards, as is the case in India. And yet Australia and South Africa have each endorsed nuclear trade with India and are supportive of the US initiative to weaken the NSG guidelines to allow such commerce. According to Potter, it's as if they believe they can selectively disavow inconvenient legally-binding obligations.

The letter written by the US senators acknowledging publicly for the first time that India's proliferation record is far from perfect indicate growing realism among American policy-makers and is evidence that the argument that India warrants exceptional treatment because it has an impeccable nonproliferation record does not have ground.

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Adil Sultan, *The News International*, October 8, 2007
http://www.tni.org/detail_page.phtml?act_id=17431&username=guest@tni.org&password=9999&publish=Y

INDIAN COMPANY CHIEF ADMITS SMUGGLING WEAPONS TECHNOLOGY

The Indian head of an international electronics firm pleaded guilty Thursday to a charge of shipping restricted weapons technology to the Indian government, the US Justice Department said.

Parthasarathy Sudarshan, president of Cirrus Electronics with offices in the United States, Singapore and India, admitted to the felony charge of "conspiracy to violate" various laws, including the Arms Export Control Act and the International Emergency Economic Powers Act.

The 47-year-old Sudarshan faces a maximum punishment of five years in prison, a 250,000 dollar fine and three years of supervised release, a justice official said while talking to a French news agency. He is to be sentenced on June 16.

He was said to have provided export controlled microprocessors and electronic components to Indian state entities involved in developing ballistic missiles, space launch vehicles, and fighter jets.

Among the recipients were the Vikram Sarabhai Space Centre (VSSC), an enterprise within the Indian Department of Space; and Bharat Dynamics, Ltd. (BDL), an Indian Defense Ministry enterprise.

Both are on the US Department of Commerce's so-called Entity List. Exports of US-origin commodities to these entities are restricted and require prior authorization in the form of a license from the department. Sudarshan entered his guilty plea Thursday in a district court in Washington.

"The defendant participated in a clandestine network that circumvented our export laws and put sophisticated technology in the hands of foreign companies that were listed as end-users of concern for proliferation reasons," US Attorney Jeffrey Taylor said.

"With this prosecution, the defendant will no longer be able to make a profit at the expense of our national security," he said. Between 2002 and 2006, Sudarshan acquired electrical components with applications in missile guidance and firing systems in the United States for VSSC and BDL.

There were no export licenses for any of the shipments to VSSC and BDL. Sudarshan routed the products through his company's Singapore office and then sent the packages on to India to conceal that goods were going to entities on the Entity List, officials said.

In addition to supplying VSSC and BDL with components, Sudarshan acquired microprocessors for the Tejas, a fighter jet under development in India.

The microprocessors were necessary for the navigation and weapons systems of the Tejas.

Pakistan Defence, March 14, 2008
http://www.defence.pk/forums/indian-military-strategic-affairs/10431-indian-company-chief-admits-smuggling-weapons-technology.html

INDIAN EMBASSY WORKER TIED TO ARMS CONSPIRACY

An employee with the Indian Embassy in Washington and Indian government agencies conspired with an international electronics executive to obtain secret weapons technology from U.S. companies, according to a guilty plea the businessman made yesterday in federal court.

The plea by Parthasarathy Sudarshan, 47, before a federal judge in Washington suggests the Indian government violated a pledge made in 2004 that it would not try to bypass U.S. export-control laws and regulations that were imposed after India tested a nuclear weapon in 1998.

The Bush administration has invested significant effort in seeking to conclude a deal that would give India access to U.S. civilian nuclear technology. The deal, which has stalled because of political difficulties in India, requires final approval from Congress, and some lawmakers expressed outrage after an indictment of Sudarshan was unsealed last year.

The Indian Embassy did not respond to a request for comment.

In a separate case announced yesterday, a Minnesota company, MTS Systems Corp., pleaded guilty and was sentenced to two years' probation and fined $400,000 for repeatedly falsifying documents so it could illegally export equipment for use in India's nuclear program.

According to court documents, Sudarshan, as chief executive of Cirrus Electronics, sought to evade the export laws by arranging for critical parts needed for missiles, space launch vehicles and fighter jets to be shipped to Singapore, which did not require a license from the Commerce Department. The parts then were secretly rerouted to India.

The documents said that Sudarshan worked closely with an Indian Embassy employee identified only as "co-conspirator A." At one point, according to court documents, Sudarshan advised the official that a shipment of microprocessors for combat aircraft "is leaving for Singapore, as we do not want it to be held up at U.S. customs for want of business registration and export code numbers, etc."

Sudarshan, of Simpsonville, S.C., agreed to cooperate with the investigation as part of his guilty plea and faces a maximum five-year prison term for conspiring to violate two federal laws.

Sudarshan's attorney, Reid Weingarten, did not return a call seeking comment.

http://www.washingtonpost.com/wp-dyn/content/article/2008/03/13/AR2008031303653.html

INDIAN CONSPIRACY TO OBTAIN SECRET TECH

According to Washington Post's story titled: 'Indian Embassy Worker Tied to Arms Conspiracy' by Glenn Kessler, published on Friday, March 14, 2008, an employee with the Indian Embassy in Washington and Indian government agencies conspired with an international electronics executive to obtain secret weapons technology from U.S. companies, according to a guilty plea the businessman made on March 13, 2007 in federal court. The plea by Parthasarathy Sudarshan, 47, before a federal judge in Washington suggests the Indian government violated a pledge made in 2004 that it would not try to bypass U.S. export-control laws and regulations that were imposed after India tested a nuclear weapon in 1998. The Bush administration has invested significant effort in seeking to conclude a deal that would give India access to U.S. civilian nuclear technology. The deal, which has stalled because of political difficulties in India, requires final approval from Congress, and some lawmakers expressed outrage after an indictment of Sudarshan was unsealed last year.

The Indian Embassy did not respond to a request for comment. In a separate case announced a day earlier, a Minnesota company, MTS Systems Corp., pleaded guilty and was sentenced to two years' probation and fined $400,000 for repeatedly falsifying documents so it could illegally export equipment for use in India's nuclear program. Appearing before a federal judge in Washington, Parthasarathy Sudarshan admitted to a scheme to conceal the true destination for electronic parts used in missile guidance systems and jet fighters, and night vision filters used in combat aircraft.

Sudarshan came to the United States and opened an office in Simpsonville, S.C. He was accused by the government of conspiring to violate U.S. export restrictions by directing at least seven American firms he did business with to send deliveries to Singapore or to the office in South Carolina, where Sudarshan then re-exported the items to India. According to papers filed in the case, Sudarshan coordinated with and took direction from a co-conspirator who was identified only as an Indian government official in Washington, D.C. The court papers identify five other co-conspirators, all

employed by Sudarshan's business. Officials at the Indian Embassy in Washington had no immediate comment.

Sudarshan's company, Cirrus, made 16 shipments in 3 1/2 years of microprocessors, memory chips and other items that ended up in units at the Indian government's defense ministry or space center, the court papers stated. Some of the exported items were built specifically for military use and required licenses from the State Department's Directorate of Defense Trade Controls. A resident of South Carolina, Sudarshan supplied microprocessors and other electronic components to Indian agencies including the Vikram Sarabhai Space Centre (VSSC) and Bharat Dynamics Ltd. (BDL), which is involved in development and production of ballistic missiles, between 2002 and 2006. "Both VSSC and BDL are on the Department of Commerce's Entity List and exports of US-origin commodities to these entities are restricted and require prior authorization in the form of a license from the Department of Commerce," the Department said. Sentencing is scheduled for June 16. Sudarshan faces a maximum punishment of five years in prison, a USD250, 000 fine and three years of supervised release. Sudarshan did not get the licenses, nor did he get licenses for other electronic components from the Commerce Department, which restricts the export to certain countries involved in developing nuclear weapons or ballistic missile delivery systems. The equipment went to three Indian government agencies: the Vikram Sarabhai Space Centre, which researches spacecraft and ballistic missiles; Bharat Dynamics Ltd., a key agency in the nation's guided missile program; and the Aeronautical Development Establishment, which is developing the Tejas light combat aircraft (LCA). The United States imposed sanctions in 1998 after India conducted tests of its nuclear weapons, with the Commerce Department placing a number of enterprises in India on a list that included some of Sudarshan's principal customers. According to evidence presented by Justice Department prosecutors in court Thursday, Sudarshan told one prospective customer that the sanctions were no obstacle for one of his enterprises. "Orders, like, flew ... it was flowing like water," he was quoted saying. The court papers identified the enterprise as Bharat Electronics Ltd.

According to court documents, Sudarshan, as chief executive of Cirrus Electronics, sought to evade the export laws by arranging for critical parts needed for missiles, space launch vehicles and fighter jets to be shipped to Singapore, which did not require a license from the Commerce Department. The parts then were secretly rerouted to India. The documents said that Sudarshan worked closely with an Indian Embassy employee identified only as "co-conspirator A." At one point, according to court documents, Sudarshan advised the official that a shipment of microprocessors for combat aircraft "is leaving for Singapore, as we do not want it to be held up at U.S. customs for want of business registration and export code numbers, etc."

In another development, the US has not ruled out deportation of Indian nationals who entered America through illegal means with the help of 200 South Indian film personalities after a fake visa racket involving them was busted. Sarath Kumar, president of South Indian Cine Artistes Association, meanwhile said the entire visa scam has brought "shame" to the film industry in the region. To a query by newsmen, David T Hopper, US Consul General for South India, did not rule out legal action against those staying in the US after entering the country through the "scheme" involving the film fraternity, including deportation. The "scheme" of a person trying to fly to the US in the garb of a film personality's associate, assistant or acquaintance was first detected in May 2007, Hopper said. The US government should take note of the flagrant violation of rules and attempt to hoodwink the authorities by India to acquire secret weapons technology on the one hand and attempting to woo USA for entering into civil-nuclear pacts on the other. It is high time Indian duplicity is exposed.

Sultan M Hali, Email: sm_hali@yahoo.com

http://pakobserver.net/200803/21/Articles01.asp

WASHINGTON WOULD REGARD AN INDIAN NUCLEAR EXPLOSION USING PLUTONIUM DERIVED FROM THE CIRUS REACTOR, AS A VIOLATION OF THE U.S.-INDIA NUCLEAR COOPERATION AGREEMENT

16 November 1970: India's renewed debate and official statements showing interests in peaceful nuclear explosions alarms US government officials. As a result, the United States presents an "aide-memoire" to the Indian government declaring that Washington would regard an Indian nuclear explosion using plutonium derived from the CIRUS reactor, which is moderated by a U.S.-supplied heavy water, as a violation of the U.S.-India nuclear cooperation agreement. India rejects the U.S. interpretation and states that it has a right to pursue "any peaceful applications of nuclear energy, including peaceful nuclear explosives."

George Perkovich, India's Nuclear Bomb: The Impact on Global Proliferation (Berkeley & Los Angeles, CA: University of California Press, 1999) p.159.

CANADIAN PRIME MINISTER PIERRE TRUDEAU ON THE REASSESSMENT OF NUCLEAR COOPERATION AGREEMENT WITH INDIA

1 October 1971: Canadian Prime Minister Pierre Trudeau, prompted by Sarabhai's statement concerning peaceful nuclear explosives and goaded by an alarmed U.S. bureaucracy, writes to Indira Gandhi, to declare that "use of Canadian supplied material, equipment and facilities... for the development of a nuclear device would inevitably call on our part for a reassessment of our nuclear cooperation agreement with India."

George Perkovich, India's Nuclear Bomb: The Impact on Global Proliferation (Berkeley, CA: University of California Press, 1999) p. 159.

INDIA'S MAY 18 EXPLOSION OF NUCLEAR DEVICE VIOLATES CANADIAN AID TO INDIA'S NUCLEAR ENERGY PROGRAM

21 May 1974: Ivan Head, chief foreign policy adviser to Canadian Prime Minister Pierre Elliot Trudeau, says that "India's May 18 explosion of nuclear device violates '71 understanding between India and Canada on Canadian aid to India's nuclear energy program." Also, Canadian Minister of Trade and

Commerce, Mitchell W. Sharp, announces that Canada is re-examining its nuclear relations with India.

The New York Times, Information Bank Abstracts, May 21 1974, Lexis-Nexis Academic Universe, 21 May 1974, http://web.lexis-nexis.com

INDIA'S USE OF THE CANADIAN-SUPPLIED CIRUS REACTOR AS THE SOURCE OF THE PLUTONIUM

22 May 1974: Canada evinces the strongest international reaction to the nuclear explosion at Pokhran, reflecting a sense of betrayal at India's use of the Canadian-supplied CIRUS reactor as the source of the plutonium used in the peaceful nuclear explosion (PNE). As a result, Canada freezes all assistance to India for the Rajasthan-II Pressurized Heavy Water reactor (PHWR-Unit 2) and the Kota Heavy Water plant, both under construction.

George Perkovich, "India Explodes A 'Peaceful' Nuclear Device," India's Nuclear Bomb: The Impact on Global Proliferation (Berkeley, CA: The University of California Press, 1999) p.186.

US INTELLIGENCE REPORT ON INDIAN HELP TO EGYPT FOR DEVELOPING NUCLEAR WEAPONS TO DETER ISRAEL

25 August 1975: US Intelligence reports that Egypt has "put out feelers" to New Delhi about the chances of getting help in developing nuclear weapons in order to deter Israeli nuclear capability.

John A. Conway, *Newsweek* (US Edition) "Nukes on the Nile?" August 25, 1975 Lexis-Nexis Academic Universe, August 25 1975, http://web.lexis-nexis.com

THE US CONGRESS MOVES TO TIE THE CARTER ADMINISTRATION'S HANDS IN DEALING WITH INDIA BY PASSING THE NUCLEAR NON-PROLIFERATION ACT (NNPA)

10 March 1978: The US Congress moves to tie the Carter administration's hands in dealing with India by passing the Nuclear Non-Proliferation Act (NNPA). This long and complicated legislation is the culmination of several years of intense intergovernmental debate informed by numerous official and nongovernmental studies. The Act restricts the export of sensitive nuclear material, including enriched uranium fuel, only to countries, which place all such facilities under the International Atomic Energy Agency's (IAEA) full scope safeguards.

George Perkovich, "The Nuclear Program Stalls," India's Nuclear Bomb: The Impact on Global Proliferation (Berkeley, CA: University of California Press, 1999) p.206;

Raj Chengappa, "Hello, Mr Bomb," Weapons of Peace: The Secret Story of India's Quest to be a Nuclear Power (New Delhi, India: Harper Collins Publishers India, 2000) p.223.

US NUCLEAR REGULATORY COMMISSION (NRC) TAKES A TOUGH LINE AGAINST INDIA BY REFUSING TO LICENSE THE NEXT SHIPMENT OF FUEL FOR THE (TAPS)

27 April 1978: The US Nuclear Regulatory Commission (NRC) takes a tough line against India by refusing to license the next shipment of fuel for the Tarapur Atomic Power Station (TAPS). In response, US President Jimmy Carter uses his presidential authority to overturn the NRC's decision explaining that it seriously undermines his government's efforts to persuade India to observe the Nuclear Non-Proliferation Act's (NNPA) deadline of March 1980.

Raj Chengappa, "Hello, Mr. Bomb," Weapons of Peace: The Secret Story of India's Quest to be a Nuclear Power (New Delhi, India: Harper Collins Publishers India, 2000), p.223.

INDIA'S DECISION TO STOCKPILE FUEL IN EXCESS OF ITS OPERATIONAL REQUIREMENTS CONTRAVENES THE INDO-US AGREEMENT

September 1980: US congressional opponents of the enriched uranium export deal with India claim that India has probably stockpiled enough enriched uranium to continue running the Tarapur plant at least until February 1982. The assessment of the alleged Indian stockpile is made on the basis of data complied by the Nuclear Regulatory Commission (NRC) on the Tarapur plant's operating history. A senate source says India's decision to stockpile fuel in excess of its operational requirements contravenes the Indo-US agreement. Opponents of the deal also downplay the State Department's argument that continued shipments of enrichment uranium are necessary to avoid disrupting operations at the Hyderabad-based nuclear fuel fabrication facility, on grounds that since the facility did not exist when the fuel supply agreement was drawn up in 1963, it should not now be part of any consideration.

"Indian Stockpile Disturbs Congressional Opponents of Tarapur Fuel Supply," *Nucleonics Week*, 18 September 1980, pp. 9-10.

US Demands an Explanation on Photographic Evidence of India's Efforts to Build Nuclear Test Shafts at Pokhran

May 1982: US Undersecretary of State for Political Affairs Lawrence Eagleburger confronts visiting Indian foreign secretary M. Rasgotra with photographic evidence of India's efforts to build nuclear test shafts at Pokhran and demands an explanation. Rasgotra, who is evidently unaware of the activities, denies knowledge of any impending tests. On his return to India, Rasgotra briefs Prime Minister Indira Gandhi about his visit and warns that a nuclear test will have negative repercussions for India.

Raj Chengappa, "Do You Want Our Skulls Cracked," Weapons of Peace: The Secret Story of India's Quest to be a Nuclear Power (New Delhi: HarperCollins Publishers India, 2000), pp. 256-257.

Indian Intention to Help Iran with its Nuclear Energy Program

17 August 1982: Iran's speaker of the parliament, Akbar Hashemi Rafsanjani says that India will assist Iran in developing its nuclear energy program. He says, "What we need from India is cooperation. We do not want to depend on the Western powers and what we need we will get from India." An unidentified Indian industry ministry official confirms India intention to help Iran with its nuclear energy program. "India will consider favorably any specific request from Iran identifying the areas of cooperation needed for nuclear power generation," the official says.

"An Iranian Leader...," UPI, August 17, 1982; in Lexis-Nexis Academic Universe August 17, 1982, http://web.lexis-nexis.com

India Attempted to Purchase "Two Sophisticated Industrial Cameras in Britain"

9 May 1986: The Financial Times reports that India attempted to purchase "two sophisticated industrial cameras in Britain." Western officials view the attempt by the Indian defense ministry to buy the cameras, known as flash discharge x-ray machines, from Hadland Photonics of Hemel Hempstead as indicating India has resumed it nuclear weapons program. According to the report, "the machines can take a series of pictures through metal at extremely short intervals and are typically used to inspect welds or calibrate guns. They are also used in designing nuclear weapons." The sale was blocked by the

British government. It is reported that India has now approached the Swedish company Scandiflash of Uppsala.

Simon Henderson, "Suspicions Aroused on Indian N-Weapons," *Financial Times* (London), May, 9, 1986; in Lexis-Nexis Academic Universe, May 9, 1986, http://web.lexis-nexis.com

SEVEN TONS OF HEAVY WATER ESCAPED FROM THE COOLANT SYSTEM OF THE MADRAS NUCLEAR POWER PLANT (MAPP-1)

27 June 1986: According to an Indian government press release, about seven tons of heavy water escaped from the coolant system of the Madras Nuclear Power Plant (MAPP-1) on 25 June. The MAPP-1 was undergoing re-commissioning activities. The incident did not result in the release of any radioactivity into the surrounding environment.

"Indian Nuclear Reactor's Incident," *Xinhua* (Beijing), June 27, 1986 Lexis-Nexis Academic Universe, 27 June 1986, http://web.lexis-nexis.com

15 TONS OF NORWEGIAN HEAVY WATER WAS ILLEGALLY DIVERTED TO INDIA

21 April 1988: The Norwegian newspaper Verdens Gang reports that in 1983, 15 tons of Norwegian heavy water was illegally diverted to India while being shipped from Norway to West Germany. The paper alleges that the heavy water was used for the start up of the Kalpakkam nuclear power plant. Under Norwegian law, heavy water cannot be sold to India because it is not a signatory to the nuclear Non-Proliferation Treaty (NPT). An official from India's Ministry of Science Technology, while refusing to divulge where India obtained heavy water for the Kalpakkam facility, admits that in the past India has imported heavy water from the Soviet Union to make up for domestic shortfalls in production.

Dilip Ganguly, "India Needed Heavy Water at Time Norwegian Consignment Vanished," Associated Press, May 6, 1988 Lexis-Nexis Academic Universe, May 6, 1988, http://web.lexis-nexis.com

NORWAY CLAIMS HEAVY WATER DIVERTED TO INDIA

2 November 1988: Norwegian Trade Minister Jan Balstad confirms that 15 tons of Norwegian heavy water was smuggled to India five year ago. Balstad states, "The (Norwegian) government strongly regrets that Norwegian heavy

water seems to have ended up in a country which is not party to the nuclear Non-Proliferation Treaty." Balstad says that Norway will ask for India's cooperation in the investigation of the shipment (1983) of heavy water that was sold by the Norwegian company Norsk Hydro to the West German firm of Rohstoff-Einfuhr. The Norwegian State Prosecutors office shows that the West German firm of Rohstoff-Einfuhr "handled the Norwegian consignment along with a smaller Soviet consignment of heavy water." The Indian Atomic Energy Commission (AEC) Secretary, S. Rajgopal denies India had "secretly imported heavy water from Norway but admit(s) that small quantities were imported from the Soviet Union."

"Norway Claims Heavy Water Diverted to India," UPI, November 2, 1988
Lexis-Nexis Academic Universe, 2 November 1988, http://web.lexis-nexis.com

HEAVY WATER FROM ROMANIA WAS RE-SHIPPED TO INDIA

April 1990: A spokeswoman for the Norwegian Foreign Ministry Sigrid Romundset says Romanian officials have recently informed the ministry that a 1986 shipment of heavy water from Norway was reshipped from Romania to Mumbai, India. The spokesperson of the Indian embassy in Washington, DC, says India produces enough heavy water domestically and does not import anything.

Michael R. Gordon, "A Nuclear Deal is Reported Between Romania and India,
New York Times, April 30, 1990, p. A7

WESTERN NEWSPAPERS ALLEGE THAT IN 1983 AND 1986, THE MINISTRY OF TRADE OF NORWAY GAVE EXPORT LICENSES TO NORSK HYDRO TO SELL HEAVY WATER THAT ENDED UP IN INDIA

28 May 1990: Western newspapers allege that in 1983 and 1986, the Ministry of Trade of Norway gave export licenses to Norsk Hydro to sell 27.5 tons of heavy water that ended up in India. In 1983, fifteen tons of heavy water were sold to German businessman Alfred Hempel to be used in West Germany. Journalists and researchers claim that the heavy water was later resold to India without reaching German soil. It was shipped to Switzerland, where it was combined with a shipment of 4.7 tons of Soviet heavy water and flown to Mumbai, India. In 1986, Romania purchased 12.5 tons of heavy water from Norway. Romanian officials say it was later resold to India. The Indian government denies the allegations.

Harald Stanghelle "Norway Called Naïve, Tricked," Arbeiderbladet (Oslo), May 28, 1990, p. 5; in Document JPRS-TND-90-011, June 28, 1990, p. 42; Michael R. Gordon

"A Nuclear Deal is Reported Between Romania and India," New York Times, April 30, 1990, p. A7.

NORWEGIAN HEAVY WATER RESHIPPED TO INDIA IN 1983 AND 1986

7 May 1991: Paul Chaffey, a member of Storting (Norwegian Parliament) says Norway might freeze development aid to India if the Indian government does not provide an explanation for what happened to the 12.5 tons of Norwegian heavy water that was illegally reshipped to Mumbai, India, from Romania in 1986, as well as to 15 tons of heavy water reshipped by a West German businessman to India in 1983.

"India, Romania Heavy Water Investigation Seen," Aftenposten (Oslo), May 7, 1991 p. 16; in FBIS Document JPRS-TND-91-009, June 24 1991, p. 38.

RULES BROKEN BY INDIA, SAYS OSLO

4 February 1992: A senior public prosecutor Anstein Gjengedal in Oslo says Norway has fresh evidence that India has illegally received 12.5 tons of heavy water that was originally destined for Romania in 1986. According to Gjengedal, the heavy water was reshipped to the Directorate of Purchase and Storage in Mumbai. Norwegian Foreign Ministry spokesperson Bjoern Blokhus says that Norway has informed the Indian government of its findings and has given India "reasonable time to respond." Norway expects a comment from India by 13 February and intends to undertake a "tougher strategy" if the response is not forthcoming.

Karen Fossli, "Rules Broken by India, Says Oslo," *Financial Times*, February 5, 1992; "Report from Oslo," *Times of India* (Mumbai), February 5 1992, p. 1; in FBIS Document JPRS-TND-92-008, March 26, 1992, p. 25.

BRITISH FIRM GEC-MARCONI HAD "SECRETLY EXPORTED NUCLEAR AND MISSILE TECHNOLOGY TO INDIA"

15 June 1992: Indian government denies a report published by Sunday Times (London) that the British firm GEC-Marconi had "secretly exported nuclear and missile technology to India, in conflict with government's commitment to halt the spread of strategic weapons." According to the export manager of Marconi, Allan Luskow, the firm tried to register equipment destined for the Bhabha Atomic Research Center (BARC) and the Defense Research and

Development Organization (DRDO) as related to medical research. A spokesperson of the Ministry of External Affairs of India says the report is "inaccurate..., misleading, mischievous and malicious." According to the spokesperson, India had negotiations with this firm regarding some missile components since 1986 with the prior permission of the British government.

"India Denies Report on British Nuclear Deal," Reuters, June 15, 1992; in Compuserve-Executive News Service, June 17 1992; "Firm Said Exporting Nuclear Technology to India," *Muslim* (Islamabad), June 15 1992, pp. 1, 12; in FBIS Document JPRS-TND-92-024, July 21 1992; "Procurement of Nuclear Parts from UK Denied," Delhi All India Radio Network, June 15 1992; in FBIS Document JPRS-TND-92-024, July 21 1992, p. 16.

ISRAELI PAPER ALLEGES INDO-IRAN NUCLEAR TIES

May 1995: A report from the Israeli Embassy in New Delhi states that India and Iran have agreed on an accelerated plan to step up cooperation in nuclear research and development. The report also says that India sent nuclear experts to Iran.

"Israeli Paper Alleges Indo-Iran Nuclear Ties," *Ma'ariv* (Tel Aviv), May 21, 1995; in FBIS Document FTS19950521000175, May 21 1995

STATEMENT BY THE PRESIDENT OF THE UN SECURITY COUNCIL

14 May 1998: The President of the UN Security Council issues a statement deploring the nuclear tests carried out by India on 11 and 13 May 1998 "despite overwhelming international concern and protests." The statement urges India "to refrain from any further tests" and expresses its "concern at the effects of this development on peace and stability in the region."

Statement by the President of the UN Security Council, May 14, 1998, UN Security Council Presidential Statements 1998, S/PRST/1998/12, May 14, 1998, http://www.un.org

INDIA REFUSES TO ACCEPT REGIONAL NON-PROLIFERATION

Mid-January 1999: In an address at the seventh Carnegie International Conference on Nonproliferation in Washington, DC, India's Deputy Chief of Mission T.P. Srinivasan says: "In carrying out the [nuclear] tests in May 1998, India did not violate any international agreement, but merely underscored the point that if some nuclear powers are here to stay, including those in our immediate neighborhood, then India has no choice but to maintain its minimal, assured nuclear/missile capabilities." Srinivasan reiterates India's

rejection of a "South Asian regional nonproliferation regime" and indicates that India's right to minimum credible deterrent is non-negotiable.

"India Refuses to Accept Regional Non-Proliferation," Rediff on The Net, January 13, 1999, http://www.rediff.com; C. Raja Mohan, "China Slams India's Nuclear Talks," Hindu (Chennai), January 18, 1999, http://www.hinduonline.com

INDIA APPEARS IN THE LIST OF COUNTRIES "SPYING" ON US NUCLEAR SECRETS

1 May 1999: The New York Times reports that a classified US intelligence report says that China poses an "acute intelligence threat" to US nuclear laboratories. This 25-page report was prepared by counterintelligence experts in November 1998. India appears in the list of countries "spying" on US nuclear secrets. According to the report, "an unknown individual sent 38 faxes to India from inside a sensitive area of the Oak Ridge Laboratory in Tennessee, during a 30-day period in 1995 and 1996."

Jeff Gerth, James Risen, "1998 Report Told of Lab Breaches and China Threat," *New York Times*, May 2 1999; in Lexis-Nexis Academic Universe, May 2, 1999, http://www.lexis-nexis.com

CBI TO INVESTIGATE 'MISUSE' OF BARC LABS

23 April 2000: The Asian Age (New Delhi) reports that Central Bureau of Investigation (CBI) has begun an investigation of "irregularities and misuse" at the Bhabha Atomic Research Center's (BARC) facilities. The report mentions complaints by scientists that apart from nuclear tests at Pokhran, BARC has no other significant achievements to its credit and "most of scientific, technical and administrative staff are promoting their own personal businesses. The quality of research degenerated totally." Commenting on the issue, BARC director Anil Kakodkar dismisses the allegations as "baseless and untrue."

Haima Purushottam, "CBI to Investigate 'Misuse' of BARC Labs," *Asian Age* (New Delhi), April 23 2000, http://www.asianage.com

PAKISTAN PROPOSES NUCLEAR RESTRAINT REGIME

13 June 2000: In an official statement, Pakistan offers India "a strategic restraint regime for avoidance of an arms race, nuclear and conventional, and confidence-building in the region." According to the statement, Pakistan is "willing to consider any restraint arrangement on a reciprocal basis with India."

Amit Baruah, "Pakistan Proposes Nuclear Restraint Regime," *Hindu* (Chennai) June 14 2000, http://www.hinduonline.com

INDIA REJECTS PAK OFFER

14 June 2000: The spokesperson for India's Ministry of External Affairs R.S. Jassal says that India's security concerns go beyond South Asian confines. He adds that soon after India's nuclear tests Prime Minister Vajpayee referred to the China threat.

"India Rejects Pak Offer," *Times of India* (Mumbai), June 15, 2000 http://timesofindia.indiatimes.com

INDIA CONTINUES N-WEAPONS DEVELOPMENT PROGRAM: CIA

10 August 2001: The U.S. Central Intelligence Agency (CIA) in its report to Congress on global proliferation trends says that India's May 1998 nuclear tests "were a significant milestone" and that India continues its nuclear weapons program; the acquisition of foreign equipment could benefit India in developing and producing more sophisticated weapons. The agency report states that "India continues to rely on foreign assistance for key missile and dual-use technologies, where it still lacks engineering or production expertise in ballistic missile development...entities in Russia and Western Europe remained the primary conduits of missile-related technology transfers during the first half of 2000."

"India continues N-weapons development program: CIA," Press Trust of India, August 10 2001; in Lexis-Nexis Academic Universe, August 10, 2001, http://web.lexis-nexis.com

US FIRMS INDICTED FOR NUCLEAR SALES TO INDIA

29 August 2001: A grand jury indicts three executives--David Brown, Richard Hamilton, and Vincent Delfino of Berkeley Electronics, a Marin County electronics firm--for illegally selling five nuclear pulse generators to India's Bhabha Atomic Research Center (BARC) and Nuclear Power Corporation between 1999 and 2000. The generators emit electrical pulses and can be used to calibrate radar and nuclear instruments with military applications. The U.S. federal government began building a case against the firm after agents of the Commerce Office of Export Enforcement posed as exporters in a sting operation.

David Kravets, "Marin Country executives indicted in nuclear testing sale," Associated Press State & Local Wire, August 29, 2001; in Lexis-Nexis Academic Universe, August 30, 2001, http://web.lexis-nexis.com; "US firms indicted for nuclear sales to India," Business Recorder, September 11 2001; in Lexis-Nexis Academic Universe, September 11, 2001, http://web.lexis-nexis.com

INDIAN FIRMS PROBED FOR ALLEGED WEAPONS TECHNOLOGY SALES TO IRAQ: REPORT

26 August 2002: India's Department of Revenue Intelligence (DRI) releases a report outlining its ongoing investigation of five subsidiaries of the Indian company NEC Engineers Private Limited for allegedly supplying technology and equipment to Iraq for its missile and chemical weapons programs. According to the DRI, NEC Engineers "actively assisted" Iraq in setting up a chlorine plant in Fallujah by exporting sensitive membranes and centrifugal pumps. India's external intelligence agency, Research & Analysis Wing (RAW), and appropriate U.S. agencies are also involved in the investigation.

"Indian Firms Probed for Alleged Weapons Technology Sales to Iraq: Report," Agence France Presse, August 26 2002; in Lexis-Nexis Academic Universe, February 14 2005, http://www.lexis-nexis.com; Shishir Gupta, "Arms Control: the Indian Connection," *India Today*, October 14, 2002, http://www.india-today.com

BRITISH PM TONY BLAIR SINGLES OUT THE INDIAN COMPANY NEC FOR "ILLICITLY" HELPING IRAQ IN EXPANDING ITS MISSILE AND CHEMICAL WEAPONS ARSENAL

24 September 2002: British Prime Minister Tony Blair singles out the Indian company NEC Engineers Private Limited for "illicitly" helping Iraq in expanding its missile and chemical weapons arsenal. The Indian government, in response, finds Mr. Blair's "selective reference" to the Indian company "unfortunate" but it also accuses NEC Engineers of exporting sensitive equipment to Iraq.

Shishir Gupta, "Arms Control: the Indian Connection," *India Today* October 14, 2002, http://www.india-today.com

INDIAN SCIENTIST ALSO INVOLVED IN NUCLEAR PROLIFERATION

8 February 2004: Allegations surface that the Indian nuclear scientist Dr. Y.S.R. Prasad, who retired as the Chairman of India's Nuclear Power Corporation in the year 2000, served in the employ of the Iranian government. Prasad allegedly visited Iran on several occasions without obtaining clearances from the Indian government. The Iranian government apparently forwarded details concerning Dr. Prasad's employment to the International Atomic Energy Agency (IAEA) and the IAEA in turn requested the Indian government to debrief Dr. Prasad.

"Indian scientist also involved in nuclear proliferation to Iran," *Frontier Star*, February 8 2004; in Lexis-Nexis Academic Universe, May 19 2004, http://web.lexis-nexis.com

NRI HELD IN DUBAI FOR SELLING NUCLEAR SECRETS

June 12, 2004: The Dubai police have arrested a 35-year-old Indian businessman for allegedly trying to sell secrets of the Indian nuclear development programme obtained from his brother who is said to be a nuclear scientist in India.

Dubai police Commander-in-Chief Lieutenant General Dhahi Khalfan Tamim said UAE resident Akhtar Hussain Qutbuddin Ahmed 'had attempted to sell nuclear secrets to the diplomatic missions of a number of brotherly countries in the UAE', according to Khaleej Times online newspaper.

Ahmed allegedly wanted to sell the nuclear secrets to regional states for quite some time. His arrest came almost two years after security forces set up a surveillance operation to find out whether he had worked with a network. He was deported to Mumbai on Saturday night. The Mumbai police detained him immediately after he landed at the airport after receiving a tip off from their counterparts in Dubai.

"We have held the businessman following an oral message from the Dubai police that he was caught selling Indian nuclear secrets," Joint Commissioner of Police (Crime) Satyapal Singh told PTI.

Arrest or further prosecution would be possible only after the police received documents from Dubai, he said adding, "It would be possible only in a day or two. Till then Akhtar will be questioned by the police."

Central intelligence agencies have begun quizzing the businessman somewhere in Chhatrapati Shivaji International Airport, police sources said.

"We are providing backup support to central agencies who are pursuing the case," a senior Mumbai police official said.

It is quite possible that Akhtar may be moved to Delhi for further questioning till authorities in Dubai sent details of the documents found in his possession.

Earlier, the Dubai police had sealed a computer firm in Dubai owned by a Sri Lankan in another instance of an expatriate businessman trying to sell nuclear equipment illegally.

http://www.rediff.com/news/2004/jun/12uae.htm

INDIAN NUCLEAR IMPORTS

Year/Date	Exporter	Item(s)	Remarks
1949	France	Technical assistance	Indian Rare Earth (now Indian Rare Earth Limited [IREL]) and the French entities Societe de Produits Chimique and Banque Marocaine de Credit agree to construct a facility at Alwaye (Kerala) to extract thorium from monazite sand.
Late 1954-Early 1955	United Kingdom	Six kilograms of enriched uranium fuel rods and technical assistance	In exchange for the Atomic Energy Commission (AEC) consideration to purchase a British reactor in the future, Dr. H. Bhabha obtains uranium fuel rods and technical data for a swimming pool-type research reactor.
February 1955	United States	10 tons of heavy water	The US Atomic Energy Commission agrees to sell heavy water for the proposed Canada-India-US (CIRUS) research reactor in Trombay.
August 1955	Canada	Technical assistance	Canada offers to build the 40MW CIRUS pressurized heavy water (PHW) research reactor and pay all foreign exchange costs for the $14 million project (eventual costs total $24 million). Although Canada does not require safeguards on the reactor, a secret clause states that India will only use the reactor for

			peaceful purposes.
October 1955	United Kingdom	Reactor fuel elements and technical assistance	The British Atomic Energy Commission declares it would be willing to provide all the necessary fuel elements for the CIRUS reactor. The UK also declares that it will give technical assistance for the Zerlina zero energy reactor.
1955	United Kingdom	Technical assistance	Construction of the Aspara research reactor begins in Trombay using British blueprints.
1955	United States	Technical assistance	Indian nuclear scientists and engineers are trained by US officials and given access to thousands of declassified papers and reports.
16 March 1956	United States	Four shipments of heavy water	The United States and India sign a contract in which the United States agrees to sell heavy water for the CIRUS reactor. Under this agreement, the United States will provide four shipments of heavy water with the last consignment to arrive on 15 June 1956. One of these shipments constitutes 18.9 tons of heavy water and is provided without a safeguards mandate.
28 April 1956	Canada	Uranium fuel	A nuclear cooperation agreement is signed between India and Canada. Canada agrees to supply half of the initial fuel needed for the

			CIRUS reactor.
27 March 1961	United States	Blueprints for a spent fuel reprocessing plant	The US company Vitro International supplies India with blueprints for PUREX (plutonium-uranium extraction) reprocessing. This technical assistance is made possible through the Atoms for Peace program. Indians modify the blueprints during the construction of the plant in Trombay.
1962	Soviet Union	Technical assistance	Two Soviet mining consultants visit Jaduguda to assist the Department of Atomic Energy (DAE) with sinking the main shafts of uranium mines.
1962	Unspecified	Technical assistance	76 Indian nuclear scientists are sent abroad for training.
April 1964	Canada	Technical and monetary assistance and uranium fuel	Canada agrees to give India blueprints for its CANDU pressurized heavy water power reactor (PHWR). This will assist India in building the first reactor of the Rajasthan Atomic Power Station (RAPS). The Canadian Government also extends a $37 million loan to New Delhi for this technology. A safeguards agreement between the two countries allows reciprocal inspection rights of RAPS and the Douglas Point Power Station in Ottawa.
October 1964-October 1969	United States	Two 200MW boiling water reactors and monetary credit	On 8 August 1963, the United States agrees to supply India with two boiling water reactors

			(BWR) for the Tarapur Atomic Power Station (TAPS). In exchange, India agrees to use only safeguarded enriched uranium fuel for the facility. The agreement also includes $80 million in US credit. General Electric, which signed an agreement with the Department of Atomic Energy (DAE) on 8 May 1963, begins building the BWRs in October 1964. The reactors commence commercial operations in October 1969.
Late 1965	United Kingdom	Technical assistance	The UK Atomic Energy Authority helps the Bhabha Atomic research Center (BARC) establish the Gauribidnur Seismic Station north of Bangalore.
December 1966	United States	Small amount of plutonium	India, the United States, and the IAEA sign an agreement that allows the United States to supply India with a small amount of plutonium for research purposes.
16 December 1966	Canada	Technical assistance	Canada agrees to assist India in the construction of a second reactor at Rajasthan (RAPS-2). Strict IAEA safeguards are to be placed on the uranium fuel for this reactor.
1969-1971	France	Technical assistance	A 67.2-ton annual capacity heavy water plant in Baroda is being built with French assistance. A consortium of French firms (GELPRA)

			supervises the design, engineering, and import of equipment for the plant's construction.
1969	France	Technical assistance	As part of an agreement with the Commissariat a l'Energie Atomique, 30 Indian nuclear scientists, engineers, and technicians travel to France to work on designs for a fast breeder reactor.
June 1970	Spain, Sweden, and France	Technical assistance	Indian scientists visit these countries to study advances in uranium ore mining and exploration.
1971-1972	Canada	Two nitriding furnaces	These were procured and commissioned for the nitriding of 17-4PH stainless steel components for fueling machines.
1976-1996	Germany, Spain, Sweden, and other European countries	Equipment for Tarapur Atomic Power Station (TAPS)	Following the 1974 Pokhran peaceful nuclear test, India purchases the majority of equipment for the TAPS boiling water reactors (BWR) from Europe.
1978-1979	United States	Enriched uranium hexafluoride (UF6)	The enriched uranium is used as a fuel source for the Tarapur Atomic Power Station (TAPS). It is fabricated into fuel elements by the Nuclear Fuel Complex (NFC).
1978-1979	France	Technical assistance	The Fast Breeder Test Reactor in Kalpakkam is being built with French assistance. The major components for the reactor are being produced indigenously.
15 February 1980	Finland	Technical assistance	India and Finland sign a memorandum of

			understanding (MoU) regarding Finnish technical assistance in building nuclear reactors in India.
28 May 1980	Soviet Union	Heavy water	India receives the first consignment of heavy water from the USSR. In 1979, the Soviet Union agreed to supply India with 250 tons of heavy water.
5 October 1980	United States	19-ton batch of enriched uranium	After numerous delays, the United States supplies the Tarapur Atomic Power Station (TAPS) with enriched uranium pursuant to its 1963 pledge to provide the facility with 19 tons of enriched uranium annually. A second consignment of 19 tons is delayed indefinitely, however, due to India's refusal to accept full-scope safeguards for all its nuclear facilities.
May 1983	France	19.5 tons of enriched uranium fuel	Pursuant to an agreement signed in November 1982, France agrees to supply enriched uranium fuel for the Tarapur Atomic Power Station (TAPS). This first consignment arrives in May 1983. France halts fuel shipments in 1992.
1983	Norway/West Germany	27.5 tons of heavy water	Norwegian heavy water intended for West Germany is reportedly diverted to Switzerland and then flown to India. The Indian Government refutes these claims.

1983	Soviet Union	4.7 tons of heavy water	Soviet heavy water is combined with the 27.5 tons of Norwegian heavy water that is reportedly diverted to Switzerland. The shipment is then transferred to Mumbai by aircraft.
1983-1984	Norway	Six Type ND 100 and ND 500 computers	The Norwegian firm Norsk Data sells these computers to the Bhabha Atomic Research Center (BARC) for $1.88 million. Norway insists that these computers must not be used in nuclear power plants.
1984-1990	Norway	Computers and technical assistance	Norsk Data (ND) sells approximately 60 computers to India. Although most of these are produced in Norway, the Electronics Corporation of India Limited (ECIL) receives the right to manufacture ND computers under a technology sharing agreement worth nearly $15 million. Norway later refuses further sales or transfers due to fears that its computers will be used for India's nuclear weapons program.
20 March 1986	Norway/Romania	12.5 tons of heavy water	Norwegian-supplied heavy water for the CANDU pressurized heavy water reactors (PHWR) under construction in Cernavoda, Romania is reportedly re-exported to India in March 1986. India denies these claims.

Mid-1980s	China	Heavy water	An Indian official denies claims by the US-based Natural Resources Defense Council that it illegally imported heavy water from China in order to commission three atomic reactors in 1985. An Indian official describes the allegations "utter nonsense."
5 February 1988-5 January 1991	Soviet Union	One Project 670A Skat Series (NATO designation "Charlie-class") nuclear attack submarine (SSN)	The *INS Chakra* arrives in Vizag on 5 February 1988 as part of a three-year lease agreement with the USSR. It is supplied to India for "training purposes." The SSN is returned on 5 January 1991.
1989	West Germany	Beryllium	India imports beryllium from West Germany. This material can be used in the production of nuclear weapons.
8 April 1990	United States	Cray supercomputer	The United States decides to sell a supercomputer to India's Institute of Science (IISc) in Bangalore. The sale is made on the condition that it only be used for peaceful purposes. President George Bush approves the sale on 13 December 1990.
15 June 1992	United Kingdom	Technical assistance	The *Sunday Times* (London) reports that the British entity GEC-Marconi "secretly exported nuclear and missile technology" to India. The firm's exporting branch

			supposedly tried to register equipment bound for the Bhabha Atomic Research Center (BARC) and the Defense Research and Development Organization (DRDO) as medical research materials. India denies these claims.
January 1995	China	30 tons of enriched uranium	India announces that it is buying enriched uranium from China to fuel the Tarapur Atomic Power Station (TAPS). The initial shipment arrives on 5 January and reportedly concurs with IAEA safeguards. By 20 January, three consignments from China total 30 tons of enriched uranium.
1996	United States	One supercomputer	Indian Institute of Science, Bangalore, acquires a supercomputer from Digital Equipment Corporation.
Mid-1990s	Russia	Technical assistance	The Russian submarine entity Rubin is reportedly assisting the Defense Research and Development Organization (DRDO) in developing a 90MW pressurized water reactor (PWR), and a double hull for India's nuclear-powered submarine (Advanced Technology Vessel [ATV]).
March 1997	Australia	Technical assistance	The Australian Nuclear Science and Technology Organization (ASNTO)

			offers to help the Bhabha Atomic Research Center (BARC) identify a location for the disposal of high-level radioactive waste. This will reportedly be done using accelerator mass spectrometry technology.
1998	Russia	Technical assistance	The *Washington Post* reports that India will begin construction of the its Advanced Technology Vessel (ATV) or nuclear submarine within months with Russian assistance.
1998-2001	United States	Five nuclear pulse generators	Despite the 1998 nuclear sanctions, the US firm Berkeley Nucleonics Corporation sold India at least five nuclear pulse generators. Executives of the California-based company are indicted by a San Francisco grand jury on 28 August 2001.
January and February 2001	Russia	Low-enriched uranium (LEU)	The LEU is supplied as a fuel source for the Tarapur Atomic Power Station (TAPS). Although the TAPS facility is under IAEA safeguards, the US Department of State claims that Moscow has broken its nonproliferation commitments.
31 March 2002	Russia	Technical assistance and reactor equipment, machinery, material, fuel, and spare parts	In accordance with an Indo-Russian agreement of 12 February 2002, the construction of two VVER-1000MW reactors begins in Koodankulam (Tamil Nadu). The reactors will be completed

			over a five- to six-year period and media reports indicate that nearly 300 Russian companies are involved in the $1.5 billion project. Construction work for the project will be done by Indian personnel with Russian supervision.

This table includes all types of reported transactions: complete systems, components and special materials, production technologies and information, training and human resources, etc. Updated October 2003

Sources: *Arbeiderbladet* (Oslo); Associated Press; Bharat Rakshak, <http://www.bharat-rakshak.com>; Brahma Chellaney; *Nuclear Proliferation: The U.S.-India Conflict* (New Delhi: Orient Longman, 1993); Department of Atomic Energy, Government of India, "Annual Report: 1962-1963," "Annual Report: 1963-1964," "Annual Report: 1964-1965," "Annual Report: 1969-1970," "Annual Report: 1970-1971," "Brief Annual Report: 1978-1979," "Brief Annual Report: 1983-1984"; British Broadcasting Service; *Dagbladet* (Oslo); *Defense and Foreign Affairs Weekly*; Delhi All India Radio Network; Duetsche Presse-Agentur; Federation of American Scientists, <http://www.fas.org>; George Perkovich, *India's Nuclear Bomb: The Impact on Global Proliferation* (Berkeley, CA: University of California Press, 1999); G.G. Mirchandani, *India's Nuclear Dilemma* (New Delhi: Popular Book Services, 1968); *Indian Express* (Mumbai); Interfax; Itty Abraham, *The Making of the Indian Atomic Bomb* (London: Zed Books, 1998); K.K. Pathak, *Nuclear Policy of India* (New Delhi: Gitanjali, 1980); *Muslim* (Islamabad); Lexis-Nexis Academic Universe: <http://www.web.lexis-nexis.com>; *New York Times*; *Nuclear Engineering International*; *Nuclear Fuel*; *Nucleonics Week*; Press Trust of India; Robert Wohlstetter, *Absent-Minded Peaceful Aid and the Indian Bomb* (Los Angeles: Pan Heuristics, 1977); *Reuters*; Shyam Bhatia, *India's Nuclear Bomb* (Ghaziabad: Vikas, 1979); *Telegraph* (Kolkata); *Times of India* (Mumbai); *Washington Post*; Xinhua General Overseas News Service.

INDIAN NUCLEAR EXPORTS

Year/Date	Importer	Item(s)	Remarks
1965	Belgium	11 tons of heavy water	In 1992, Atomic Energy Commission (AEC) Chairman P.K. Iyengar claims that the Department of Atomic Energy (DAE) exported heavy water to Belgium in 1965.

1970-1972	West Germany	Thorium-uranium blocks and strips	The Atomic Fuels Division of the Bhabha Atomic Research Center (BARC) supplies these materials to the Julich Atomic Research Center under a cooperative agreement.
1970-1971	Europe, Japan, and the United States	Chloride	The Department of Atomic Energy's (DAE) Indian Rare Earths Limited (IREL) enters into contracts with several countries for the sale of chloride.
1971-1972	Canada	10kg of sinterable-grade thoria powder	Thoria powder is sent to Atomic Energy of Canada Limited for testing purposes.
1971-1972	Switzerland	Thorium foils and wires	These materials are supplied to the Swiss company Minerals AG, Schwz.
1977-1978	United States	500 tons of beryl ore	This consignment is sent from the Kodarma Mines in Bihar to Philadelphia.
1979-1980	United States	Ilmenite	Indian Rare Earths Limited (IREL) concludes a contract to sell ilmenite to the United States. U.S. sales for 1979-1980 total $12.9 million.
1982-1983	Burma	Gamma Chamber-4000 A	Bhabha Atomic Research Center (BARC) exports one of these units to Burma.
1982-1983	Indonesia	Lasers	BARC exports lasers to the Atomic Energy Agency of Indonesia.
1983-1984	Indonesia, Syria, Tanzania, and Zambia	130 consignments of radio-labeled phosphates	The exact distribution of these phosphates among the named countries is unspecified.
1983-1984	Singapore	One gamma chamber	One gamma chamber is exported to Singapore.
1983-1984	Sudan	One gamma chamber	One gamma chamber is exported to Sudan.

1983-1984	United Kingdom	Neutron spectrometer	The spectrometer was designed and produced for the Rutherford Appleton Laboratory.
1983-1984	South Korea	Neutron polarization analysis spectrometer	This BARC-designed spectrometer is eventually installed in the Korean Atomic Energy Research Institute.
1985-1986	Bulgaria	Seamless titanium tubes	These were produced by the Nuclear Fuel Complex (NFC) from ingots supplied by Mishra Dhatu Nigam Limited (MIDHANI).
April 1990	Vietnam	Technical assistance	While visiting Vietnam to study uranium resources, the DAE informs a Vietnamese delegation that a pilot plan for monazite processing is in the final stages of completion. This plan is intended as "a gift" to Vietnam.
June 1990	Unspecified	Technical assistance and nuclear-related products	At the June 1990 meeting of the IAEA Board of Governors in Vienna, Atomic Energy Commission (AEC) Chairman P.K. Iyengar formally offers to export nuclear technology and products for industrial and medical purposes. Nine categories of services are offered including the production of composites by radiation, polymerization, gamma irradiators, radio-immunoassay counters, radio chemicals, medical preparations, special tracers and tracer complexes, labeled nutrients, pesticides, and inorganic compounds.
December 1990	Egypt	Technical assistance	Under a five-year cooperation agreement for the peaceful use of nuclear energy, India agrees to aid Egyptian experts in increasing the capacity of the Egyptian research reactor from two to five megawatts.

November 1991	Iran	Proposed sale of a 10MW nuclear research reactor	The AEC confirms in November 1991 that it has made an offer to sell a research reactor to Iran. India cancels the proposed sale in late November after "stiff criticism" from the United States.
1991-1992	Syria, Vietnam, Jordan, Zambia, Egypt, and Nigeria	Technical assistance	Under an Indo-IAEA agreement, 13 scientists from six countries receive uranium exploration and laboratory training in India.
1991-1992	Norway	Ilmenite	Ilmenite from Orissa is sold to Norway for the first time.
1991-1992	Japan	Synthetic rutile	Japan serves as a trial customer for the pilot sale of synthetic rutile.
1993-1994	Unspecified	Technical assistance	Fourteen BARC scientists travel to unspecified countries on behalf of the IAEA.
1994-1995	Sri Lanka	Technical assistance	Under the IAEA's Technical Assistance Program, the BARC lends its expertise in the gamma scanning of distillation columns. This will reportedly benefit the Sri Lankan petrochemical industry.
1994-1995	Peru	Gamma camera PC interface card	IAEA installs this product in Peru through the DAE.
May 1995	Iran	Technical assistance	According to an Israeli report, India and Iran have accelerated cooperation in nuclear research. This includes the sending of Indian nuclear experts to Iran.
1996-1998	South Korea	Heavy water and nuclear grade zircaloy	According to the Indian embassy in Washington, DC, $35,800 worth of heavy water was shipped to South Korea between 1996-1998. Approximately $584,000 worth of nuclear grade zircaloy was also exported to

			South Korea during this time period.
20 January 1997	South Korea, United States, France and "Nuclear Club" countries	Reactor materials	K.K. Sinha, Chief Executive of India's Nuclear Fuel Complex (NFC), tells a news agency that the NFC has exported reactor materials to Korea and "Nuclear Club" countries.
July 1997	United States	Thorium oxide ceramic buttons (500 pieces)	These nuclear related materials are imported by General Electric.
July 1997	United States	Zirconium	In an interview with *Business Line*, an Atomic Energy Commission (AEC) representative states that zirconium was exported to the United States by the Nuclear Fuel Complex (NFC).
May-June 1998	South Korea	100 metric tons of heavy water	The Korean Electricity Power Corporation (KEPCO) imports heavy water valued at $22.75 million. The original agreement was signed in May 1994 between the Department of Atomic Energy (DAE) and KEPCO.
1998-1999	Latin American, Asian, and African countries	Gamma Camera Interface Cards	These are exported by BARC through the IAEA.
October 2000	South Korea	16 metric tons of heavy water	This consignment, which was exported by the DAE's Heavy Water Board, reportedly met the technical requirements of the Korean Electricity Power Corporation (KEPCO).
2000-2001	Unspecified	Technical assistance	Under IAEA programs and bilateral agreements, approximately 82 foreign scientists train in India.
2001-2002	Vietnam	Technical assistance	Scientists from Vietnam receive training in uranium fuel production, zircaloy structural

			components, and analytical techniques at the Nuclear Fuel Complex (NFC).
10 January 2002	Vietnam	Technical and monetary assistance	A nuclear science center in Dalat City is inaugurated by the Director of the Bhabha Atomic Research Center (BARC) and the Vietnamese Vice Minister of Science. India contributed approximately $215,000 for the project and provided five personnel to train Vietnamese scientists at the center. The original agreement for this cooperation was signed on 19 January 1999.

This table includes all types of reported transactions: complete systems, components and special materials, production technologies and information, training and human resources, etc. Updated October 2003

Sources:

Department of Atomic Energy, Government of India, "Annual Report: 1970-1971," "Annual Report: 1971-1972," "Annual Report: 1977-1978," "Annual Report: 1979-1980," "Annual Report: 1982-1983," "Annual Report: 1983-1984," "Annual Report: 1985-1986," "Annual Report: 1991-1992," "Annual Report: 1993-1994," "Annual Report: 1994-1995," "Annual Report: 1998-1999," "Annual Report: 2000-2001," "Annual Report: 2001-2002"; *Business Line*, Cairo MENA, *Deccan Herald* (Bangalore), Embassy of India (Washington, DC), http://www.indianembassy.org; Inter Press Service; *Ma'ariv* (Tel Aviv); *Nuclear Engineering International; Nucleonics Week;* Press Trust of India, Stichting Antenna, http://www.antenna.nl; *The Hindu* (Chennai).