

# Clandestine Nuclear Trade and the Threat of Nuclear Terrorism

*Leonard S. Spector*

**C**landestine nuclear dealings have long threatened international efforts to halt the spread of nuclear arms and could contribute to the risk of future nuclear terrorism. Today, this nuclear netherworld embraces a broad range of activities, including outright smuggling, the quiet exploitation of loopholes in nuclear export controls, the purchase of nuclear goods under false pretenses, and secret R&D work on nuclear weapons themselves.

Fortunately, these activities fall short of constituting a black market comparable to that for illicit drugs or conventional arms. For now, virtually all the activities in the nuclear underground are pursued at the behest of a small number of national governments rather than by criminal, dissident, or terrorist groups. There appear to be few, if any, independent, free-standing smuggling networks. Furthermore, the commodities ultimately being sought—nuclear weapons and nuclear weapons material—do not appear to be for sale, only the equipment and technology needed by national governments to build the plants to produce them are commercially available.<sup>1</sup>

Still, this nuclear netherworld may ultimately contribute to the danger of nuclear terrorism in at least three ways. First, as national governments exploit this underground market and nuclear weapons spread to additional states, the possibility that terrorists will gain access to them will grow. Such weapons in nuclear threshold countries are likely to be more vulnerable to terrorist seizure than they are in today's more advanced nuclear weapons states. Moreover, depending on its alignment, an emerging nuclear weapons state could conceivably seek to advance its own political goals by sharing those weapons with ostensibly independent terrorist groups whose actions it could later disclaim.

---

The author wishes to thank Theodore Hirsch, an intern at the Carnegie Endowment for International Peace, for his help in preparing this report.

Second, terrorist groups might seek to exploit the nuclear gray market themselves, using the same subterfuges that national governments use. Although in today's nuclear netherworld, subnational groups cannot obtain nuclear arms or nuclear weapons material and cannot hope to build the complex installations needed to produce the latter, they might be able to engage in a form of barter with sympathetic emerging nuclear states (for example, offering raw materials or needed nuclear hardware in return for nuclear weapons material).<sup>2</sup> No cases of such barter arrangements involving terrorist groups have come to light, but it has been reported that one national government, Libya, provided uranium concentrate to Pakistan in the possible hope of receiving nuclear weapons or sensitive nuclear technology in return.<sup>3</sup> U.S. officials disclaim the possibility that Pakistan would have offered such a *quid pro quo*.

Finally, there is always the risk that nuclear arms or nuclear weapon materials will someday become available on the nuclear black market. There is evidence indicating that terrorist organizations might well be interested in acquiring such items. Understanding underground nuclear commerce in its current form is essential to preventing such future dangers.

## **Rules for Legitimate Nuclear Commerce**

The cornerstone of current nuclear export controls is an agreement among the nuclear suppliers—in essence, the advanced industrialized nations, including those in the Eastern bloc—to require that their nuclear exports be subject to audits and inspections in recipient nations by the International Atomic Energy Agency (IAEA). Suppliers have adopted this requirement for IAEA safeguards under the Nuclear Suppliers' Guidelines they negotiated in 1976. The requirement is also mandated by the 1970 Non-Proliferation Treaty (NPT), which has been signed by all the suppliers except France.<sup>4</sup>

The commodities that trigger the application of safeguards in recipient countries are worked out in negotiations among the suppliers and are specified in an agreed-upon trigger list, which is updated from time to time. Manufacturers seeking to export items on this list must report their proposed sales to the supplier country authorities and obtain export licenses so that these authorities can verify the intention of the recipient country to apply the required safeguards.

Many recipient countries are themselves parties to the NPT and as such have agreed to place all their nuclear activities under IAEA inspection. However, Argentina, Brazil, India, Israel, Pakistan, and South Africa have not joined the pact. To support their growing nuclear weapon capabilities, many of these nonsignatories have quietly attempted to obtain nuclear commodities

without being subject to IAEA safeguards Iraq, although an NPT signatory, may have done likewise

In addition to the safeguards requirement, the supplier nations have agreed to exercise restraint in the sale of the most sensitive nuclear facilities These include reprocessing plants, which extract weapons-usable plutonium from spent reactor fuel, and enrichment installations, which can upgrade uranium from its natural state to weapons grade Since France cancelled its proposed sales of reprocessing plants to the Republic of Korea and Pakistan in the late 1970s, there have been no sales of those installations The very success of these efforts to curtail commercial sales of sensitive nuclear plants, however, has driven would-be purchasers to the nuclear underground, where at least the components for these facilities can sometimes be obtained

The export of related dual-use commodities—items having both nuclear and nonnuclear uses—is controlled partly through the suppliers' trigger list In the West, many of these items are also controlled through a separate export control system (known as the COCOM regime), established to prevent exports of strategic items to the Soviet Union and Eastern Europe<sup>5</sup> Licenses are required for these exports, but IAEA safeguards need not necessarily be applied in the recipient nation because the basis for granting the relevant export license is often that the export not be destined for a nuclear end use Dual-use items controlled through these mechanisms include advanced computers potentially useful for designing nuclear weapons, equipment for nuclear weapons testing, and electronics and hardware potentially usable in nuclear weapons themselves

Despite their seeming comprehensiveness, these controls are far from being wholly effective As a stream of recent prosecutions has shown, they are subject to continuous assault by a number of emerging nuclear nations intent on using the nuclear netherworld The prosecutions provide hard evidence of clandestine nuclear trade and also show the relative leniency accorded offenders, a factor that may encourage would-be nuclear terrorists to exploit the nuclear gray market in the years ahead

## **Illicit Nuclear Trade**

Perhaps the most egregious case of nuclear smuggling in the recent past took place between 1977 and 1980, when Albrecht Migule, a West German businessman, shipped a nuclear plant to Pakistan in sixty-two truckloads and provided a team of West German engineers to supervise its construction The facility processes natural uranium into easily gasified uranium hexafluoride so that it can be enriched for possible use in nuclear arms Thus the plant is a critical building block in Pakistan's nuclear weapons program—in the words of one West German official, providing the “yeast for the cake”<sup>6</sup>

Unlike many other nuclear smugglers, Migule was tried and convicted for exporting the \$6 million plant in 1985 He received only a \$10,000 fine

and an eight-month suspended sentence.<sup>7</sup> The facility he supplied, now believed to be operating in the town of Dera Ghazi Khan, contributes to fears that Pakistan will soon have the bomb.

Similarly, in 1976 and 1977, the Dutch automobile transmission manufacturer, Van Doorne Transmissie, exported 6,500 tubes of specially hardened steel to Pakistan, despite warnings from the Dutch government. The tubes were intended to encase high-speed centrifuges at Pakistan's sensitive Kahuta enrichment plant, a facility that may soon produce weapons-grade uranium.<sup>8</sup> Although Van Doorne executives had acknowledged to one Dutch official that the tubes were destined for the Pakistani enrichment program, the businessmen were acquitted at their 1985 trial because of ambiguities in Dutch regulations implementing the Nuclear Suppliers' Guidelines.<sup>9</sup>

Other recent criminal and civil proceedings for similar acts of nuclear smuggling include the following:

The prosecution of the Dutch firm Fysisch Dynamisch Onderzoekslaboratorium (Physical Dynamics Laboratory) for illegally exporting in 1976 specially designed measuring equipment for Pakistan's classified Kahuta uranium enrichment plant.<sup>10</sup>

The prosecution of Henk Slebos in the Netherlands for illegally exporting to Pakistan in 1983 a wide-band oscilloscope potentially useful in helping run the Kahuta plant.<sup>11</sup>

The prosecution in Canada of Abdul Aziz Khan and two accomplices for the illegal export to Pakistan in 1980 of electronic components for inverters, devices used to regulate the speed of centrifuges of the type used in the Kahuta plant.<sup>12</sup>

US Commerce Department proceedings against Sarfraz Mir and Albert Goldberg for illegally attempting in 1981 to export zirconium metal (used to sheathe uranium fuel for reactors) to Pakistan, labeled as "mountain-climbing equipment."<sup>13</sup>

The prosecution in Houston, Texas, of Nazir Vaid for attempting illegally to export to Pakistan in 1984 50 krytrons (high-speed electronic switches used in nuclear weapons).<sup>14</sup>

The prosecution of Richard Smyth for illegally exporting 810 krytrons to Israel between 1980 and 1983.<sup>15</sup>

The prosecution of Man Chung Tong, in Los Angeles, for attempting to export high-technology equipment to the People's Republic of China in 1983 and 1984, including special Polaroid film, measuring devices, and computers said to be destined for China's nuclear test site at Lop Nor.<sup>16</sup>

In April 1986, the West German weekly *Stern* carried a lengthy account of yet another nuclear smuggling operation involving Pakistan that was con-

cluded in August 1985—and whose perpetrators have apparently not been brought to justice. The account offers a detailed look at the intricacies of such operations.

On August 10, 1985, according to *Stern*, a shipping company, Global International Transport, moved 880 kilograms (1,936 pounds) of specially hardened maraging steel to a Karachi address.<sup>17</sup> The steel had been fabricated into round bars whose diameter exactly matched that of a German-designed uranium enrichment centrifuge of the type Pakistan is believed to be building at Kahuta.<sup>18</sup> Maraging steel is on the list of items of the Nuclear Suppliers' Group that require special export licenses to ensure either that the export will not be used for nuclear purposes or that it will be used only in a nuclear installation covered by IAEA safeguards. The Kahuta enrichment plant is not so covered.

According to *Stern*, a small London steel-trading firm, Lizrose Ltd, originally ordered the maraging steel from the Arbed Corporation of Voelklingen, West Germany, in October 1984. Lizrose is run by Inam Ullah Shah, a man of Pakistani descent. Western intelligence agents learned of the order and persuaded Arbed not to go through with it. Two weeks afterward, Arbed received a second order for the same material from Mark Blok, a Cologne steel dealer, who is married to a Pakistani and is said to be a friend of Inam Shah. Blok had the material delivered to a Cologne warehouse, thus avoiding the need for Arbed to obtain an export license. The material was then shipped to Hamburg and on to Karachi by Global Transport, presumably under false labeling.<sup>19</sup>

Although these episodes all involve smuggling activities undertaken to advance the nuclear weapons programs of national governments, one case that has been the subject of a prosecution initiated in 1984 by the Italian government raises the possibility that a subnational group, the Palestine Liberation Organization (PLO), may have sought to exploit the nuclear netherworld. The case is also unusual because it involves an offer to sell nuclear weapons and nuclear weapons-usable plutonium rather than merely the technology and equipment needed to derive these coveted products. Fortunately, it appears virtually certain that the would-be purveyors never actually possessed these items.

The central figure in these illicit dealings, and a defendant named in the Italian indictment, was Glauco Partel, an Italian rocket engineer who served as an intermediary for back-channel suppliers of conventional arms. In early 1982, Partel, at the initiative of an Australian arms dealer, Eugene Bartholomeus, began offering three atomic weapons for sale—weapons that Partel subsequently acknowledged did not exist—to a series of potential buyers with connections to Arab interests in the Middle East.<sup>20</sup> In all likelihood, Partel and Bartholomeus intended to use the nuclear weapons as bait to attract buyers, who would then be told that these weapons were not available.

but that Partel and company could provide a variety of conventional arms instead

One telex from Partel in the prosecutor's dossier on the case gave the following details on the offering of the weapons to another intermediary with close contacts to the Syrian government

Terms of offer Power of units same as Japanese original ones (20kt) Delivery will be effected in buyer's country The 3 units are being assembled now and will be ready for delivery in the first week of March [1982] Testing [without a detonation] will be effected in a neutral country of Europe at [sic] the presence of the seller and buyer reps/experts Selling people will arrange for transportation This unit have [sic] not been offered elsewhere Net price for the 3 units delivered is USD 924 millions Deposit of 462 millions On delivery the balance will be paid <sup>21</sup>

Other telexes to or from Partel obtained by the prosecution specified that the weapons weighed 90 kilograms (198 pounds) each, contained 40 kilograms (88 pounds) of weapons-grade uranium (sufficient for a Hiroshima-size weapon), and measured 41 inches by 11 inches <sup>22</sup>

Although Partel's approach to Syria apparently fell through, telexes from the prosecutor's file grouped under the heading "A-bombs, Arabs" appear to indicate that Partel did bring one and possibly more groups into serious negotiations for the weapons One of these initiatives sent Partel and a colleague on a trip to Iraq In a March 30, 1982, cable to Bartholomeus while he was in Sydney, Australia, Partel linked the PLO to the "three toys," a term considered by the Italian prosecutor and others who have examined the entire court file to be a code for the three atomic bombs

This is the first in a series of TLXS reporting on our trip to Baghdad presenting the general picture of the whole situation It was apparent that the first operation—the supply of specific armaments to Iraq—is the security key for the men involved in the operation of the three toys By successful completion of the first operation the men in question are to receive [sic] the official protection of the Iraqi services throughout the Middle East and Europe (not only with regard to Israel but also with nonfriendly Arab countries) In other words, the two deals were interconnected *We were introduced at the top Iraqi military and political levels by the PLO men responsible for the three toys and by the Iraqi services* <sup>23</sup>

This reference to the PLO is the only one in the dossier in connection with nuclear devices While hardly conclusive evidence (Partel may have been inflating the accomplishments of his trip), it is at least an indication of PLO interest in the acquisition of nuclear arms, either directly or through the organization's ties with the Iraqi government

The same telex describes Iraq's apparent interest in acquiring 33.9 kilograms (74 pounds) of plutonium from Partel's group—plutonium Partel later maintained was available to the smugglers, although this possibility seems extremely unlikely. "As for the offers submitted to Iraq, the Chief of Armaments told us they are interested in SAM-7 [surface-to-air missiles] mortars, AH-1s [helicopters] armed with TOWS [wire guided anti-tank missiles], plutonium, Glauco's secret rocket system."<sup>24</sup> Although Partel stated in a subsequent interview that Iraq continued to pursue the plutonium offer through the summer of 1982 (a claim seemingly supported by telexes among Partel and his cohorts in the court file), the deal fell through in August, when Partel's group proved unable to supply samples of the material for inspection.

In the end, the episode seems to reveal that at least one terrorist group, and at least one nation that has supported such groups in the past, are interested in acquiring nuclear weapons clandestinely. On the other hand, the Partel affair also supports the view that despite the existence of seemingly willing buyers, such weapons and the key materials needed for their fabrication remain unavailable in the international marketplace.

## **Preventive Measures**

Clandestine trade in nuclear-related commodities that are further removed from nuclear weapons may still contribute to nuclear terrorism in the future. Curtailing such clandestine trade is essential to reducing these risks. As a first step, efforts to prosecute nuclear smugglers must be intensified and the penalties increased. In Western Europe, criminal laws and export regulations need strengthening, and the United States is urging its allies to move in this direction. In the United States, where statutory penalties are already tough, the problem is inadequate coordination and follow-through of law enforcement efforts.<sup>25</sup> The best remedy for such case management shortcomings is more active oversight by senior officials in the executive branch and Congress. One approach would be to designate a ranking nonproliferation aide at the State Department as responsible for coordinating with appropriate Justice Department officials all nuclear prosecutions and for reporting annually on these activities to Congress.

At least as important is the need to take diplomatic action against the national governments that are directing and benefiting from today's nuclear smuggling activities. These nations should be condemned in international fora, and aggrieved nuclear supplier states, particularly when they have obtained convictions for smuggling, should strongly confront the nation responsible and demand that the illegally obtained goods be returned, mothballed, or placed under IAEA safeguards so they cannot contribute to the development of nuclear arms.

Fortunately the nuclear netherworld remains fraught with obstacles as a route to nuclear terrorism. The existing regime of export controls and international safeguards continues to restrict merchants in the nuclear gray market to the sale of components for production that are many steps removed from the coveted atomic weapons themselves. Nevertheless, this success should not be taken as a cue for complacency. The continued circumvention of nonproliferation measures by national governments not only increases the risk of nuclear terrorism by facilitating the spread of nuclear arms, it also invites subnational groups to enter the world of clandestine nuclear trade themselves, if only to obtain items for barter. Thus, the tightening of proliferation constraints must be part of any long-term strategy for curbing the threat of nuclear terrorism.

## Notes

1 This may not always have been the case. In the mid-1960s, Israel is believed to have diverted weapons-usable highly enriched uranium from a plant in Apollo, Pennsylvania, run by the Nuclear Materials and Equipment Corporation (NUMEC). No additional diversions of nuclear weapons material are believed to have occurred. Although offers to sell such material have been made from time to time, apparently they have all been hoaxes.

2 Nuclear commodities could, of course, be bartered for nonnuclear implements of terrorism, such as high explosives or rockets, thereby contributing to an intensification of terrorist activities, although not at the nuclear level.

3 John J. Fialka, "West Concerned by Signs of Libyan-Pakistani A-Effort," *Washington Star*, November 25, 1979.

4 The suppliers' guidelines are set forth in International Atomic Energy Agency document INFCIRC/254, the parallel requirements applicable to NPT parties are specified in IAEA document INFCIRC/209/Add 2.

5 COCOM is an acronym for Coordinating Committee, an informal organization of Western governments that meets periodically to ensure consistency in the implementation of member nations' respective export control systems. In the United States the principal statutes establishing export controls over strategic goods are the Arms Export Control Act and the Export Administration Act.

6 "Waffenschmied Deutschland" [Weaponsmaker Germany], *Stern*, November 14, 1984, and interview with a West German official, March, 1985.

7 "Achte Monate au Bewahrung fur Albrecht Migule" [Albrecht Migule receives eight months' probation], *Badische Zeitung* (Freibourg), March 12, 1985, and interviews with the presiding judge and West German foreign ministry officials, May 1985.

8 "Report of the Inter-Ministerial Working Party for Investigating the 'Khan Affair,'" Foreign Ministry of the Netherlands (mimeo, English version), p. 16, and interviews with Dutch prosecutors and foreign ministry officials, May 1985.

9 The defendants had little to fear in any event. Had they been convicted, each would have received a \$6,000 fine and a one-month suspended sentence.



10 The firm was also acquitted because of ambiguities in Dutch law Violet Cotterell, "Boetes geeist voor verboden export" [Fines demanded for forbidden exports], *Parool* (Amsterdam), October 30, 1984

11 Slebos received a six-month suspended sentence and a modest fine Details of the Slebos prosecution are based on interviews with Dutch and US officials, July 1985, see also "Israel's Uranium," *Foreign Report*, July 19, 1985

12 Khan was acquitted after the prosecution failed to prove the inverters had been exported The others pleaded guilty and received \$3,000 fines John J Fialka, "How Pakistan Secured US Devices in Canada to Make Atomic Arms," *Wall Street Journal*, November 26, 1984, and interview with the Canadian prosecutor, July 1985

13 Mir was never apprehended, Goldberg's export privileges were suspended indefinitely Leslie Maitland, "US Studying Foiled Bid to Export a Key Reactor Metal to Pakistan," *New York Times*, November 20, 1981

14 Vaid pleaded guilty after three months' pretrial detention and was deported to Pakistan Seymour M Hersh, "Pakistani in US Sought to Ship A-Bomb Trigger," *New York Times*, February 25, 1985

15 Smyth disappeared before his trial, the krytrons not in use were returned by Israel, which told the United States that the others were being employed for nonnuclear purposes John M Goshko, "LA Man Indicted in Export of Potential Nuclear Bomb Component to Israel," *Washington Post*, May 17, 1985, US House Subcommittee on Europe and the Middle East, *Hearings on Developments in the Middle East*, 99th Cong, 1st sess, July 24, 1985, and John J Fialka, "Investigators in Pollard Case Confront History of Accommodation by US, Israeli Spy Agencies," *Wall Street Journal*, December 18, 1985

16 Tong jumped his \$350,000 bail and did not appear for trial Ronald L Soble, "US Investigates Illegal High-Tech Exports to China," *Los Angeles Times*, April 11, 1984 Regarding other alleged high-technology smuggling for China, see Maureen Dowd, "5 Named in Plot to Send Peking High-Tech Gear," *New York Times*, February 13, 1984, and telephone communication with the assistant US attorney in charge of the prosecution, winter 1985

17 Egmont Koch and Simon Henderson, "Auf dunken Wegen zur Atommacht" [Secret routes to the bomb], *Stern*, April 30, 1986, p 52

18 "Report of the Interministerial Working Party Responsible for Investigating the 'Kahn Affair,'" Foreign Ministry of the Netherlands Dr A Q Khan, a German-trained metallurgist, is thought to have obtained classified information on this design in the course of his work in 1975 for the Dutch enrichment program at Almelo, where the West German design was being vetted

19 The Pakistani embassy in Bonn, the *Stern* report states, was involved in the operation from the beginning A few weeks after the first order was placed with Arbed, Pakistan's military attaché visited the steelworks and showed considerable interest in specialized steels The most damning piece of evidence of involvement by the Pakistan government, however, is that Global International Transport sent the shipping documents and its invoice for shipping the material to the Pakistani embassy in Bonn for payment According to a short note dated August 20, which authors Koch and Henderson apparently obtained in the course of their investigation, the shipping documents and the invoice, numbered 12240 in the amount of deutschemark (DM) 1,373 38

(about \$660), were sent to embassy counselor Azmat Ullah “per telephone conversation with Mr Shaw,” an alias of Inam Shah

20 This discussion is based on an examination of the documents in the prosecutor’s file on the indictment, an in-person interview with one defendant (Gluco Partel) and a telephone interview with a second (Carlo Bertoncini), talks with journalists covering the case, and the following news reports “Iraq’s Bid for Plutonium Foiled,” *Energy Daily*, June 15, 1984, “Bombes A d’Occase” [Second-hand A-bombs], *Le Matin*, June 20, 1984, p 11, “Le Marché noir de la mort atomique,” [The black market in atomic death], *Le Nouvel observateur*, June 22, 1984, p 35, “Unfassbar! Europäische Waffenmafia Liefert Atombomben frei Haus” [Incredible! European weapons mafia delivers atomic bombs C O D ], *Bunte*, August 9, 1984, p 102, Peter Nichols, “Judge in a Hurry Indicts 37,” *Times* (London), November 19, 1984, E J Dionne, Jr “Italian Case Uncovers an Alpine Heart of Darkness,” *New York Times*, November 24, 1984, and “Atomica Connection” [Atomic connection], *Il Mondo*, February 25, 1985, p 42 Significant assistance was also provided to the author by the ABC “Closeup” television documentary team that investigated this story in depth in the course of preparing a three-hour documentary, “The Fire Unleashed,” which aired on June 6, 1985

21 Prosecutor’s file, p 3762

22 Ibid , p 3754

23 Ibid , p 3783 Emphasis added

24 Ibid

25 Nazir Vaid, for example, was apparently let off lightly because the prosecutor in that case thought that evidence clearly linking Vaid’s krytrons to the Pakistani nuclear program was lacking As investigative journalist Seymour Hersh has brought out, however, the prosecution had subpoenaed a cable showing that the krytrons were ordered in Pakistan by one SA Butt—a figure unknown to the prosecutor in the Vaid case but known well to State Department experts as a man long involved in Pakistan’s clandestine nuclear affairs Although it was supposedly monitoring the case closely, State apparently failed to alert the prosecutor to this key fact Hersh, “Pakistan in US” In the Smyth and Tong proceedings, a different case management problem arose the failure to take adequate measures to prevent the flight of the defendants