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Programme for Promoting Nuclear Non-Proliferation, Newsbrief, Number 9

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Summary:

A compilation of the latest news, events, and publications related to nuclear weapons and nuclear non-proliferation. The “Newsbrief” was produced by the PPNN and personally edited by Ben Sanders.

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PROGRAMME FOR PROMOTING NUCLEAR NON-PROLIFERATION

Number 9 **NEWSBRIEF** **Spring 1990**

Editorial note

The ninth issue of the **Newsbrief** published by the Programme for Promoting Nuclear Non-Proliferation covers events in the area of nuclear non-proliferation during the first quarter of 1990.

The PPNN **Newsbrief** carries information relating to the spread of nuclear-weapon capabilities to additional States as well as reports on developments tending to deter that spread. It also contains references to related questions of arms control and to diplomatic, economic and technical issues that may affect nuclear non-proliferation.

Items selected for inclusion in the **Newsbrief** are based on reports from reputable sources only. Every attempt is made to present them objectively and in a balanced manner, without commenting on their validity. The Chairman of the PPNN Core Group acts as editor of the **Newsbrief** and is responsible for its contents. Unless expressly stated, the inclusion of an item does not imply the agreement of the members of the Core Group collectively or individually with its substance or with its relevance to the Programme.

Readers who wish to comment on items included in the **Newsbrief**, or to draw attention to information they feel should be included, are invited to send their remarks to the editor, so they may be published in a subsequent issue. A letter from Prof. Marvin Miller of the Massachusetts Institute of Technology (M.I.T.), commenting on the contents of the Programme's fourth 'Occasional Paper', is reproduced in this issue.

The **Newsbrief** is sent free of charge to institutions and persons interested in nuclear non-proliferation. Copies of previous issues are available upon request.

The aims and activities of the Programme for Promoting Nuclear Non-Proliferation (PPNN), under whose aegis the **Newsbrief** is published, are described briefly at the end of this issue.

I. Topical developments

a. Background

Once again, the **Newsbrief** appears at a time of rapid change in inter-state relations in several parts of the world. Besides affecting the international situation in general, the events of the past months are likely to have an impact also on the nuclear non-proliferation scene.

Relations between the major nuclear powers have continued to improve, although there is speculation about the effect of current events in the Baltic area. There has again been progress in several sets of negotiations, including the talks on a major cut in strategic nuclear delivery vehicles and on banning chemical weapons. American military authorities have been quoted as saying that when the treaty on the reduction of conventional forces in Europe comes into effect, that is now being negotiated in Vienna, NATO will be able to defend its territory by non-nuclear means. The 'Open Skies' discussions between the major military alliances may lead to the adoption of aerial observation procedures that might eventually also serve to verify nuclear non-proliferation measures.

The editor wishes to draw the reader's special attention to several events and situations referred to in this issue of the **Newsbrief**.

Among **Other Non-Proliferation Developments**, the agreement between India and Pakistan prohibiting attacks on each other's nuclear installations is interesting as a possible step towards the diffusion of the nuclear rivalry between these states (see section c, page 3). Similarly, nuclear co-operation between Argentina and Brazil seems to be continuing also after the change of government in both countries (see section d, **Nuclear Trade and International Cooperation**, page 3), reflecting solid progress in relations in an area which at one time seemed fraught with potential conflict.

Section d, **Nuclear Trade and International Cooperation**, refers to increased East/West cooperation on nuclear matters, following recent political developments in the Eastern part of Europe. However, the economic aspects of those developments, and the emergence, for the first time, of open environmental resistance, may in the near future also act to restrain the use of nuclear energy in some of the states concerned, as reflected in section f, **Peaceful Nuclear Developments**. Several items under that heading illustrate that over-all the use of nuclear energy for power generation is still increasing. On the supply side, Argentina and the Republic of Korea appear to be emerging as possible new sources of research and power reactors (pages 4-6). In South Africa, the pilot plant for the enrichment of uranium, which had been operating since 1978 and is known to have been used to produce highly-enriched uranium, has been closed down (page 5). France's supply of a reactor to Pakistan may run into a snag as a result of the policy of France's partner in that supply, West Germany, to require full-scope safeguards. It is not yet certain if the Bonn Government will insist on that requirement also in the case of joint supply; moreover, its

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policy apparently extends only to safeguards on all nuclear material present in the recipient country at the time of supply (page 4).

In the area of arms control and disarmament, proposals for intrusive and wide-ranging verification are now standard elements of the negotiations. Exchanges of data unheard of until recently, such as information on military budgets, have become an accepted part of the discussions between the two major military alliances. But while there seems to be concrete progress in the scientific and technical aspects of monitoring nuclear-weapons tests, since the conclusion of the Partial Test Ban Treaty in 1963 there has been little or no change in the political situation in that area. As noted under section g, pages 6-7, **Developments of Concern for Vertical Proliferation**, this seems to be largely due to renewed American inflexibility with respect to a resumption of negotiations on a comprehensive test-ban treaty.

Other United States items recorded under the same heading (see pages 6-7) highlight links between disarmament negotiations, the size of the military budget and the development of new weapon systems and show how a reduction in one area may lead to a trade-off against new developments in another. Especially in the light of the large budget deficit, the current decrease in the military strength of the Warsaw Pact is causing extra careful scrutiny of the military budget as presented by the American Administration. Given present needs for economy it is unlikely that the Congress will approve all the proposals for the reconstruction or replacement of defective or over-age nuclear material production plants. In this context, ideas for a cut-off in the production of nuclear material for military purposes remain relevant.

There is reason for anxiety about several of the events referred to as **Developments of Concern for Horizontal Proliferation** (pages 7-8).

Reports that Iraq may have tried to obtain devices to trigger nuclear detonations (page 7) are inevitably seen in conjunction with the news that it is seeking to develop a uranium enrichment capability and has tested a medium-range ballistic missile. Iraq is a party to the NPT.

Evidence that North Korea may have constructed a reactor and the ancillary plant that would enable it to produce plutonium for military purposes (page 7) is the more distressing as that nation is a party to the NPT. It has not so far concluded the safeguards agreement with the IAEA which would permit it to demonstrate the innocence of its nuclear activities.

In 1989, statements by Rumania's former chief of state, about that country's ability to produce nuclear weapons, raised suspicions about its ambitions in that regard. The matter is now under investigation (page 8). This shows how, even if they do not reflect national policy, public utterances of this kind are manifestly harmful to the confidence generated by the state's adherence to the NPT.

News of the acquisition of missile capabilities by non-nuclear-weapon states (pages 7 and 8) has become an integral part of the proliferation scene. A report of January 22, 1990, from the Nuclear Non-Proliferation Project of the Carnegie Endowment for International Peace gives details about the development of missiles or their acquisition in a dozen Third World states during 1989. A disturbing element in such reports is the increasing incidence of collaboration between states in different parts of the world in the design, construction and testing of missiles. Much of that work is evidently done with active assistance from industrialised nations.

Under **Developments of Concern for Horizontal Proliferation**, in section h, pages 7-8, reference is made to reports that Libya's chemical plant at Rabta, which is suspected of producing chemical arms, may have been damaged in a fire. Libya's presumed persistence in producing such weapons, notwithstanding its own denials and wide-spread international concern; the fact that the plant was constructed with help from a Western industrialised country whose government seems unwilling or unable to prevent such assistance; and the question whether the fire took place at all and, if it did, whether it was the result of sabotage - all add up to a situation that is highly relevant to the issue of nuclear proliferation.

Following disturbances in parts of the USSR, there have been questions raised about the security of nuclear warheads in times of civil unrest. This is a dimension of nuclear proliferation worthy of careful attention, not only in nuclear-weapon states but in other states with nuclear ambitions, which should recognise that the possession of nuclear weapons (and the materials they are made of) is not an undivided blessing (see page 8).

b. NPT Events

- On the occasion of the twentieth anniversary of **Iraq**'s ratification of the NPT, the Iraqi Ministry of Foreign Affairs expressed its profound belief in the Treaty's objectives. The statement called on the Fourth NPT Review Conference to give serious consideration to the need for international pressure on Israel 'to force it forthwith to discard its nuclear weapons, renounce the possession of such weapons, subject all its nuclear activities to full-scope safeguards, help in making the Middle-East a nuclear-free zone and abide by all relevant resolutions ...' (**IAEA Document** INFCIRC/373, 11 January 1990).

- In his address to the Conference on Disarmament in Geneva on March 1, 1990, His Excellency Dr. Rilwanu Lukman, Minister of External Affairs of the **Federal Republic of Nigeria** informed the Conference that on 2 November 1989 his government had formally submitted to the Depositary Governments of the NPT a Proposed Agreement on the Prohibition of the Use or Threat of Use of Nuclear Weapons Against Non-Nuclear Weapon States Parties to the NPT for consideration during the 1990 NPT Review Conference (for draft text of agreement see **Section VI. Documentation**).

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- The Ministers for Foreign Affairs and Mineral and Energy Affairs of **South Africa** had a two-day meeting in Vienna, last December, with representatives of the **United Kingdom**, the **USSR** and the **USA**. The discussions are said to have led to progress towards South Africa's acceding to the NPT, but it was also reported that South Africa was 'not expected' to do so 'at this stage' (**IAEA Document** INFCIRC/372, 28 December 1989; **Johannesburg Radio Service** and **Television**, 11,12,13 December 1989, in JPRS-TND-90-001, 4 January 1990).

- Meeting in Moscow, from 8 to 11 January, the **Soviet Union** and the **United States** held a round of consultations on nuclear non-proliferation. A spokesman for the Soviet Foreign Ministry stressed the importance of non-proliferation for the progress of the present bilateral disarmament talks (**TASS**, 11 and 12 January 1990, in JPRS-TND-90-003, 1 February 1990).

c. Other Non-Proliferation Developments

- **India** and **Pakistan** have ratified the agreement prohibiting attacks on each other's nuclear installations. They had planned to exchange instruments of ratification at a meeting between Prime Ministers Bhutto and Gandhi on 1 January. Although developments in India have prevented this, both sides express confidence that the agreement will enter into effect very soon (**Morning News** (Karachi), 7 December 1989; **Dawn** (Karachi) 7 January 1990, in JPRS-TND-90-002, 17 January 1990; Delhi Radio 13 January 1990, in JPRS-TND-90-003 1 February 1990; **Nucleonics Week**, January 18, 1990).

- The agreement between **India** and the IAEA, for the application of safeguards in connection with the supply of nuclear material from France, has entered into force (**IAEA Document** INFCIRC/374, January 1990).

d. Nuclear Trade and International Cooperation

- **Algeria** (which several years ago purchased a research reactor from **Argentina**) may buy an Argentine 5- to 20-MW pool-type isotope production reactor and related facilities, including a hot cell. Algeria is also said to be interested in the 380-MW Argos power reactor designed in Argentina (**Nucleonics Week**, January 4, 1990)

- **Brazil** and the **USSR** have concluded an agreement on nuclear cooperation, covering among other things information on fast breeders. **Argentina** is joining Brazil in research on breeder reactors and will thus be associated with the cooperation between Brazil and the USSR (**Folha de Sao Paulo**, 24 November 1989 in JPRS-TND-90-001, 4 January 1989; **Nuclear Engineering International**, February 1990).

- The agreement between **Brazil** and the **Federal Republic of Germany** has been extended for another five years, after the determination of the Bonn government that fears of supplied technology being diverted for military use did not justify cancelling it (**Nuclear Engineering International**, February 1990)

- The US firm Westinghouse has applied for an export licence to ship reactor equipment to **Bulgaria** (**NuclearFuel**, March 5, 1990)

- **China** is thinking of importing the two 1000-MWe reactor units that are to make up its power plant in Liaoning Province. Just before China cancelled its earlier plans to purchase power reactors abroad it had been in negotiation with KWU, in the **Federal Republic of Germany** (**Nuclear News**, February 1990). President Bush has vetoed a bill suspending nuclear cooperation between the **United States** and China, adopted by Congress as part of the sanctions responding to the crackdown in Tiananmen Square (**Nuclear Engineering International**, February 1990).

- Uranium which **Finland** thought it had bought from **Niger**, in 1987, has been found to have come from **South Africa**, via the German firm NUKEM. Finland does not have trade relations with South Africa (**IPS** news service, 16 January 1990).

- The **German Democratic Republic** and the **Federal Republic of Germany** have agreed to cooperate on nuclear energy matters. The agreement foresees among other things cooperation in reactor safety, radiation protection, waste disposal and the harmonisation of nuclear legislation (**ADN** (Berlin) 17 January 1990, in JPRS-TND-90-003, 1 February 1990)

- After the cancellation of its plans to purchase two VVER-1000 reactors in the **USSR, Hungary** is now planning to join with **France** in the construction of two 1000-MWe power reactors. One of these would supply power to the Hungarian grid and the electricity produced with the other unit would be exported to Western Europe. France would pay 70 per cent. of construction costs in hard currency ($ 2 billion) which Hungary would pay back as electricity, over a twenty-year period, starting upon completion of construction. France would also build the grid up to the Austrian border (**Figyelo** (Budapest), 21 December 1989, in JPRS-TND-90-003, 1 February 1990; **Nucleonics Week**, quoted in **Strategic Digest**, February 1990).

- **Japan** has decided that shipments of plutonium processed in **France** and the **United Kingdom** will be escorted by a frigate-sized vessel to be built specially for the Maritime Safety Agency (MSA) rather than by units of the Self-Defence Force. It will cost about $138 million. Japan's Atomic Energy Commission has approved the transport of plutonium for use in its fast breeder programme. It is to start in 1992 (**Tokyo Kyodo**, 19 December 1989, in JPRS-TND-90-001, 4 January 1990).

- Under their agreement of 1985, the **USSR** is planning to provide the **Democratic People's Republic of Korea**, after 1994, with a four unit nuclear power plant. The spokesman of the Soviet Foreign Ministry is quoted as saying that his country 'will naturally take into account the situation with the signing of an agreement between [North

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Korea] and the IAEA' on safeguards (**The Washington Times**, March 2, 1990).

- The **Republic of Korea** has agreed to buy annually 40 metric tonnes of uranium enriched to 3.5 per cent from the **USSR** (**NuclearFuel**, March 19, 1990).

- **Pakistan** is planning to construct six nuclear power plants with a total output of 2400-Mw. Negotiations are underway for the supply of these installations with **China**, **France** and the **USSR**. Pakistan has announced that China will supply it with its second nuclear power station, of 220-MW. France will supply Pakistan with a 950-MW nuclear power plant. The deal — said to be meant as compensation for the aborted supply of a reprocessing plant in the 'Seventies — is causing criticism, especially in the USA, as it helps Pakistan's nuclear programme assumed to be partly dedicated to military production. France requires IAEA safeguards on its supply but does not make that conditional on Pakistan's accepting 'full-scope' safeguards. A report from Japan says that Pakistan's Finance Minister secretly visited Riyadh to seek financial support from **Saudi Arabia**, which also made the down-payment for the French reprocessing plant. The reactor would presumably be supplied through a French/German conglomerate in which the firm Siemens in the **Federal Republic of Germany** participates. As the Federal Republic requires the implementation of 'de facto full-scope safeguards' (i.e. safeguards on all nuclear materials in the country at the time the transaction is concluded) this might complicate the supply (**Xinhua**, 21 December 1989, in JPRS-TND-90-001, 4 January 1990; Islamabad **Overseas Service**, 15 January 1990, in JPRS-TND-90-1990, 1 February 1990; **Kyodo News Service**, January 31, 1990; **Strategic Digest**, February 1990; **Financial Times**, 22 February 1990; **The Washington Post**, February 22 and 24, 1990; **Nucleonics Week**, March 1, 1990; **NuclearFuel**, March 5 and 19, 1990; **Congressional Record, Senate** S 2132, March 6, 1990).

e. IAEA Developments

- Following an agreement with the Government of **Japan** the functions of the International Atomic Energy Agency's office in Tokyo will be expanded. So as to enhance the effectiveness of safeguards in the area and make more economic use of resources, inspectors serving in that office will now also inspect nuclear installations in other parts of the region. The office will also be used for non-safeguards related activities of the Agency in Japan (**IAEA Press Release** PR 90/4, 20 February 1990).

- **Pakistan** has agreed to allow the IAEA to carry out tests on the heavy water at the Kanupp power plant and supplement its camera surveillance there with increased inspections (**NuclearFuel**, January 8, 1990

f. Peaceful Nuclear Developments

- In 1989, nine new nuclear power plants started operation: one each in **Bulgaria**, the **Federal Republic of Germany**, **India**, **Japan**, the **Republic of Korea**, **Mexico** and the **United Kingdom**, and two in the **United States**. The total number of operating nuclear power plants is now 434; they produce 17 per cent. of the world's electricity. Three reactors were shut down: one in the **United Kingdom** and two in the **USSR**, following the earthquake in Armenia (**IAEA Press Release** PR 90/2, 18 January 1990). At the Pacific Basin Nuclear Conference held in San Diego, speakers from **Canada**, **China**, Japan and the Republic of Korea announced ambitious nuclear power plans for the next decade (**Nucleonics Week**, March 8, 1990). At the First International Conference for Nuclear Cooperation in Asia, held in Tokyo in mid-March, the representative of the Republic of Korea proposed a standing committee to promote nuclear energy utilisation in Asia outside the framework of the IAEA (underlined by editor) (**Nucleonics Week**, March 22, 1990)

- Amidst reports of continuing problems at the 650-Mw Embalse Nuclear Power Station, **Argentina's** Atucha-1 reactor — which had been generating 10 per cent. of Argentina's total electricity before it was shut down for urgent repairs in August 1988 — resumed operation on 10 January 1990. For reasons of safety the reactor, which has a rated capacity of 357 Mw, will until further notice generate only 100 Mw. President Menem has put the National Atomic Energy Commission of Argentina once again directly under the Presidency (**Buenos Aires Radio,** 6-9 December 1989, in JPRS-TND-90-001, 4 January 1990; **TELAM**, 10 January 1990, in JPRS-TND-90-003, 1 February 1990; **La Prensa**, 13 January 1990, Ibid.; **Nucleonics Week**, January 25, 1990).

- The **Bangladesh** Atomic Energy Commission is exploring the possibilities of obtaining loans for a 300- to 500-Mw nuclear power plant at Roopur (**Nucleonics Week**, February 8, 1990).

- **Brazil's** Angra-1 power reactor, which started producing electricity in 1982 and was inaugurated in 1985, has been modified following five years of operating problems and is now again operating at low power. The Brazilian Congress has authorised the expenditure of $ 200 million in 1990 for construction of Angra-2. Construction of this 1,245-Mw unit, which is supplied by Siemens AG/KWU, is expected to be completed in 1995, two years behind schedule (**Nucleonics Week**, January 11, 1990; **O Globo** (Rio de Janeiro) 17 January 1990, in JPRS-TND-90-003, 1 February 1990).

- In **Bulgaria** there is resistance to the construction of a new nuclear power plant at Belene. Public opinion is negatively disposed to nuclear energy, following the Chernobyl accident (**Rabotnichesko Delo** (Sofia), 2 January 1990, **Sofia Radio**, 29 December 1989 and 7 January 1990, in JPRS-TND-90-002, 17 January 1990 and JPRS-TND-90-003, 1 February 1990). It is reported that the Bulgarian Government has now halted the construction of a 4,000 MW nuclear power complex at Belene following a general strike in the nearby town of Svishtov. The strikers claimed that the PWR reactors being built on this site were unsafe, both because they were of a primitive design and because they were sited in an earthquake zone (**New Scientist**, 24 March 1990).

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- A major uranium producer in **Canada**, Rio Algom Ltd., has announced the closing of two mines as a consequence of a decade-long slump in uranium prices, which have fallen from $43 a pound in the late 1970's to $17 in 1987 and $9 at present (**The New York Times**, January 29, 1990).

- In **Chile** a second research reactor (which according to IAEA documentation is subject to Agency safeguards — ed.) has been inaugurated at 'Lo Aguirre' Nuclear Research Centre (**El Mercurio** (Santiago), 23 November 1989, in JPRS-TND-90-001, 4 January 1990).

- **China's** indigenously designed and constructed 300-Mw power reactor at Qinshan is expected to be on line by the end of 1990, after a construction period of only 69 months. Two 600-MW power reactors at the same site are planned for completion by the end of the present decade. At Daya Bay, two power reactors with an installed capacity of 900 Mw are to be on line in the early 'Nineties. China plans to purchase foreign-designed reactors for its Liaoning nuclear power plant (**Wen Wei Po** (Hongkong), 30 November 1990; **Beijing Xinhua**, 24 December 1989,; **Zhonggo Xinwen She**, 2 January 1990, in JPRS-TND-90-003, 1 February 1990).

- **Czechoslovakia**, which was initially considering ordering the two reactor units it planned to add to its Temelin power station in Western Europe, has decided for the present only to complete the two (Soviet-supplied) units that are now under construction (**Mlada Fronta**, 9 January 1990; **ORF** (Austrian Television), 16 January 1990; **Pravda** (Bratislava), 18 January 1990, in JPRS-TND-90-003, 1 February 1990).

- In **Finland,** rumours of foul play at the 735-Mw Olkiluoto-1 power reactor, which had to close down when 2.8 litres of metal filings were found in control rods (see **Newsbrief** Number 8, Winter 1989/90, page 5) appear to have been unfounded. It is now believed that the particles may have been in the rods since the plant was commissioned. The shutdown and clean-up have cost the power company $20-million (**Helsingin Sanomat**, 10 October 1989, in JPRS-TND-90-001, 4 January 1990; **Nucleonics Week**, January 11, 1990)

- For economic reasons, **France**'s fast breeder, Superphenix, will cease producing plutonium after its first fuel change, in 1993. Technical problems at Superphenix — which were expected to be overcome by the end of March — have greatly increased the cost of the plutonium produced there, which is said no longer justified, given the drop in the cost of nuclear fuel and the decreased demand (**Liberation** (Paris) 28 November 1989, in JPRS-TND-90-003, 1 February 1990; **Nucleonics Week**, March 8, 1990). A high-level report warns against overcapacity in the French nuclear industry, especially in plutonium production and fuel fabrication, and indicates that the laser enrichment technique for which France has opted may require further consideration. It also calls for urgent decisions on high-level waste management (**NuclearFuel**, March 19, 1990).

- At the invitation of the **German Democratic Republic**, an IAEA expert team has reviewed past events at the Greifswald nuclear power station, including the fire that occurred there in 1975, which almost resulted in a meltdown of one of the reactors. The incident is thought to have been due to embrittlement of the reactor vessel, which apparently tends to occur in reactors of the original Soviet VVER-440 type (**The New York Times**, January 23, 1990; **Nucleonics Week**, January 25, 1990; **IAEA Press Release**, PR 90/3, 9 February 1990; **Wall Street Journal**, February 16, 1990).

- In the **Federal Republic of Germany**, a pilot facility for the conditioning of spent nuclear fuel for disposal is being built at Gorleben. Studies are said to confirm that even with the lower prices now charged by French and British reprocessing facilities, the once-through fuel cycle will be cheaper than reprocessing (**NuclearFuel**, January 22, 1990). Two pilot reprocessing facilities at the Karlsruhe Nuclear Research Centre, may soon be decommissioned (**NuclearFuel**, January 8, 1990).

- The **Polish** Government has decided for economic reasons to halt the construction of the nuclear power plant in Zarnowiec (**Warsaw Radio**, 23 December 1989, in JPRS-TND-90-002, 17 January 1990).

- **Rumania** intends with help from the West to accelerate construction of nuclear power plants. In the long run it hopes to build 17 600-MWe units (**Nucleonics Week**, January 25, 1990).

- **South Africa**'s uranium enrichment pilot plant, which had been in operation since 1978, was shut down on 1 February 1990. The production plant is now in full operation. It has a design capacity to satisfy all short-term fuel requirements of South Africa's nuclear power programme (**Press Release of the South African Atomic Energy Corporation**).

- The fire at the Vandellos-1 reactor in **Spain** (see **Newsbrief** Number 8, Winter 1989/90, page 6) has triggered anti-nuclear protests in Spain and various demands to close this nuclear power plant as well as several others. While the government does not wish to commit itself to a permanent shut-down of Vandellos-1, which reports say has inherent safety problems, there is said to be French pressure to keep the station in operation. Two reasons are cited for this: France supplied the technology and fears that a shutdown would set a bad precedent, and the plutonium produced in the reactor is reprocessed in France for weapons use (**Madrid Diario 16**, 3, 24, 28, 29 and 30 November 1989; **El Independiente**, 18, 25,27, 28 and 30 November and 1 December 1989, in JPRS-TND-90-001, 4 January 1990, and JPRS-TND-90-002, 17 January 1990).

- In **Sweden**, a recent cabinet reshuffle raises speculation that the new Minister for Energy may rethink the starting date for the phaseout of nuclear power decided upon after a referendum in 1980 (**Nuclear Engineering International**, February 1990).

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- Plans of the Government of **Taiwan** for the construction of the seventh and eighth 1000-Mw reactor units originally planned for the early 'Nineties but cancelled following lower estimates of electricity demand, are meeting strong resistance by local government (**Nucleonics Week**, February 1, 1990).

- **Turkey** is said to be in the market to buy a power reactor in the 25-50 MWe range, perhaps with help from **Argentina** (**Strategic Digest**, February 1990).

- A three-judge panel from the **United States** Court of Appeals for the District of Columbia has refused to stay the full-power operating licence which the Nuclear Regulatory Commission has granted to the Seabrook nuclear power plant in New Hampshire. For twenty years, pressure from the neighbouring State of Massachusetts and from public interest groups, which maintained that evacuation plans for the surrounding populace were inadequate and the plant was unsafe, had kept the station from operating. Resistance is continuing but full-power operation is expected to start soon (**The New York Times**, March 2 and 15, 1990; **The Washington Post**, March 15, 1990) During refuelling of a reactor unit at a nuclear power plant in Georgia, a truck backed into a power pole, cutting off electricity to the plant. Of the back-up diesel engines, one failed to switch on and the other was undergoing maintenance. The incident also shut off the other reactor, so that the entire plant was briefly left without power, which called for a 'site area emergency'. The event caused no further material or personal harm, but might have resulted in damage to the reactor core. An inquiry has begun. (**The New York Times**, April 1, 1990) Eleven OECD countries, cooperating in a project of that organisation's Nuclear Energy Agency, have managed to remove samples from the damaged reactor vessel at the Three Mile Island Unit 2. The three-year project was proposed by the US Nuclear Regulatory Commission, after it had become apparent that molten material had flowed in the vessel, causing severe local overheating. The samples are being sent for analysis in a range of laboratories and the results are expected to contribute to a better understanding of reactor accidents (**NEA Information Dispatch**, 20 March 1990).

g. Developments of Concern for Vertical Proliferation

- Responding to political pressure from citizens, the **USSR** has decided to end by 1993 its nuclear testing at the principal testing site of Semipalatinsk, in Kazakhstan, and limit its tests to the site it has at Novaya Zemlya in the Arctic. It is expected that the move will force a reduction of the Soviet testing programme (**The Washington Post**, March 10, 1990).

- Following the discovery of cracks in the cooling circuit of HMS Warspite, the **United Kingdom** has ordered checks on all other nuclear reactors on board Royal Navy submarines. Opposition speakers have called on the Government to withdraw the five 'Valiant'-class and four 'Resolution'-class [Polaris missile-carrying — ed.] nuclear submarines from service which use a similar reactor design and were built in the 1960s. Checks will be carried out on all of these submarines when they berth in naval harbours; no submarines are being recalled from operational tasks (**Hansard**, 5 and 12 February 1990; **The Guardian**, 6 February 1990).

- The **United States** set off its first nuclear test explosion of the year on 10 March, in the Nevada desert. The device had a yield near the upper limit of the 20-150 kiloton range. The US Administration has decided to wait for an indefinite period before embarking on further negotiations with the USSR on limiting nuclear testing, thus reneging on an undertaking made by President Reagan in 1986 to do so once '...verification concerns (had) been satisfied and the (Threshold Test Ban and Peaceful Nuclear Explosions Treaties) had been ratified...'. Sixty-Seven members of the US House of Representatives, led by the Majority Leader and including the Chairman of the Foreign Affairs Committee, have urged the Administration to reverse this decision (**The Washington Post**, January 24 and March 11, 1990; **Letter** dated February 6, 1990, to the Secretary of State; **The Toronto Star**, February 9, 1990)

  The chairman of the Joint Chiefs of Staff of the **United States** has said that the military services may oppose the deep reductions in strategic nuclear weapons now being negotiated by the **USSR** and the **USA**, if the US Congress makes substantial cuts in the funds proposed to build two new nuclear-missile types (the mobile MX missile and the Midgetman) and the B-2 ('Stealth') bomber (**Defense Week**, February 12, 1990). The Department of Defense is working on a new nuclear 'High-Power Microwave Weapon', designed to destroy electronic equipment controlling an opponent's ground-based mobile intercontinental ballistic missiles. It is also planning a 'Hypervelocity Glide Vehicle' that would enable an airplane or a satellite to use remote control devices to manoeuvre warheads from American ICBMs and make them change direction at extremely high speeds (**The Washington Post**, February 2, 1990). The United States Navy has made the fourth consecutive successful launch of a Trident-2 missile from a submerged submarine. The Trident-2 has a range of 5000 miles and is capable of carrying up to 12 nuclear warheads. Each Trident submarine will carry 24 of these missiles (**The New York Times**, January 16, 1990).

  As political and environmental opposition against the production of fissionable material for weapons use is rising in the **United States**, in the Congress and in several of the states involved, there are conflicting reports about what will happen with the installations that have had to be closed for safety reasons. The Administration's budget proposals omit a request for funds for the Special Isotope Separation Project, which had been proposed in 1986 to be set up at the Idaho National Engineering Laboratory, at a cost of $1.2 billion, to purify plutonium by means of advanced laser techniques and for which the planning has so far cost $588-million. It is further proposed to halt plutonium reprocessing in Hanford, Wash., by 1995. The Administration contemplates building one production reactor, rather than two, to replace the old Savannah River reactors. The fate of the Rocky Flats plutonium fabrication plant is unclear. The original facilities had to be shut for reasons of safety, after numerous malfunctions and the exposure of workers to radiation hazards and — as now suspected — inhalation of beryllium dust. A new $225-million plant completed in 1982 has never operated

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properly. Consequently, the US Government has no facility at present where significant amounts of plutonium (including material recovered from discarded warheads) can be processed or recycled. It is considering abandoning the existing installation (which might cost up to $1-billion to reconstruct) and instead building a new one, at an estimated cost of $565 million. During recent clean-up operations, approximately 62 pounds of plutonium have been found in air ducts, pipes and filters. The Governor of Colorado has asked the Federal Government not to re-start the plant until these problems have been solved. Disclosures about the dumping of huge amounts of radioactive waste from military production in the metropolitan area of St. Louis are receiving much attention in the press. A new federal study warns that there is a danger that radioactive wastes now in storage tanks at Hanford might explode (**The New York Times**, January 17 and 2, February 2, 8 and 15 and March 24, 25, 29 and 31 1990; **The New York Times Magazine**, March 11, 1990; **The Washington Post**, February 6, 1990; **The Washington Post Weekly**, February 12-18, 1990) The Department of Energy has announced that it will no longer reimburse operators of nuclear weapons plants for fines incurred for criminal actions, environmental penalties, fraudulent losses and other questionable costs (**The Grand Rapids (Michigan) Press**, December 28, 1990). Evidence is growing of the existence, several decades ago, of a deliberate policy of the Federal Government to put production in the nuclear weapons industry ahead of workers' safety. Legislation is now being introduced into the US Congress to compensate uranium miners and their survivors for injury suffered in the period between the late 1940's and 1960, when uranium mining ceased (**The New York Times**, January 9, 1990).

h. Developments of Concern for Horizontal Proliferation

- The **Brazilian** navy has announced that in 1991 it will begin constructing a pressurized water reactor at the Aramar Experimental Centre in Ipero, 125 km west of Sao Paulo. The 48-MW (thermal) reactor should be in operation in 1995. The Centre is the site of an ultracentrifuge enrichment programme which now produces 5-per cent enriched uranium and should eventually produce uranium enriched to 20 per cent. (**Folha de Sao Paulo**, 3 December 1989, in JPRS-TND-90-001, 4 January 1990; **Gazeta Mercantil** (Sao Paolo), 1 December 1989, in JPRS-TND-90-003, 1 February 1990; **Defence & Foreign Affairs Weekly**, December 18-24 1989, as quoted in **Strategic Digest**, February 1990).

- **China** has denied reports that it had agreed to supply **Syria** with 140 M-9 missiles, with a range of about 600 kilometres but Israeli sources state that the sale is taking place (**Beijing Xinhua**, 11 December 1989; **Jerusalem Post**, 12 December 1989, in JPRS-TND-89-022, 29 November 1989 - see also the item on Syria, below);

- After reports that 'Chakra', the first nuclear-propelled 'Charlie'-class submarine **India** had leased from the USSR, was experiencing radiation problems and would be replaced by a second, named 'Chitra', it was announced that both boats had problems and would be returned. India is said to be reconsidering its plans to acquire six nuclear submarines from the Soviet Union [at least insofar as 'Charlie'-class boats are involved — ed.] (**The Bulletin of the Atomic Scientists**, January/February and March, 1990).

- At the end of an 18-month undercover investigation, American and British authorities claim to have foiled a scheme to smuggle to **Iraq** forty capacitors that could be used in a nuclear weapons programme. The components were seized at Heathrow Airport, London by United Kingdom Customs officials. The UK Secretary of State for Foreign and Commonwealth Affairs, Mr. Douglas Hurd, stated that '[t]he specification...suggests that the capacitors were intended for use in the trigger mechanism of a nuclear warhead.' The incident was described by a Foreign office official as 'a criminal matter which need have no bearing on our relationship with Iraq.' Three people have been charged with offences under the Customs and Excise Management Act 1979 and the Export of Goods (Control) Order 1989. A fourth person was deported from the United Kingdom (**Hansard** 29 March 1990; **The New York Times**, March 29, 1990; the **New York Post**, March 29, 1990).

  U.S. authorities pay careful attention to reports that Iraq is interested in developing a uranium enrichment capacity, using centrifuge technology obtained in West Germany. The matter is seen also in the context of the announcement that Iraq has tested a three-stage rocket which it claims to be capable of putting a satellite into orbit. The missile, called 'El-Badr II', is supposed to have a horizontal range of 1,250 miles and seems to be an offshoot of the **Argentine** 'Condor' programme. The president of Egypt has congratulated his Iraqi colleague and the official Egyptian paper Al-Ahram has warned Israel not to take violent action against Iraq (**Baghdad Radio**, 19 and 30 December 1989 and 8 January 1990; **Zimbabwe Radio**, 20 December 1989; **Cairo Radio**, 24 and 27 December 1989 in JPRS-TND-90-002, 17 January 1990; **The Journal of Commerce**, January 16, 1990).

- A photograph taken by a French satellite and released by Japanese scientists, of a hitherto undeclared nuclear plant near Pyongyang is cited as confirming claims by South Korean and American intelligence agencies that **the Democratic People's Republic of Korea** may be producing a nuclear weapon (**The Economist**, February 17, 1990; **Nucleonics Week**, February 22, 1990).

- Early this year there were indications that the chemical plant at Rabta, **Libya**, had resumed production of chemical warfare agents. It had earlier been assumed that operations at the plant had ceased as a result of international pressure. This seems to have caused differences between the Federal Republic of Germany and the United States. The Federal Republic, whose industry is said to have been instrumental in building the installation, suggested that there should be an international inspection of the plant, while the USA was of the opinion that this would not keep it from resuming production and that it should be torn down. Shortly after these reports appeared in the press, news came that the plant at Rabta was on fire, and it is now said to be out of operation indefinitely. Since then, there have been reports that the fire may have been simulated to mislead foreign

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intelligence and that the plant is still operational (**The New York Times**, March 6, 7, 14, 15 and 31, 1990).

- The Chief of Staff of the Army of **Pakistan** has stated that his country needs nuclear weapons for its defence (**Jasarat** (Karachi) 19 November 1989, in JPRS-TND-90-1990). There is a report that Pakistan has an arsenal of six 'Hiroshima-size' bombs and has begun work on a second-generation of nuclear weapons, using plutonium. It is also said to be converting US-supplied F-16 fighters to permit them to carry nuclear weapons. The same report states that Pakistan is helping **Iran** build a plutonium reactor (**U.S. News & World Report**, February 12, 1990).

- In **Rumania** the nuclear research programme of the Ceaucescu regime will be investigated, following reports that political prisoners had been forced to work in uranium mines in Transylvania. While Rumania is a party to the NPT, Mr. Ceaucescu said in 1989 that it had the ability to make nuclear weapons. Press reports also note that the 12.5 tons of heavy water which Norway sold to Rumania in 1986 for use in its power reactor appears to be missing, that experts had opposed the supply by the United States of enriched uranium for Rumania's research reactor and that it was building a missile assembly plant (**The Times** (London), 3 January, 1990; **The Independent**, 3 March 1990; **The New York Times**, February 5, 1990)

- Israeli sources claim that **Syria** is seeking help from North Korea in acquiring surface-to-surface missiles. This was supposedly precipitated by US opposition to the deal between Syria and China (see above). A report from South Korea speaks of cooperation between North Korea and Egypt in upgrading Soviet-supplied Scud-B Missiles, which have an original range of 300 km (**Seoul Radio**, 29 December 1989; **The Korea Times** (Seoul), 30 December 1989, in JPRS-TND-90-002, 17 January 1990).

- Reports that during civil disorders in Azerbaijan, in the **USSR**, insurgents briefly besieged a nuclear weapon store are raising renewed concern about the security of nuclear weapons against capture or theft by rebellious elements or terrorists. It is generally thought, however, that Soviet nuclear security measures, including 'permissive action links' (PALs) and 'command destruct devices' are sophisticated, effective and strictly applied (**The New York Times**, January 28, 1990; **National Journal**, March 3, 1990).

II. PPNN Activities

- From 9 to 12 January, Ben Sanders visited Canada upon invitation by the Department of External Affairs and the Centre for Arms Control and Disarmament, in Ottawa. On 10 January he spoke at a lunch hosted by the Centre, for representatives of various branches of government involved with nuclear energy and non-proliferation, and at a seminar for government officials, academics, diplomats and journalists. On 11 and 12 January he addressed the annual meeting of the Consultative Group on Disarmament and Arms Control Affairs, on the NPT and non-proliferation, in Cornwall, Ont., as a member of a panel and as resource person. In Ottawa he had meetings with officials of the Centre and the Canadian Institute for International Peace and Security.

- On 22 February, PPNN Occasional Paper Five: **New Concepts in Nuclear Arms Control: Verified Cutoff and Verified Disposal**, was presented at a lunch for media representatives at the National Press Club, in Washington. After introductions by the authors, Warren Donnelly and Lawrence Scheinman, and statements by Ben Sanders and John Simpson, there was a lively question-and-answer period.

- John Simpson visited Dublin on 22 January as part of the PRIF team briefing Irish officials on non-proliferation questions relevant to the Irish Presidency of the European Community. He also participated in the advisory group meeting for the project on 'Civil plutonium in Europe' being undertaken by the Science Policy Research Unit at Sussex University, UK on 27-28 March.

- Preparations have continued for the three major PPNN meetings scheduled for this year. Some 30 members of diplomatic missions based in Geneva are expected to attend the second PPNN Conference for working level diplomats on issues likely to arise at the 1990 NPT Review Conference in Guernsey, UK Channel Islands over the weekend of 11-14 May 1990. Plans for the Seventh PPNN Core group meeting and second 'Extended Core Group Session' in Geneva are now well advanced. This meeting will be organised by PPNN in conjunction with the Programme for Strategic and International Security Studies at the Graduate Institute of International Studies, University of Geneva. The PPNN Core Group will hold meetings on 23, 24 and 26 June, and there will be a seminar on issues likely to arise at the NPT Review Conference for senior diplomats based in Geneva on 25th June. Attendance at this is by invitation only.

- In August 1989, pressure of work compelled Professor Joseph Nye to resign from the PPNN Core Group. Ambassador Roland Timerbaev of the USSR and Ambassador Okawa of Japan have joined as members of the Core Group. Ambassador Timerbaev is currently the Permanent Representative of the USSR to the IAEA. Ambassador Yoshio Okawa is a former head of Japan's delegation to the Conference on Disarmament in Geneva. The Core Group currently consists of the following persons: Dr Benson Agu (Nigeria); Ambassador Jayantha Dhanapala (Sri Lanka); Dr Warren Donnelly (United States); Dr Lewis Dunn (United States); David Fischer (United Kingdom); Dr Joseph Goldblat (Sweden); Ambassador Oleg Grinevsky (USSR); Ambassador Jorge Morelli-Pando (Peru); Dr Harald Mueller (FRG); Ambassador Yoshio Okawa (Japan); Dr Walter Rehak (GDR); Ben Sanders (Netherlands) [Chairman of the Core Group]; Ambassador Mohamed Shaker (Egypt); Dr John Simpson (United Kingdom) [Rapporteur to the Core Group]; Ian Smart (United Kingdom); Ambassador Roland Timerbaev (USSR).

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- Work is proceeding on the organisation of the Eighth PPNN Core group meeting in Charlottesville, Virginia scheduled for the weekend of 9-11 November.

III. Other Non-Governmental Groups Active in Related Areas

- The fourth meeting of **UK Officials and Academics**, sponsored by the British members of the PPNN Core group, took place in London on 16th February 1990. Issues discussed included the 1995 NPT Extension Conference, Japan and its plutonium position and additional measures that might be negotiated to reinforce the NPT.

- The **Civil Plutonium in Europe** project of the Science Policy Research Unit at the University of Sussex, England, headed by William Walker, held its second annual advisory group meeting from 27-28 March 1990. The meeting was attended by experts from Belgium, France, the Federal Republic of Germany, Hungary, Japan, the United Kingdom, the United States and the USSR.

- The **Verification Technology Information Centre (VERTIC)** held a 'Short Course on the Technologies of Arms Control Verification' at Imperial College, London during the week 26-30th March 1990. Specialist sessions included nuclear and chemical proliferation and nuclear testing. The course was attended by representatives of the UK Foreign Office and defence staff from the United Kingdom, the Netherlands, Finland and India. Also present were representatives from academic research groups, Greenpeace and a variety on defence equipment manufacturers. VERTIC has completed its report 'Scientific and Technical Aspects of the Verification of a Comprehensive Test Ban Treaty' that was commissioned by Parliamentarians for Global Action.

- In order to acquaint readers of its **Newsbrief** with the work of other non-governmental groups active in the field of nuclear non-proliferation, PPNN has sent questionnaires to a number of organisations, asking them about their work, purposes, methods, composition, etc., and about their current activities. The response to the inquiry so far has been very good. It is the intention to include with a future issue of the **Newsbrief** a special supplement devoted to non-governmental groups and to follow this up periodically with information on their current activities.

  The following information has been compiled from returned questionnaires

- **The Peace Research Institute, Frankfurt's** program on **Building Blocks for a Western European Non-Proliferation Policy**, directed by Harald Mueller, has been very active in providing briefings on non-proliferation matters for those states holding the Presidency of the European Community. A small group of experts provided a one day briefing for officials in Rome in December and in Dublin in January, and will provide a further briefing for officials in Athens in May. Dr Mueller briefed the NATO Planning Group in Brussels on this issue in February and was also responsible for a report 'After the Scandals: West German Export Policy' published by PRIF in February. Contact Address: Leimenrode 29, D-600 Frankfurt 1, Federal Republic of Germany.

- **New York University's Center for War, Peace and the News Media** has initiated a special project on nuclear non-proliferation headed by Judy K.Weddle. It is currently engaged in establishing a board of advisors for the project and developing dossiers of briefing materials on the subject. Over the next six months it hopes to work with the International Press Institutes in Zurich and London to organise up to four briefing conferences for US foreign correspondents and domestic journalists, and to organise a meeting for foreign journalists in Washington in conjunction with the Center for Foreign Journalists of Reston, Virginia. Contact Address: 10 Washington Place, New York 10003, United States.

- A new national senior action group on non-proliferation has been formed in the United States, the **Washington Council on Non-Proliferation,** based on the Johns Hopkins University Foreign Policy Institute. This has Ambassador Gerard C. Smith as Chairperson and Dr. Rodney W.Jones as Executive Director. Its main activities will be meetings of the Council and associated actions. Contact Address: Johns Hopkins University Foreign Policy Institute, 1619 Massachusetts Avenue., N.W., Washington, D.C. 20036-2297, United States.

- The **Proliferation Reform Project** coordinated by Gordon Thompson is developing a variety of reform options in preparation for the fourth NPT review conference and the 1995 Extension Conference, based on a uniform approach to all dimensions of nuclear proliferation in all nations. In October 1989 it published 'A Global Approach to Controlling Nuclear weapons' which summarised its work to date. Contact Address: Institute for Resource and Security Studies, 27 Ellsworth Avenue, Cambridge, MA 02139, United States.

- The **Groupe de Bellerive**, assisted by the Proliferation Reform Project, is organising a two day colloquium on 20 and 21 June in Geneva on the theme 'Non-Proliferation in a Disarming World'. For further details contact Nazir Sunderji, Bellerive Foundation, Case Postale 6, 1211 Geneva 3, Switzerland.

- The Non-Proliferation Project of the **Canadian Centre for Arms Control and Disarmament**, coordinated by Tariq Rauf, organised a meeting of the Consultative Group on Disarmament and Arms Control Affairs for the Ambassador for Disarmament, Department of External Affairs, Canada on January 11-12 in Ottawa. The subject was 'The Nuclear Non-Proliferation regime: Options for Canada'. The Centre also organised a seminar addressed by Soviet Deputy Foreign Minister Viktor Karpov, where the issue of the Soviet 'loan' of nuclear submarines to India was raised. Work is also taking place on Safeguards/Verification aspects of Non-Proscribed Nuclear Military Activities. Contact Address: 151 Slater street, Suite 710, Ottawa, Ontario, Canada K1P 5H3.

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- The **Wisconsin Project on Nuclear Arms Control**, headed by Gary Milhollin and based on the University of Wisconsin Law School at Madison is currently researching into national export laws and behaviour that affect the spread of nuclear weapons and long-range missiles. Its most recent work has been on transfers of missile technology to India. Contact Address: Suite 601, 1900 L Street, N.W., Washington,D.C. 20036.

- Bill Potter has been continuing work on his **Nuclear Suppliers and Nonproliferation Project**, despite its base moving from UCLA to the Monterey Institute of International Studies. He has been distributing his Emerging Suppliers Database to interested non-proliferation researchers, and is investigating its utility as a tool for implementing national nuclear export controls. In addition, a seminar series on Nuclear and Non-Nuclear Proliferation has been instituted at the Monterey Institute of International Studies. He is currently working on an NPT Review Conference Simulation to be held in Geneva in June/July 1990, and expansion of the Emerging Suppliers database to include ballistic missile technology. He has also made presentations in both the US and USSR on nuclear and missile technology proliferation. Contact Address: Montery Institute of International Studies, Global Peace and Security Program, 425 Van Buren Street, Monterey, CA 93940, United States.

- The **Peace Studies Programme** at Cornell University, headed by Lawrence Scheinman, has been active in the areas of Nuclear Free Zones and Chemical and Ballistic Missile Proliferation in the Middle East. Work is also taking place on the impact upon the IAEA of the verification systems associated with superpower arms control agreements and non-proliferation problems associated with nuclear submarines. Contact Address: 180 Uris Hall, Cornell University, Ithaca, New York 14853, United States of America.

- The **European Proliferation Information Centre**, headed by David Lowry, is currently concentrating upon two activities. It is compiling and circulating information on nuclear non-proliferation and related issues to a wide range of disarmament groups, media representatives and politicians in both the United Kingdom and in Europe. It has also set up an electronic conference on GreenNet, to facilitate access to non-proliferation information. Contact Address: 258 Pentonville Road, London N1 9JY, United Kingdom.

- The **Centre for International Security Studies at Maryland (CISSM)**, currently directed by George Quester, is involved in studies of specific countries and their relationship to the non-proliferation regime, as well as the role of nuclear testing in arms control and the insurance of weapons safety and reliability. In addition, George Quester is involved with a SIPRI project on the outlines of a world without nuclear weapons and how this would impact on the existing non-proliferation regime. Contact Address: Morrill Hall, University of Maryland, College Park, Maryland 20742.

IV. Some recent books, articles and other materials on Nuclear Non-Proliferation

Books:

Frank Barnaby (ed.), **A Handbook of Verification Procedures**, (Macmillan, London, 1990), 256 pp.

David Carlton and Carlo Schaerf (eds.), **Perspectives on the Arms Race: Studies in Disarmament and Conflict**, (Macmillan, London, 1989), 360 pp.

M.P.Fry, N.P. Keatinge, J. Rotblat (eds.) **Nuclear Non-Proliferation and the Non-Proliferation Treaty**, (papers presented at a Pugwash Symposium held in Dublin, Ireland, in May, 1989) (Springer Verlag, Berlin, Heidelberg, New York), 1990. 270 pp.

J. Goldblat, **Twenty Years of the Non-Proliferation Treaty: Implementation and Prospects**, (International Peace Research Institute, Oslo, 1990).

Harald Mueller (ed.), **A Survey of European Nuclear Policy, 1985-87**, (Macmillan Press, Basingstoke and London, 1989), 158 pp.

Joseph F. Pilat and Robert E. Pendley (eds.), **Beyond 1995: The Future of the NPT Regime**, Plenum Press, New York and London, 1990. A publication of the Centre for National Security Studies, Los Alamos National Laboratory, in the series 'Issues in International Security'. Foreword by Hans M. Blix, 257 pp.

William C. Potter,(ed.) **International Trade and Nonproliferation: The Challenge of the Emerging Suppliers**, (Lexington Books, Lexington, Mass. January 1990), 431 pp.

Cesare Silvi, **Nuclear Power and East-West Cooperation** (Available from Westview Press, 5500 Central Avenue, Boulder, Colorado 80301): published under the auspices of the Institute for East-West Security Studies, January 1990, 51 pp.

Articles and Other Materials

Lewis A. Dunn, 'Arms Control Verification', **International Security**, Vol. 14, No. 4, Spring 1990, pp. 165-75

Daniel Hirsch and William G. Mathews, 'The H-Bomb: Who really gave away the secret?', **The Bulletin of the Atomic Scientists**, Vol. 46, No. 1, January/February 1990 pp. 22-30.

Harald Muller, **The Controversy over West German Export Policy**, GPSP Research Note No. 1, issues in the Global Peace and Security Program of the Monterey Institute of International Studies, January 1990. 7 pp.

Ivan Oelrich, 'Changing Rules of Arms Control Verification', **International Security**, Vol. 14, No. 4, Spring 1990, pp. 176-84

Research Papers:

Leonard S. Spector and Jacqueline R. Smith, **Missile Proliferation in the Third World: Major Events of 1989**, Carnegie Endowment for International Peace, January 1990

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V. Comments from Readers

The editor has received a letter from Prof. Marvin M. Miller, of the Department of Nuclear Engineering, Massachusetts Institute of Technology, commenting on part of the contribution by Dennis Fakley to PPNN's Occasional Paper Four, **'New Technology, the NPT and the IAEA Safeguards System'**. Although the comments do not, strictly speaking, refer to an item published in the **Newsbrief**, the fact that the Occasional Paper has appeared under the same auspices as the **Newsbrief** would seem to make that an appropriate means of publicising them. The text of the letter follows.

I am writing to express reservations about the discussions of the proliferation implications of isotope separation technology and of considerations relevant to nuclear testing in the article 'New Technologies and Nuclear Proliferation' by Dennis Fakley. I comment first on the isotope separation issue.

The essential problem here is the lumping together of gas centrifuge and laser technologies as potential routes for the production of highly-enriched uranium (HEU) by proliferators; in particular, the statement (p. 4) that:
'The technology for isotope separation by either gaseous centrifuges or lasers has been developed and plants based on either of these technologies could be built on a relatively small scale and could be run efficiently.'

The facts are quite different. In the first place, centrifugation for uranium enrichment is not one technology, but a spectrum of technologies which span a wide range in technical sophistication, from machines similar to the simple, sub-critical aluminium alloy centrifuge described by Gernot Zippe in 1960 (construction details of which are in the public domain), to the large, highly supercritical, composite-material rotor machines developed by the U.S. Department of Energy before the cancellation of the U.S. centrifuge program in 1985. I would certainly agree with Fakley that the latter technology is not 'technically easy'. However building Zippe-type machines, or even reasonable extensions thereof, is well within the capability of a growing number of countries, including some of proliferation concern, e.g., Pakistan, India, and Brazil. Moreover, there is no difference in the centrifuges used in a plant used to make weapons-grade uranium except for the obvious and simple precautions to avoid accumulation of a critical mass. Thus, once the separative capacity of a machine has been demonstrated on natural uranium feed, its performance at higher enrichment levels is known with certainty.

The current implications of laser separation for proliferation are in marked contrast to the above. I will restrict my remarks to the most advanced of the laser methods, that based on the selective irradiation of uranium atoms in the vapor phase. The most advanced program to develop this technology is in the U.S., where it is known as the AVLIS process. Although the U.S. Department of Energy has invested almost $1 billion in AVLIS for LEU production since 1973, the process is still in the developmental stage. To date, only kilogram quantities of about one per cent assay uranium have been produced, and demonstration of the process will not take place until 1992, when operation of a 100,000 to 200,000 SWU/year capacity pilot plant is planned.(1) The basic reason for this slow progress is that production of uranium on a scale of hundreds of kilograms per year requires the reliable operation of several advanced and tightly integrated technologies, notably a highly sophisticated laser system and the handling of a uranium alloy in the solid, liquid, and vapor phases. While exploratory research on AVLIS involving measurement of basic data (e.g., transitions, cross sections, and isotope shifts) as well as actual production of enriched uranium on a laboratory scale is within the capability of research scientists in many countries, including some of proliferation concern, there is a quantum leap between such efforts and production of hundreds of kilograms of enriched uranium. While the latter may be feasible, it has yet to be demonstrated.

Production of significant quantities of HEU rather than LEU presents additional challenges, e.g., radical redesign of LEU separator internals and a major development and test program at high enrichment levels. Even if these problems are solved, operation of a hundred kilogram per year AVLIS HEU plant would still require a high level of technical sophistication, even assuming that the primary design criterion was assured production rather than low-cost separative work.

This is not to say it will not be possible to produce significant quantities of HEU at some time using lasers, e.g., through the AVLIS process: all enrichment processes that can produce LEU can also make HEU. However, at the current state-of-the-technology,(2) there is a world of difference between the feasibility of doing so via low-technology centrifuges and AVLIS.

The problem with regard to Fakley's discussion of test ban considerations is of a different nature. Here, given the author's background, and the way he presents his case one would assume that the two rationales given on page 8 for continued testing, i.e., 'to maintain the operational serviceability of their advanced weapons stockpiles' and 'for certifying the operational fitness of a new warhead that has not been subjected to any nuclear tests,' both represent the consensus view of the relevant experts. However, this is far from the case. While there is a consensus about the need for testing, in some cases very extensive testing, for modernization, the need for testing to maintain confidence in stockpiled weapons is the subject of a strong division of opinion among weapons experts. Thus, while former U.S. weapons designers, J. Carson Mark, Richard Garwin, and Hans Bethe, maintain that nuclear testing is not necessary to insure stockpile reliability, former Livermore and Los Alamos Directors, Roger Batzel, Harold Agnew, and Donald Kerr, contend that testing is essential.(3) At the least, one would expect references to the pertinent literature.(4) In general, the paper suffers from a lack of such references which would enable the reader to check on the opinions expressed and to dig deeper into the subject matter.

(1) 'Atomic Vapor Laser Isotope Separation (AVLIS),' *Fiscal Year 1989 Arms Control Impact Statements* (Submitted to the Congress by the president Pursuant to Section 36 of the Arms Control and Disarmament Act; prepared by M. Miller for the U.S. Arms Control and Disarmament Agency), April 1988, p.150.

(2) In this connection, one should be skeptical of the claims of new enrichment process developers that the resulting separative work will be 'too cheap to meter.' Even if their laboratory proof-of-principle experiments are substantiated by independent researchers, it still must be demonstrated that the technique will work on an industrial scale. A contemporary case in point is the so-called CRISLA (Chemical Reaction by Isotopic Selective Activation) laser process. see, e.g., J.W. Eerkens, 'CRISLA aims to reduce costs,' *Nuclear Engineering International*, June 1989, p. 48.

(3) The problem with relying on the opinions of current weapons designers and stockpile custodians regarding the need for testing is the unavoidable tendency 'to stand where you sit.'

(4) For a book length assessment of the various dimensions of the testing issue, including stockpile confidence in the context of warhead performance, I would recommend Steve Fetter, *Toward a Comprehensive Test Ban*, Ballinger, Cambridge, Massachusetts, 1988.

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VI. Documentation

Conference on Disarmament CD/967
14 February 1990

Nigeria:
Proposed Agreement on the Prohibition of the Use or Threat of Use of Nuclear Weapons Against Non-Nuclear Weapon States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons

The States Parties to this Agreement,

Being also parties to the Treaty on the Non-Proliferation of Nuclear weapons opened for signature at London, Moscow and Washington on 1 July 1968 (hereinafter called "the Treaty"), have hereby accepted the following provisions:

Article I

Each nuclear-weapon State Party to this Agreement undertakes not to use or threaten to use nuclear weapons against any non-nuclear-weapon State Party to the Treaty which does not belong to a military alliance and does not have other security arrangements providing for mutual defence with a nuclear-weapon State.

Article II

Each nuclear-weapon State Party to this Agreement undertakes not to use or threaten to use nuclear weapons against any non-nuclear-weapon State Party to the Treaty which belongs to a military alliance, or have other security arrangements providing for mutual defence, with a nuclear weapon State but has no nuclear weapons stationed on its territory. The non-nuclear weapon State Party to the Treaty referred to in this Article undertakes not to partake in, or contribute to, any military attack on any nuclear-weapon State Party to this Agreement, or its allies, Parties to the Treaty, except in self-defence, in accordance with the Charter of the United Nations.

Article III

1. This Agreement shall be signed and shall be subject to ratification, or may be acceded to, as if the provisions of Article IX of the Treaty applied hereto.
2. This Agreement shall enter into force in respect of each State on the sate of deposit of the instrument of ratification or accession of the State concerned.
3. The duration of this Agreement shall be the same as that of the Treaty and the provision regarding denunciation contained in Article X paragraph 1 of the Treaty shall be applicable to it.

Article IV

This Agreement, the English, Russian, French and Chinese texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Agreement shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

In witness WHEREOF the undersigned plenipotentiaries, having deposited their full powers, found to be in good and due form, hereby sign this agreement on behalf of their respective Governments.

Done in triplicate, at the cities of London, Moscow and Washington, the .....day of.....one thousand nine hundred and .....

The Programme for Promoting Nuclear Non-Proliferation and the Newsbrief

The Programme for Promoting Nuclear Non- Proliferation was established in the Spring of 1987 with the ultimate purpose of helping to strengthen the nuclear non-proliferation regime and with the shorter-term goal of contributing to the success of the fourth review conference of the Non-Proliferation Treaty and of the 1995 conference that will decide on the Treaty's extension. The Programme provides for the creation of an international, non-governmental and informal system of collecting, exchanging and analysing relevant information which should be brought to the attention of government officials, diplomats, the research community, parliamentarians, non-governmental organisations and the media, so as to help foster among those groups, and particularly among their younger members, a greater interest in, and a deeper knowledge of, the issues involved.

The central element of the Programme for Promoting Nuclear Non-Proliferation is an international networking exercise based on a Core Group of high-level experts from eleven industrialized and developing nations. These experts give general guidance to the Programme, pool and exchange information on the many different aspects of the question of nuclear (non-)proliferation and make the respective communities of which they form part aware of the need to support the non-proliferation regime and the Treaty. The Core Group customarily meets twice a year.

The **Newsbrief** was initially conceived as a means of communication from the chairman of the Core Group of the Programme for Promoting Nuclear Non-Proliferation to the members, to acquaint them with developments relevant to the aims and activities of the Programme. Given its general nature, however, the **Newsbrief** has become part of the outreach effort which constitutes a major element of the Programme. It is therefore now addressed to a wider, though still limited, audience of persons not directly involved with the Programme for Promoting Nuclear Non-Proliferation but interested in the subject, to inform and help them alert their respective environments to the issue of nuclear non-proliferation.

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