THE UNLAWFUL PLUTONIUM ALLIANCE

Japan's supergrade plutonium and the role of the United States

Shaun Burnie and Tom Clements

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Greenpeace International
Keizersgracht 176
1016 DW Amsterdam
The Netherlands

"... the bilateral agreement will be mutually beneficial..Japan will be able to speed up its development period of its reprocessing technology through its collaboration with the U.S., while also probably saving some money ... For the U.S., ... the deal 'keeps us in the ballgame'..."

William Burch, Director of the ORNFL Fuel Recycle Division.

"My concern is that a vigorous, robust North Korean nuclear bomb program with the delivery systems might make the temptation for other countries like Japan and South Korea and Taiwan to go ahead with the nuclear bomb program irresistible. There can be no doubt of the technical capability of these countries to do that, and in addition, in the case of JAPAN, they have large quantities of plutonium left over from their reactors which would make it a simple and straightforward matter for them to go to a nuclear weapons program."

US Secretary of Defence, William Perry, May 3 1994

Foreword

Nuclear proliferation, especially of plutonium and weapons-usable technology is one of the most important issues on the international agenda. In 1995 a decision will be taken on the future of the Treaty on the Non-Proliferation of Nuclear Weapons, NPT. One of the decisive factors that will decide the future of the Treaty is the record on effective non-proliferation by the nuclear weapons states and their allies. This report highlights the record of two such countries. First the emerging threat from Japan as a plutonium superpower, which will shortly begin construction of a new reprocessing facility that will give it access to the highest quality plutonium ideal for advanced, highly accurate nuclear weapons.

Secondly, the report reveals that Japan's new plutonium plant will operate using Sensitive Nuclear Technology (SNT) provided illegally by the United States. The U.S. technology supplied to Japan was developed at nuclear weapons laboratories, including the Savannah River Site and Oak Ridge National Laboratory, and used for plutonium production for U.S. nuclear weapons. As such technology of such a type is prohibited from export or transfer to any other country under both the U.S. Nuclear Non-Proliferation Act of 1978, and the U.S./Japan Peaceful Nuclear Cooperation Agreement of 1987. The former being the central pillar of U.S. non-proliferation legislation.

These disclosures further highlight the ineffectiveness of the current nonproliferation regime, as well as the real proliferation risks from two leading advocates of indefinite extension of the NPT, Japan and United States. For this reason, the report will be welcomed by those seeking to establish a truly effective and non-discriminatory, non-proliferation regime.

Dr Frank Barnaby, former Director of Stockholm International Peace Research Institute, SIPRI.

September 1994

Introduction

Nuclear proliferation has emerged after the Cold War as one of the central foreign and security policy issues confronting the international community. At the same time proliferation is emerging as a rationale for maintaining defence budgets and developing new conventional and nuclear "counter-proliferation" technologies. As a decision on the future of the Treaty for the Non-Proliferation of Nuclear Weapons (NPT) nears in 1995, the issue will inevitably receive even greater attention.

However, as with many of the most sensitive issues related to security and foreign policy, the commonly presented view is selective and self-serving. The reality is that those countries most actively highlighting the threat of nuclear horizontal proliferation, at the same time are actively proliferating dangerous nuclear technology to regions of political instability, all in the name of peaceful nuclear trade.

Nowhere is this more true than in North-east Asia. The focus of this paper is the little-publicised plutonium alliance between the United States and Japan. Documents obtained through the U.S. Freedom of Information Act reveal that rather than discouraging weapons capable nuclear programmes in the region, the United States has been actively assisting Japan acquire advanced plutonium technologies. Developed at a cost of billions of dollars to the U.S. taxpayer, this civil-military technology is to be incorporated into a new Japanese plutonium reprocessing facility. Once operational the plant will give Japan access to the highest quality plutonium ideal for sophisticated nuclear weapons.

Contradiction in U.S. policy is a common theme running through this paper. For example, it is the United States which is most actively defending the NPT, and working to secure an indefinite future for the Treaty in 1995. In recent years that future has been placed in doubt by the nuclear programme of the Democratic People's Republic of Korea (DPRK), including its announcement to withdraw from the Treaty. Indeed the threat to the NPT posed by the DPRK plutonium programme has been one of the more consistent concerns expressed by the Washington policy establishment. Yet at the same time as the U.S. has sought to scale-back the plutonium programme of the DPRK, it has been shipping technology to Japan which originated in the U.S. nuclear weapons programme.

One of the most significant revelations is that a legal analysis undertaken for Greenpeace, has concluded that the central pillar of U.S. non-proliferation legislation, the Nuclear Non-Proliferation Act (NNPA), has been violated by the transfer of technology to Japan. Similarly, no sensitive nuclear technology is permitted to be transferred under the U.S.-Japan nuclear cooperation agreement.

In a period of less than five years, the United States has transferred technology to Japan that is the result of decades of research and development at some of the most sensitive and secretive military sites in the United States. Japan's programme has been enhanced by years, providing it access to the most advanced weapons plutonium systems over developed.

Although the new Japanese plutonium plant will operate under International Atomic Energy Agency safeguards (IAEA), these are so ineffective when it comes to plutonium facilities that diversion to military use of significant amounts of plutonium is simple.

A central issue detailed in the paper is how U.S. technology and Japanese plutonium have direct application to an advanced nuclear weapons programme, suggesting that Japan will likely opt for one of the most destabilising of nuclear weapon doctrines, that of counterforce.

Placed in the context of the wider debate on nuclear non-proliferation and the future of the NPT, the conclusion reached is that current U.S. policy and therefore the NPT, are part of the problem not the solution. Without a rethink of non-proliferation policy, and a commitment to develop instruments and measures that curtail proliferation rather than assist it, the proliferation problem of the late 1990's and the next century will eventually threaten the future of all societies.

Japan and Supergrade Plutonium

Plutonium, artificially created in nuclear reactors, is the nuclear explosive material chosen for most nuclear weapons and therefore is one of the world's most dangerous substances. While all nuclear reactors are essentially plutonium production facilities, one type of reactor, the Fast Breeder Reactor (FBR) is particularly troubling due to the fact it is most commonly fuelled with plutonium and operated specifically to create large quantities of plutonium during operation.

Fast Breeder Reactors, which remain experimental in design, have long been considered major threats to nuclear non-proliferation. Because of their capacity to yield high-quality plutonium as well as their dependence on reprocessing, or chemical separation, of plutonium from spent commercial nuclear power fuel, they pose an exceptional proliferation risk.

The principal behind the FBR is that more plutonium is produced than is consumed, with the net gain in plutonium being used to fuel other FBRs. As with all uranium-fuelled reactors, plutonium is produced in the reactor core of FBRs, but in addition assemblies, or "blankets", consisting of depleted uranium (U-238) are inserted into and or around the reactor core and are converted into high-quality plutonium during the reactor's operation. The fissioning of U-235 and Pu-239 in the FBR fuel during the nuclear reaction leads to neutron-capture by U-238 in the blanket, leading, via rapid radioactive decay, to the creation or "breeding" of plutonium.

The plutonium produced in FBR blankets, as with other plutonium forms produced in conventional reactors, is categorised according to its isotopic composition. "Reactor-grade" plutonium is so designated because it has greater than 18% of the plutonium isotope 240 (Pu-240), compared to "weapons-grade" plutonium, so-designated because it has less than 7% Pu240. The plutonium produced in FBR blankets is in fact purer than weapons grade, with concentrations of Pu-240 of less than 2%, which is categorised by the International Atomic Energy Agency (IAEA) as "super-grade." Such plutonium presents an extreme proliferation risk due to the fact that small quantities can be used directly in lightweight, highly accurate, nuclear weapons or alternatively blended with plutonium of different isotopic concentration to make weapons-grade material.

Once thought of as a boundless source of energy, plans by the world's nuclear industry to construct tens of FBRs by the 1990's have not been realised, due to technological failure and cost overruns, as well as the proliferation threat which they present.

Most countries which had intended to operate commercial FBR's have now abandoned their plans as unrealistic. In the United States, the commercial breeder programme of the Department of Energy (DOE) - the Clinch River Breeder Reactor - was terminated by the U.S. Congress in 1983 before the construction had begun. Although there has not been an analysis of the extent of cooperation, it is believed that termination of the U.S. breeder program caused researchers at the DOE's Oak Ridge National Laboratory (ORNL) to turn towards mutual cooperation with the expanding Japanese breeder programme in order to utilize technology developed for the Clinch River. As is consistently demonstrated, those scientists dedicated to the plutonium fuel cycle are not disposed to abandon their fascination with plutonium even in the face of strong arguments to the contrary and will seek out means to perpetuate their research.

Today, one country above others clings tenaciously to the failed dream of breeders and continues to pour vast sums of money into their development and to the pursuit of the "plutonium economy." That country is Japan.

Joyo and Monju

Japan currently operates two plutonium production FBRs: the experimental Joyo reactor which reached criticality in 1977, and the prototype Monju reactor, which went critical in April 1994. Construction of a follow-on demonstration FBR modelled on the Monju prototype is not to begin until early next century. It is the plutonium produced in Joyo and Monju that are the focus of growing international concern.

The sodium-cooled Joyo FBR, which is rated at 100 Megawatts thermal (MWt), is located at the Oarai research centre north of Tokyo and is operated by the Japanese Power Reactor and Nuclear Fuel Development Corporation (PNC). Very little information on the reactor has been made public, but it is known that in 1977 it was loaded with 67 uranium fuel core assemblies and 191 uranium blanket assemblies. The MK-1 fuel assembly was eventually replaced with a MK-2 assembly, which did not have a blanket. The irradiated cores of MK-1 and MK-2 had a combined total of 840 kilograms (kg) of plutonium by March 1993, with total plutonium contained in the blanket of approximately 40 kilograms.

The annual reloads of Joyo consume between 60-120 kg of plutonium, which has been fabricated into fuel at the Tokai Plutonium Fuel Production Facility (PFPF). The PFPF, also operated by the PNC, has a capacity of 4 tonnes of mixed oxide (MOX) uranium and plutonium fuel per year and recently has been plagued with problems whilst attempting to manufacture plutonium fuel pellets for Monju.

The Monju FBR, which is also cooled with liquid sodium, is located near Tsuruga (Fukui) on the coast of the East Sea (Sea of Japan), west of Tokyo, and is rated at 714 MWth (280 MWe - electric), with an initial plutonium fuel-MOX core of 5.9 tonnes consisting of 1.2 tonnes plutonium. Its annual reload capacity is estimated to be 720 kg plutonium. Monju's axial and radial blankets consist of 4.5 and 13 tonnes U-238, respectively. The "breeding ratio" has been calculated at 1.20, which means than it can potentially produce 1.2 times as much plutonium as was initially in the core. The reactor is planned to operate at 80% capacity and with a fuel burn-up rate of around 80,000 MWD/t (megawatt days per tonne). The estimated net annual consumption of fissile plutonium will be 120 kg, and the net annual production will be 144 kg total plutonium. As much as 70 kg of this plutonium will be created in the blanket.

Monju went critical in April 1994, despite protests by national and international non-proliferation organizations. The original start-up date was delayed for over a 18 month due to technical problems with the reactor, particularly the cooling system, and more recently delay in plutonium fuel fabrication at Tokai, The Recycle Equipment Test Facility.

The innocent-sounding Recycle Equipment Test Facility (RETF) is in fact yet another plutonium reprocessing facility to be built by PNC, at the Tokai-mura site, north of Tokyo. Operated in conjunction with Monju, this facility is of considerable international proliferation significance, as its operation will provide Japan access to super-grade plutonium.

RETF is Japan's first FBR reprocessing facility and its operation is central to the long-term development of Japan's plutonium breeder programme. The facility is intended to reprocess the blanket of the Joyo reactor, as well as the blanket and nuclear spent fuel of the Monju reactor. Without a successful demonstration of this facility, Japan is unlikely to reprocess the spent fuel and blanket from Joyo and Monju and thus will not be able to "close" the nuclear fuel cycle and re-use the plutonium in other reactors. Thus, for the Japanese plutonium elite, much is riding on the construction and effective operation of the RETF.

Approval for the RETF was given by the Science and Technology Agency in December 1992, budget approval was granted in early 1993, and construction was originally due to have begun during the summer of 1993, but recently it has been confirmed by the STA that construction will now begin in September 1994. It was intended to be operation by 1998, but according to the recently issued long-term nuclear energy plan by Japan's Atomic Energy Commission, operation will not be until the year 2000. The estimated total budget is 120 billion Yen, or over US$ 1.2 billion. To date 48 billion Yen has been spent.

RETF is designed to process 1.3 tonnes of fast reactor spent core fuel annually, as well as 5 tonnes of blanket fuel, giving an annual throughput of 6.3 tonnes. Operated in conjunction with the existing Tokai-mura reprocessing plant, the RETF will undertake the initial stages of reprocessing, the so-called "head end" operations and initial chemical processing. These will include: dismantling of the fuel and blanket assemblies, shearing of the assemblies into short sections, dissolution in nitric acid, as well as the first solvent extraction process (separation of plutonium and uranium from fission products). The remaining stages of reprocessing, including purification, will be conducted at the existing Tokai reprocessing facility.

An important safety issue relevant to the RETF is risk of criticality, or nuclear chain reaction, due to the higher concentrations of fissile plutonium in comparison to conventional reactor fuel reprocessing. The blanket of Joyo for example consists of approximately 98% Pu-239, and 2% of Pu-240, with insignificant quantities of other isotopes. The assessment of criticality levels is one of the main areas of collaboration between Japan and the United States (see technology section below).

Safety questions are also raised by the ability to operate the facility without interaction occurring between FBR high-burn up fuel (80-90,000 MWD/t are expected at Monju) and hydrogen gas created during the reprocessing process. The explosion and contamination at the Tomsk reprocessing plant in the Russian Urals in 1993, was an example of fuel/gas interaction.

United States and Japanese Collaboration: Agreement and Technology

Collaboration between Japan and the United States in plutonium production and reprocessing began with the Atoms for Peace initiative of the 1950's and continues until the present under the most recent U.S./Japan Nuclear Cooperation Agreement, which became effective in 1988. Under the latter, government to government cooperation in the development of the plutonium fuel cycle has been extensive and consequently well outside the reach of public scrutiny.

In January 1987, an agreement was signed between the U.S. and Japan which solidified cooperation on the development of the RETF facility. It was signed under a 1979 "umbrella" agreement between the DOE and PNC which covered cooperation on breeder reactors. That overall breeder agreement is scheduled to expire only in the year 2000. Formally the RETF agreement is known as the "Memorandum of Agreement between the United States DOE and PNC of Japan for Joint Collaboration in the Field of the Nuclear Fuel Cycle: Liquid Metal Reactor Reprocessing Technology," which is hereafter referred to as the "Agreement", and was signed by James W. Vaughan, on behalf of the U.S. Department of Energy DOE, and Takao Ishiwatari, for the PNC.

The Agreement allowed for collaboration between the two parties for a period of five years, described as the "research and development phase", and prior to actual construction of the facility. However, the Agreement allows for additional R&D and facility design, as well as involvement in the construction and operational phase, if both parties agree. The opportunity for ongoing U.S. collaboration with PNC is clearly stated.

The five year collaboration focused on four main categories:

1 Continuous Head End Process Technology, specifically laser disassembly, fuel shearing, fuel dissolution, and off-gas handling.

2 Advanced Solvent Extraction System and Process Automation, specifically fluid transfer, solvent extraction contactors, flowsheet studies, solvent treatment, process automation, and process monitoring.

3 Advanced Remote Technology, specifically: rack experiments, remote sampling, signal transmission, low-flow ventilation/environmental test chamber, completion of current remote system technology exchange items.

4 Design Optimization of Facility, specifically: radiation dose effects, design support.

The contradictions between civilian nuclear trade and non- proliferation were identified as early as 1946 by Acheson and Lillienthal when they concluded that atomic energy for peace and weapons were interchangeable, and that relying on a system of inspections would offer no security against the militarisation of nuclear energy. Ever since the 1940's, from "Atoms for Peace" to the 1988 U.S./Japan Nuclear Cooperation Agreement, U.S. policy has been to selectively reject the interrelationship between civil and military nuclear technology. The contradiction was further highlighted in the collaboration between Japan and the United States in FBR reprocessing, when the Agreement stated that,

"DOE AND PNC believe that a broad-based, long-term cooperative program of equitable sharing of their experienced research and development data, technology and experience in LMR reprocessing technology would be of mutual benefit. .. Both the United States and Japan are parties to the Treaty on the Non-Proliferation of Nuclear Weapons and, therefore, have a mutual interest in the development of nuclear energy in such a manner as to prevent the proliferation of nuclear weapons."

The US Consolidated Fuel Reprocessing Program

The RETF was to be built and supported by development work and equipment supplied jointly by the DOE/Consolidated Fuel Reprocessing Program (CFRP) and the PNC Collaboration on Nuclear Fuel Reprocessing. The CFRP began in the 1970's before the U.S. terminated programs in reprocessing of commercial spent fuel and the commercialization of the breeder reactor. The CFRP was centred at the Oak Ridge National Laboratory (ORNL) in Tennessee, and like other programs at Oak Ridge, was administered under contract with the U.S. Government by Martin-Marietta Energy Systems, Incorporated. Rumoured to be dissolved in 1993, the CFRP has likely been absorbed into other research programs at ORNL.

The CFRP had as its mandate the development of breeder fuel reprocessing, including the testing of engineering equipment and facility concepts. The initial project had been for a "hot" demonstration breeder reprocessing plant, the Hot Experimental Test Facility (HETF), intended to provide reprocessing services for six FBRs. When the true economic implications became known and plans for six FBR's were dropped, the addition of a head-end facility to the Barnwell Nuclear Fuels reprocessing plant which was to be located in South Carolina, was considered. Consequently however, even the commercial reprocessing plant in South Carolina did not operate, as a result of which the HETF facility was never built.

A scaled-down programme to support the Fast Flux Test Facility (FFTF) at DOE's Hanford Reservation and the Clinch River Breeder Reactor (CRBR), led to design work on the Broeder Reprocessing Engineering Test (BRET), which was to have been located at the Fuel and Materials Evaluation Facility (FMEF) at Hanford.

The move to closer collaboration with Japan was given added impetus when it became clear in the U.S. that there was no justification for BRET following cancellation of CRFB by the Congress. BRET was to have been a joint project between ORNL and Hanford Engineering and Development Laboratory, intended to reprocess the fuel from the Fast Flux Test Facility and the CRBR.

Though these programmes were cancelled, proponents both inside the DOE and contractors at the DOE research labs were determined to maintain their knowledge base and to continue to develop technology. According to ORNL literature, it was the DOE which encouraged the CFRP to seek a "... broad collaboration with PNC... ". The incentive for both parties was made clear, "...this collaboration will allow the United States to maintain a core of expertise; ...technical experts can stay abreast of developments in the reprocessing field as they participate in a viable, long-term mission while the Laboratory and DOE search for future directions for advanced reactor-fuel cycle technologies."

It has been suggested that the agreement was not widely publicised at the time because the Japanese wished to avoid publicity. It seems even at the time of the Agreement both sides were aware of the sensitive nature of the collaboration.

Oak Ridge National Laboratory and Savannah River Site

"If the initial phase is productive and useful, avenues for broader involvement of the Laboratory in later stages will be opened up, including fabrication and testing of special hardware systems in which ORNL expertise will help ensure success of the pilot plant."

Although collaboration was centred at Oak Ridge, the scope of the Agreement provided Japan access to additional sites in the U.S. military and civil nuclear programme, these included Los Alamos National Laboratory, Argonne National Laboratory, Savannah River Plant and Hanford. Ironically, ORNL had been one of the major centres of U.S. nuclear weapons development under the Manhattan project as well as for the entire period of the Cold War.

The five-year research and development programme required financial contributions to work at ORNL of US$ 5 million from both the DOE and PNC, as well as staff from each agency being based at each others facilities. It was expected that at later stages ORNL would assist in the design and construction and OPERATION (my italics) of facilities in Japan.

The focus of the programme was on developing and demonstrating FBR reprocessing technology, specifically: isolating radioactive fission products and recovering usable uranium and plutonium from FBR spent fuel and FBR blankets.

As a consequence of the Agreement the DOE managed to maintain some limited momentum for their FBR and reprocessing programme, which had cost the U.S. taxpayer some 16 billion dollars over three decades. In effect Japan's FBR plutonium reprocessing programme was being subsidised in large part by the United States.

William Burch, Director of the ORNL Fuel Recycle Division which led the joint venture with Japan, and who had formerly been the head of the CFRP, defined the advantages for both sides when he stated,

". . . the bilateral agreement will be mutually beneficial . . Japan will be able to speed up its development period of its reprocessing technology through its collaboration with the U.S., while also probably saving some money. .. For the US., ... the deal 'keeps us in the ballgame'"

A U.S. DOE official confirmed to Greenpeace in late August 1994 that at least one reprocessing technology-type key to RETF was developed and tested at the DOE's Savannah River Site (SRS), South Carolina, the nuclear weapon factory. SRS has served in the principal role of production of plutonium and tritium for the U.S. nuclear weapons arsenal, and has two reprocessing facilities (F and H "Canyons") capable of separating plutonium and highly-enriched uranium. The official reported that centrifugal contractors were developed and hot-tested at the F-Canyon plutonium reprocessing facility. It was further tested at DOE's Argonne Laboratory, and then provided to the PNC for use in the RETF.

Centrifugal contactors are critical to the operation of RETF and are a clear example of the link between the U.S. nuclear weapons programme and Japan's alleged peaceful civilian plutonium programme. By the use of contactors perfected in the U.S. military programme, the PNC will be able to dramatically increase the speed with which plutonium and uranium are separated from fission products, and will also enhance the purity of the separated streams of fissile materials. In addition the technology will also allow RETF to start-up and be in operation within minutes.

As the DOE Agreement with PNC made clear, experience in military plutonium processing at Savannah River was ideally suited for the Japanese plutonium programme.

"Operating experience {of contactors) has included some 19 years of excellent plant operating experience at the Savannah River Plant on contactors of a design similar to the present unnular mixing zone. Research continues on expanding our understanding of the various design parameters and on increasing the overall reliability of the contactor system." (see Appendix 2)

<u>Monju fuel tests in the United States</u>

Prior to the Agreement for collaboration on the RETF, a Specific Memorandum of Agreement for the Development of Fuels and Materials, dating from 1985, was signed between Japan and the United States. This provided the basis for the U.S. to provide a significant assistance in the design of Monju core fuel and breeder blanket assemblies. This has included the irradiation of three assemblies (two fuel assemblies and one blanket assembly) at the Fast Flux Test Facility at Hanford, which would,

"...demonstrate the irradiation performances and lifetime capability of representative Monju fuel and blanket assemblies under conditions nearly prototypic to those anticipated in the Monju reactor."

The blanket test was completed sometime before July 1991, with fuel tests conducted in September 1991 and during the autumn of 1992. The prototypic Monju fuel and blanket assemblies remain in the United States, at Hanford and the Argonne Lab-West, located on the Idaho National Engineering Laboratory site. The three assemblies have been disassembled and a sample of each assembly has been examined. The plan to ship six pins from each of the fuel assemblies and three pins from the blanket assembly to Japan for examination has been delayed due to discussions between the U.S. Departments of State and Energy. Those assemblies scheduled for transport to Japan contain one kilogramme of plutonium and six kilograms of uranium.

U.S. technology transfer

A review of the Agreement and accompanying documents reveal that on at least two occasions actual hardware was shipped from the United States to Japan. Specifically, the Fuel Disassembly System (FDS), and a Remote Sampling System, were both tested at Tokai, to be later installed in the RETF. The technologies significantly enhance the operational ability of the RETF.

Below is a summary of the main projects authorised by the U.S.- Japan agreement. All research was sponsored by the Office of Facilities, Fuel Cycle, and Test Programs, USDOE. Contract number DE-ACO5-840R21400, Martin Marietta Energy Systems, Inc. and PNC, Japan.

(For a more detailed description of the technical arrangements between PNC and DOE see Appendix 7).

CENTRIFUGAL CONTACTOR--The centrifugal contactor is intended to be used in the key chemical steps for reprocessing. ORNL had developed a generation of small, simple units, capable of being scaled to the size required in a reprocessing plant. Under their chemical process development research both PNC and DOE had identified the degree of solvent dissolution degradation that would occur with the higher burn-ups of up to 94,000MWD/t of FBR core fuel. Under the joint program, a prototype RETF contractor was completed. (See Savannah River section, page 16.)

CRITICALITY DATA DEVELOPMENT PROGRAM--Fast reactor reprocessing involves higher percentages of plutonium than do light water reprocessing, and therefore require greater safety margins. The PNC and DOE program would enhance safety and improve efficiency. The experiments were conducted at the Hanford Critical Mass Laboratory.

FUEL DISASSEMBLY SYSTEM--The ORNL designed a Fuel Disassembly System (FDS) for the RETF, intended to disassemble spent fuel/blanket from Monju and Joyo FBRs. The ORNL project was to design remotely operated fuel disassembly equipment, based upon what was described as "CFRP's development work in laser fuel disassembly". The FDS design has already been delivered to the Tokai works, where it was to be fabricated and tested at the EDF-III test facility, prior to installation in the RETF.

REMOTE SAMPLING--The objective was to design a demonstration sampling vehicle, to be demonstrated in the Experimental Demonstration Facility-III (EF at Tokai) and at the Integrated Equipment Test (IET) facility at ORNL, followed by further design and testing for the RETF sampler system. According to the Technical Document the sampling system was to be tested at the ORNL Remote Operations and Maintenance Demonstration (ROMD) facility - "It will then be shipped to Japan and the additional testing and personnel training will be performed in the EDF-III (Tokai), if required."

Safeguards Inadequacy and the International Atomic Energy Agency

It is technically not possible for the International Atomic Energy Agency (IAEA) to detect the diversion of significant quantities of weapons-usable plutonium from safeguarded reprocessing plants. There can be little confidence that the IAEA will be able to prevent a quantity of plutonium from becoming material unaccounted for (MUF) during the years of operation of the RETF and its larger successor pilot plant. Former U.S. Nuclear Regulatory Commission member, Victor

Gillinsky, when testifying to the Senate Foreign Relations Committee on IAEA Safeguards, stated,

"There is no way you are going to get adequate warning when you are talking about reprocessing plants, enrichment plants or stockpiles of plutonium or highly enriched uranium. We really ought to face that."

Gillinsky specifically identified the existing Tokai-mura reprocessing plant as a facility that it would not be possible to safeguard,

"I just don't think that technically the safeguard system at this plant (Tokaimura), just on the basis of experience with safeguards systems at other plants and what we know of our own domestic safeguards system, is going to be able to detect reliably diversions of amounts of materials of significance for weapons in 1 or 2 weeks."

Since there has been little real progress in safeguards effectiveness since this observation was made, Gillinsky's statement on Tokai is equally applicable to the RETF, a facility which will be separating higher quality plutonium.

The failure of safeguards at Tokai-Mura and implications for the RETF

"It is difficult to measure how much plutonium there is, and that is why too much accumulation is not desirable."

One likely defence of the RETF will be that it will operate under the most advanced full-scope IAEA safeguards arrangements, including Near-Real Time Accountancy and therefore the plutonium will not be able to be diverted for military use. Japan could of course formally remove itself from the NPT, (as Foreign Minister Muto suggested last year) and utilise its stock of plutonium for military purposes. The easier option would be for Japan to take advantage of the inadequacy of safeguards. The potential for Japan to divert significant quantities of plutonium was most recently demonstrated at the Tokai-mura site in May 1994.

Following accusations from the Washington-based Nuclear Control Institute, an official from PNC reluctantly admitted that 70kg of plutonium oxide had accumulated over a five year period in the Tokai FBR Plutonium Fuel Production Plant (PFPP). The IAEA denied that the plutonium was MUF but rather "hold-up", and remained under safeguards. The hold-up consisted of plutonium dust which had gathered on exposed surfaces inside the plant. Remarkably, the Agency has stated that PNC elected to leave the material in the plant, rather than remove it. Each month PNC would declare to IAEA inspectors the amount of material involved, this would then be confirmed by the Agency, using assay methods. The only way for the Agency to verify the accuracy of PNC's and its own figures would be for the plant to be closed and cleaned out. Since this has not been done the current figures for hold-up remain estimates. Over a number of years the IAEA had stressed to PNC the importance of removing the material. However this did not happen, due undoubtedly to the pressure on PNC caused by the delays in fabricating the fuel for Monju, as well as the long-standing resentment on the part of Japanese officials to the intrusive nature of the IAEA. The priority for PNC was completing fabrication and starting-up Monju, not meeting the safeguards requests of the IAEA.

A credible option for Japan to divert plutonium has been put forward whereby plutonium not accounted for in the Agency's hold- up figure could be concealed in low-level radioactive waste containers, which are eventually removed from the plant with inadequate inspection.

The Tokai episode clearly demonstrates the discriminatory application of safeguards amongst the non-nuclear-weapon states. It is unimaginable that any other non-nuclear-weapon state would be permitted by the IAEA to declare that they were going to allow more than 70kg of weapons-usable plutonium to build-up in their facilities. As we have seen recently in the stand-off between the DPRK and the Agency, the issue of safeguards anomalies are dealt with first by the IAEA Board of Governors, and then the United Nations Security Council. The Agency and international community would rightly be unwilling to accept for example the DPRK declaring that they had decided to leave large quantities of weapons-usable plutonium in the Yongbyon reprocessing facility. For Japan, no such problem exists.

This is even more disturbing when it is realised that the Agency figure for holdup will remain an estimate, so long as plutonium- contaminated equipment remains within the facility. And even if the Agency were to conduct a full assessment, the measurement error for the IAEA safeguards equipment means that as much as 10.5kg of the plutonium could be designated MUF, and as a result be an acceptable loss to the Agency. For this reason the IAEA has not and cannot answer the following question, how much plutonium could Japan have diverted?

In Agency terminology "hold-up" and "MUF" are an acceptable consequence of plutonium reprocessing. In non-proliferation terms however, 70kg of plutonium in this latest Tokai incident would be enough for eight nuclear weapons. If it was 70kg of FBR blanket plutonium, it would be sufficient for around 23 weapons. The U.S. by transferring sensitive nuclear technology and encouraging Japan in plutonium reprocessing has violated its own policy guidelines as layed out in the Atomic Energy Act of 1954, as amended by the U.S. Nuclear Non-Proliferation Act of 1978 (NNPA). Section 131b(2) of the Act provides that,

"Among all the factors in making this judgement (whether to extend a US. reprocessing agreement with Japan) foremost consideration will be given to whether or not the reprocessing or retransfer will take place under conditions that will ensure timely warning to the United States of any diversion well in advance of the time at which the non-nuclear-weapon state could transform the diverted material into a nuclear explosive device."

The "timely warning" period for the diversion of nuclear material from a reprocessing facility is greater than the length of time it would take a country such as Japan to divert nuclear materials into an explosive device. This has been most clearly demonstrated by the disclosures about Tokai.

The public response by the Agency and the Japanese authorities to these revelations suggests that the issue is merely an inconvenience and not that serious. At all costs, in the period up to the 1995 NPT Conference, safeguards effectiveness must not be questioned, or further undermined. The reality is that nations genuinely concerned about nuclear proliferation will demand a full explanation as to why in the face of such blatant discrimination and ineffective safeguards, weapons-usable plutonium facilities are permitted to operate.

US Non-Proliferation; Policy Contradictory, Discriminatory, Ineffective and Counterproductive

In September 1993, U.S. policy on nuclear non-proliferation was presented to the United Nations General Assembly by President Bill Clinton. The stated intention of President Clinton was the prioritisation of non-proliferation as a key foreign policy objective. He stated that his administration would,

"undertake a comprehensive approach to the growing accumulation of fissile material from dismantled nuclear weapons and within civil nuclear programs."

The President indicated that the administration would "encourage more restrictive regional arrangements to constrain fissile material production in regions of instability and high proliferation risk" and that the U.S. would "not encourage the civil use of plutonium" in other countries.

The on-going dispute with the Democratic People's Republic of Korea over its plutonium programme, provides a context for this approach. Indeed the policy announcement specifically identified the Korean peninsula, where it would,

"actively discourage spent fuel reprocessing and uranium enrichment and will encourage regional arrangements, such as the agreement between North and South Korea."

The United States, by directly assisting Japan in developing plutonium technologies has once again demonstrated that its nuclear non-proliferation policy as applied in Asia is discriminatory, short-sighted, and perhaps most importantly, ineffective.

The revelation that the United States for the past eight years has been working closely with Japan in developing fast breeder reprocessing is likely to be received with consternation in both the DPRK and the Republic of Korea (ROK), as well as the wider Asia region. It will also lend further support to those in Seoul demanding that the ROK obtain plutonium. The longer-term effect of U.S. policy and joint-collaboration with Japan will be reduced effectiveness for non-proliferation efforts in the region, and will enhance the ROK's chances of obtaining plutonium. In the first instance the U.S. is faced with having to defend its approach to non-proliferation in ongoing negotiations with the DPRK.

It is becoming increasingly untenable for the United States to apply non-proliferation policy in such an inconsistent manner. One consequence of the decline in U.S. power and influence around the world, will be its ability to determine the nuclear programmes of countries. A unified Korean peninsula will be reality probably within a few years, at that point U.S.
plutonium policy as it applies to the ROK will likely collapse. The response by Japan, concerned as it already is about the emergence of a strong unified Korea, and aware of Seoul's advanced nuclear weapons programme, cannot be predicted. It is perhaps at that point that the RETF will be used in its non-peaceful function.

Technology transfer violates United States law

During the compilation of data for this report, a recurring question has been how the technology transferred to Japan is defined under U.S. law. The origin of the technology (U.S. military laboratories), and the capabilities of the technology raised suspicions as to how such exports related to legislative restrictions on sensitive nuclear trade. Consequently, questions were asked of the relevant agencies of government.

According to the DOE's Office of Nuclear Energy the technology transferred to Japan was of a sensitive nature, but that because the end user was Japan, it was not.

The basis for this subjective assessment of what is and what is not sensitive technology, it has emerged, is a little-publicised DOE document titled "Guidelines for the Designation of Sensitive Nuclear Technology", drafted in July 1986. These guidelines were never published, until now. They reveal that information may not be considered sensitive nuclear technology (SNT) if provided to a technically sophisticated country, but would be SNT if provided to a country with limited nuclear expertise.

However under two cornerstones of U.S. nuclear legislation, SNT definition is simple and straightforward and based upon an assessment of the technology not its intended recipient. Both the Nuclear Non Proliferation Act of 1978 (the NNPA) and the Agreement Between the United States and Japan Concerning Peaceful Uses of Nuclear Energy (U.S.-Japan Agreement), do not allow for the transfer of SNT to a country such as Japan (footnote). The destination of the technology is not a factor.

The U.S.-Japan Agreement is even more specific, Article 2(1)(b) and states,

"Sensitive nuclear technology shall not be transferred under this Agreement."

Even under the RETF Agreement itself, it appears that the U.S. has violated its commitments. As according to Article 12 of the Agreement,

"Each party's activities under this Agreement shall be in accordance with its national laws and regulations and the applicable Agreement for Peaceful Nuclear Cooperation between the two Governments."

It having been confirmed by the DOE that the technology was in fact SNT, a legal analysis of the technology transferred to Japan and the relevant national legislation, and bi-lateral cooperation agreements, has concluded that transfers of the type of technology delivered to Japan are not authorized and therefore contrary to U.S. law. (For a more detailed legal analysis see APPENDIX 3)

The Potential Use of Breeder Plutonium in Japanese Nuclear Weapons

"The Japanese Defence Agency presented various examples of nuclear weapons which it would be constitutionally possible to obtain. These included Nike-Hercules air defence missiles, and 155mm and 203mm howitzers." Japanese Defence Agency White Paper, 1980.

The military potential of Japan's breeder reactors and the RETF should not be underestimated. The French nuclear weapons establishment certainly recognise the importance of FBR's,

"France will be able build atomic weapons of all kinds and within every type of range. At relatively low cost she will be in a position to produce large quantities of such weapons, with fast breeders providing an abundant supply of the plutonium required."

For the French military, fast reactors have been a significant source of plutonium for use in their nuclear weapons programme. France's prototype fast reactor Phenix (currently not operating) together with the experimental reactor Raphsodie (closed in 1983), produced between 0.9 and 1.6 tonnes of super-grade plutonium in the U-238 blanket, up to the end of 1990. In total, Raphsodie and Phenix produced between 18 and 19.5% of the French inventory of military plutonium by 1990, an amount sufficient for 400 - 500 nuclear warheads.

As a result of direct U.S. assistance, the RETF will provide Japan access to supergrade plutonium with 2-3% Pu-240. The United States nuclear weapons programme uses weapons-grade plutonium of around 6% Pu-240. While it must be repeated that all of Japan's separated plutonium stock - projected to be over 110 tonnes by the year 2010 - is weapons-usable, the RETF clearly has military advantages over reactor grade plutonium. The higher probability of pre-detonation due to spontaneous fission, which exists with reactor grade plutonium if used for military purposes, does not exist with breeder plutonium. The figures speak for themselves: for each gram of reactor grade plutonium, the flux of neutrons is 360 per second, weapons-grade is 66 neutrons per second, while supergrade is 40 per second. Another advantage of breeder plutonium over weapons and reactor grades is the heat generation. The figures per kilogram are – 11 watts, 2.5 watts and 1.7 watts respectively. This is considered important because of the threat of predetonation of the conventional explosive due to heat. Additionally the radiation levels on the surface of a sphere of reactor-grade plutonium is about six times that of supergrade.

Much has been made of the non-nuclear principles of Japan, but these are not legally binding, and as Japanese governments have made clear,

"...the possession of nuclear weapons does not contravene the Japanese constitution." statement in the Japanese Diet, Prime Minister Nakasone, 1984.

Over a ten year operating period Japan will produce approximately 700kg of supergrade plutonium from Monju. The commercial justification for acquiring such a stockpile is that the preferred fuel for future FBRs is weapons-grade plutonium. The military justification would be that it is excellent plutonium and that it gives Japan the option of having the most reliable nuclear warheads in terms of both yield and operation. Even using optimistic demand figures, it has been calculated that Japan's excess stockpile of reactor-grade weapons-usable plutonium will be over 80,000kg by 2010. Consequently, and with some justification, it will be difficult for Japan to explain the peaceful requirements for supergrade plutonium and the RETF to its regional neighbours and the wider international community.

Through the use of an effective beryllium reflector, as little as 3kg of supergrade plutonium is needed for one nuclear warhead. Japan by the year 2004 will therefore have sufficient supergrade plutonium for over 230 nuclear weapons. The explosive yield would be at least 20,000 tonnes TNT-equivalent. A warhead of such a size would be suitable for an advanced cruise missile, weighing no more than 150kg, and giving a range of around 2,500 kilometres. If Japan were to develop intercontinental ballistic missiles (ICBMs), of the multiple independently-targetable re-entry vehicle (MIRV) type, the weight would be around 350kg. Significantly, Japan's development of the H-2 space launch vehicle, including an Orbital Re-entry Experiment capsule, which has a payload capacity of 4000kg, would thus, if adapted for military purposes, allow more than 10 warheads for each missile.

An alternative method for Japan to obtain larger quantities of weapons-grade plutonium would be for the supergrade to be blended with a stock of reactor-grade plutonium, as the U.S. is believed to have done. The ratio for blending is 85% supergrade, 15% reactor grade. In other words, ten years accumulation of 700kg of supergrade plutonium, if blended with reactor-grade, could provide approximately 823kg of weapons grade plutonium, sufficient for around 274 nuclear warheads. Of course, if Japan wished to have larger numbers of warheads, it could utilise its stock of separated reactor grade plutonium, which by 2010 will be over 110,000kg.

Japan's expertise in nuclear and missile technologies would enable it to acquire a formidable nuclear-weapon force if the political decision was taken to do so. The warheads would be able to be delivered with great accuracy, giving Japan the ability to target hardened military installations. Using worst-case analysis, hawkish strategists and nuclear weapons enthusiasts are likely to argue for a strategic nuclear force large enough to target many military installations in a chosen region - the so-called counterforce strategy. Such a strategy is the most destabilising of all nuclear weapons strategies as it leads to a nuclear first-strike policy and pre-emptive strikes.

Such a development may seem far-fetched, but in a manner suggesting that a debate has already begun, former Japanese Prime Minister Miyazawa wrote in March 1994, that,

". . . if the Japanese constitution would change to allow overseas military deployment. . . it is

likely that a decision will take place over nuclear weapons. . . If nuclear weapons are not able to located on the land, then people would say, why not on submarines?"

Further evidence that adds to increasing concern over Japan's commitment to nuclear weapons development was revealed in July 1994. According to reports, the Foreign Ministry drafted a report titled "Prerequisites of Japan's Foreign Policy", in 1969, which recommended that the country would maintain and where necessary develop the financial and technical means to develop nuclear weapons - ***"no matter what foreign pressures were applied."***

The report was drafted by the ministry bureaucrats for use as a policy guideline. Further, the report recognised the need for Japan to maintaining a policy of not possessing nuclear weapons, but this was for the "time being".

The report was directly related to Japanese policy vis a vis the NPT, which at the time was a major political battle inside the various Japanese ministries. Undoubtedly, the drafting of the report was linked to reassuring pro-nuclear weapon advocates that Japan's signature and ratification of the Treaty would not limit its future nuclear weapon options.

Conclusion

"We can ascribe our degree of advancement today in large measure to the training and assistance so willingly provided by the United States of America during the early years of our nuclear program when several of the Western world's nations co-operated in initiating our scientists and engineers into nuclear science." Dr A.J.A. Roux, Chair of the South African Atomic Energy Board,1977.

That the United States has supplied technology and materials that have direct nuclear weapons application to Japan should come as no surprise to close observers of nuclear technology proliferation over the past 50 years. The RETF in this sense is a direct descendent of the "Atoms for Peace" initiative of the 1950's. Although the U.S. has sought to apply the condition that all U.S. origin technology and material supplied to non-nuclear weapon states be used solely for peaceful purposes, more than doubts have been raised as to the proliferating nature of Eisenhower's idea. As a former IAEA Assistant Director has stated, the U.S. and the West in effect,

". . . set about to teach each other and then the rest of the world the first and sometimes the all-but-last steps on the path to nuclear weapons."

Formal U.S. approval for Japan's reprocessing programme is contained in Article 1 of the Implementing Agreement of the Agreement between the United States and Japan Concerning Peaceful Uses of Nuclear Energy of 1987, (the U.S./Japan Agreement). In the context of proliferation, the United States concluded that the agreement would not significantly increase the risk of proliferation, and would not be inimical to each nation's common security and defence. Japanese adherence to the NPT and IAEA safeguards, the U.S./Japan mutual defence treaty, and the absence of any discernable military, strategic, or political incentive for Japan to initiate a nuclear weapons programme, were all factors that supported U.S. policy.

However, a more critical assessment of these factors would have reached a different conclusion. Certainly the developments in the last two years now justify a re-examination of Japan's commitment to non-proliferation and the effect of its plutonium programme on international non-proliferation efforts. Such an assessment could explore such issues as: the effect of Japan's plutonium programme on regional neighbours, including its relationship to the crisis over the plutonium programme of the DPRK, as well as its influence on the Republic of Korea; capability of safeguards to detect all diversion; effect of Korean crisis on Japan's defence policy; Japanese perception of reliability of U.S. nuclear umbrella, conventional defence cooperation, and its effect on Japanese policy.

There can be no definitive answer as to why the United States has provided some of its most advanced and proliferation- sensitive technology to Japan, particularly after past experience, when civil nuclear training by the United States led directly to weapons development in so-called threshold states. A mixture of benevolence, practical political calculations, pressure from interest groups and commercial considerations, as well as the influence of the Cold War - are all factors that have played their part in U.S. collaboration with Japan.

Two additional factors require mention. Firstly, United States collaboration with Japan is considered a form of oversight by U.S. agencies. What better way to have access to Japan's weapons-capable plutonium programme than to be actively involved in its development? - this may be used as an argument to justify U.S. assistance with RETF. However, there is no guarantee that U.S. oversight will exist indefinitely, also at an appropriate future date a government in Tokyo could make the decision to militarise their programme. The historical change in the balance of power between both countries, further undermines the U.S. case. However, what should finally rule out this line of argument is the context of the 1980's and the presidencies of Reagan and Bush. The Agreement was concluded and predominantly operative during the Reagan/Bush presidencies, both of which had actively sought the reversal of non-proliferation policies of previous administrations. The threat during the 1980's was the Soviet Union and its satellites, not nations such as Japan. The phrase "my enemy's enemy is my friend" certainly applies to this period, with U.S. assistance to Pakistan and Iraq's nuclear development, all evidence of the failure of U.S. non- proliferation policy. Nuclear non-proliferation, especially with "friendly nations" was not a priority during the 1980's. However, is it is supposed to be a priority in the 1990's, but collaboration continues.

Another explanation that certainly poses more questions than answers, is that the United States has accepted that it cannot stop Japan acquiring nuclear weapons. In fact, senior U.S. officials including National Security Advisor Henry Kissinger believed in the past that it would be in the interests of the United States for Japan to have nuclear weapons, most recently Kissinger has stated ambiguously that he believes Japan already has a nuclear weapons programme.

Advanced weapons technology and nuclear materials are available to Japan in abundance. Once Japan has made the decision it would require less than 30 days to construct a nuclear weapon. Assuming that U.S. policy is not to encourage Japan to acquire nuclear weapons, a defence of this approach would argue that only through a constructive relationship with Japan can the U.S. exercise political leverage over Japanese nuclear policy. By maintaining confidence in the U.S. defence commitment to Japan, and assisting in the development of its nuclear programme, it is hoped that Japan will have insufficient incentive for making the final step - nuclear weapons construction. This is indeed a reasonable explanation of U.S. policy decisions. U.S. officials would undoubtedly describe such an approach as effective non- proliferation, emphasising the twin-track approach of technical and political impediments to weaponization.

If we accept this explanation, it also must be acknowledged that at a certain point factors will emerge that argue in favour of a Japanese nuclear weapons programme. We may already have reached that point, as result of the nuclear programme of the DPRK, the precise status of which remains unclear. Undoubtedly, the latter is being used to argue for weaponization by Japan. In this sense, ineffective non-proliferation policy in the past continues today, and its failures will become more evident in the near future. This can hardly be considered a ringing endorsement of either international non-proliferation diplomacy as codified in the NPT, or of the national policy of the

United States, but it may be close to the truth.

Finally, the technology itself has been transferred to Japan in violation of one of the cornerstones of U.S. (and therefore international) non-proliferation legislation, the NNPA. As well as the U.S.-Japan Cooperation Agreement itself. Branches of government, primarily the Departments of State and Energy, have defied the will of the United States Congress in supplying design plans, and actual hardware to Japan, the nature of which is sensitive. That the technology is the product of the United States nuclear weapons programme makes the matter all the more serious.

For those in favour of genuine and effective nuclear non-proliferation, it is indeed appropriate that these disclosures have emerged at this time. A decision on the future of the NPT approaches in 1995 and the issues raised in this paper are directly relevant to that decision. They include the discriminatory nature of current non-proliferation practise as exemplified by the DOE Guidelines. IAEA safeguards ineffectiveness, which was demonstrated this year at the Tokai plant in Japan and which would allow for the diversion without detection of sufficient plutonium from RETF for a number of nuclear weapons. There is also the question of the peaceful intentions of Japan, which with the RETF and FBR-origin plutonium, it has been shown, could have a very advanced nuclear weapons programme. The implications for Asian security and non-proliferation, and therefore international confidence in the effectiveness of NPT, are obvious.

Both countries considered in this report, the United States and Japan, support indefinite extension of the NPT. In the former's case, they are actively encouraging other states that this is the only viable option, arguing that anything else would undermine the credibility of the Treaty. After all it is the cornerstone of international non-proliferation. Coincidentally however, the U.S. government departments that are promoting indefinite extension, are the same agencies that have overseen the transfer of nuclear weapons technology to Japan, thereby violating one of the central pillars of U.S. non-proliferation legislation. The credibility of the United States in dictating the nonproliferation agenda is already flawed. The story of the RETF should finally remove whatever credibility the U.S. retains.

Demands

United States-specific

1) Assessment to be made public by the U.S. State Department and
U.S. Department of Energy into all past and present cooperation with Japan and other countries in the plutonium fuel cycle. This assessment, which must contain a full listing of all information, data and technology transferred to Japan, must lead to an official statement of cancellation of all cooperation in research and development in the plutonium nuclear fuel cycle. Cancellation of cooperation is necessary to bring State Department and DOE policies in line with President Clinton's non-proliferation policy of not encouraging the civil use of plutonium.

2) Identification and, as much as possible, return, of all technology, information and data which has been transferred to the Japanese since 1988 which "are not available to the public and which are important to the design, construction, fabrication, operation or maintenance of enrichment, (and) reprocessing... facilities".

3) Immediate revocation by the State Department of consent rights to Japan involving transfer of U.S.-controlled nuclear materials until such time as the State Department and DOE and the Japanese PNC divulge what transfers of information and technology have unlawfully occurred under the U.S./Japan Nuclear Cooperation Agreement. As much as possible, such transfers must be returned to DOE before restoration of consent rights is considered.

4) Congressional investigation into: 1) unlawful transfers to Japan of Sensitive Nuclear Technology (SNT) which have taken place since the US/Japan Nuclear Cooperation Agreement went into effect in 1988, and 2) transfer of SNT to all other countries in order to determine the compliance of such transfer with the Nuclear Non-Proliferation Act and specific country nuclear cooperation agreements and non-proliferation goals.

5) Full disclosure by April 1995 on the occasion of the Review and Extension Conference for the Treaty on the Non-Proliferation of Nuclear Weapons, NPT, of technologies related to plutonium fuel cycle which have been transferred from NWS to NNWS since 1970.

Japan-specific

1) Halt to construction plans for Recycle Equipment Test Facility, RETF.

2) Return to the United States of all U.S. origin Sensitive Nuclear Technology (SNT), including information and data, with assurance that no SNT transferred from United States will be made use of. Pledge not to receive any further SNT from United States, or any other state.

3) Halt to operation of Monju and Joyo FBR.

4) Existing supergrade plutonium stock removed from national control.

5) Full disclosure of 1969 Foreign Ministry document on nuclear weapons development.

International

1) Negotiation of comprehensive fissile material cut-off for all weapons-usable materials.

Acronyms (omitted here)

Appendices

1 - Memorandum of Agreement Between the United States Department of Energy and the Power Reactor and Nuclear Fuel Development Corporation, Japan for Joint Collaboration in the Field of the Nuclear Fuel Cycle: Liquid Metal Reactor (LMR) Reprocessing Technology, 1987.
(omitted here; unscannable)

2 - Summary of Technical Plan for 5-Year Research and Development Program for Joint Collaboration Program in the Field of Nuclear Fuel Cycle: Reprocessing Technology, 1987.

3 - Memorandum: Analysis of the Lawfulness of the Transfer of Sensitive Nuclear Technology from the United States to Japan. (NOTE: All of the following appendices omitted here; unscannable)

4 - Guidelines for the Designation of Sensitive Nuclear Technology, Political Military Affairs Division, Office of International Security Affairs, Department of Energy, July 1986.

5 - Greenpeace to DOE regarding Sensitive Nuclear Technology, August 26, 1994.

6 - Department of State to Greenpeace regarding exchange of diplomatic notes between

Government of Japan and U.S. Department of State, July 28, 1994.

7 - Department of Energy to Greenpeace confirming Sensitive Nuclear Technology (SNT) transferred to Japan, July 25, 1994.

8 - Greenpeace to Department of Energy requesting design information on RETF technology, May 10, 1994.

9 - Department of Energy to Greenpeace providing Agreement, deferring to PNC Japan on design information, April 1, 1994.

10 - Department of Energy to private U.S. citizen (confidential), denying transfer of fuel reprocessing technology suitable for separating weapons-usable plutonium, and confirming on-going collaboration with Japan, March 25, 1994.

11 - Department of Energy to Greenpeace, acknowledging request under FOIA for contract details, agreements and design plans regarding RETF, October 18 1993.

Appendix Two

Technical plans for 5-year R&D program for joint collaboration program in the field of nuclear fuel cycle: reprocessing technology - Appendix One to the Agreement

Appendix 1 describes the technical scope and the timeframe for the activities carried out by PNC and DOE. Its primary focus is the work of the Consolidated Fuel Reprocessing Program (CFRP) based at ORNL. It is made clear that Japan would gain under the Agreement access to technology, facility and component designs of the CFRP, as well as the testing of prototype components in the laboratories in the United States.

The responsibility for the national management of the U.S. portion of the collaborative program was to be that of the Division of Fuels and Reprocessing, at DOE headquarters. Field management was the responsibility of the Oak Ridge Operations Office, DOE. CFRP was managed within the Fuel Recycle Division at ORNL.

The Japanese portion of the program was the responsibility of the Reprocessing Development Division of PNC. The Engineering Technology Development Division at the Tokai-mura works responsible for the day-to-day technical management of the program.

Summary of technical program activities

Under the heading of Continuous Head-End Process Technology Laser Disassembly - the long-term objective was for both Parties to design and/or review the Japanese disassembly system. PNC were to deliver their design to ORNL by May 1987 for examination. At ORNL dummy fuel elements from Clinch River Breeder Reactor and Monju FBR would be disassembled, followed by the testing of the control system for the cutting of fuel elements. A summary report on the U.S. laser disassembly system was to be completed.

Under this work PNC had access to many years of R&D at ORNL conducted since the 1970's. The feasibility of laser cutting was established by ORNL subcontractors. PNC was reported to have only been working on laser disassembly since the mid-1980s. PNC's completed advanced prototype model was to be reviewed by the CFRP.

The tests were conducted at the Remote Operations and Maintenance Demonstration (ROMD) Facility at ORNL, cold testing of the laser system was to take place in PNC facilities.

(definition of disassembly - to remove the non-processable metallic hardware (end fittings and shroud) from spent fuel (including blanket) assemblies, prior to shearing.

Fuel Shearing - the objectives included, preparing technical report on the U.S. shear development program, complete shear test of PNC LMR-type fuel, and assist PNC to design a part or all of a shear system.

Certainly PNC stood to gain from over 40 years of shearing experience in the United States, ostensibly developed in the nuclear weapons programme. Specifically the Remote Shear System (RSS), designed and developed under the CFRP which was to have been used for CRFR fuel, as well as other designs were available to PNC.

(definition of shearing - prior to dissolution in nitric acid, spent fuel bundles (including blanket) should be chopped into small pieces, shearing the bundles is considered the most feasible approach).

Fuel Dissolution - the overall objective was for the development and design of a geometrically-safe, continuous, rotary dissolver for the RETF.

Again, Japan stood to gain from years of development work under the CFRP. Especially important was the work undertaken in criticality and process development. The Integrated Equipment Test (IET) facility of the CFRP operated with a continuous rotary dissolver. In the words of the Technical document, "Incorporation of the continuous dissolver technology developed at ORNL into the PNC HETF development and design plans can provide Japan with ... advantages." p.33, 5.1.3.2.

(definition of dissolution - following chopping of assemblies the spent fuel is immersed in nitric acid, leading to the dissolution of the spent fuel products. Various aqueous methods of reprocessing have been developed over the years, in the U.S. and elsewhere. Continuous dissolution which was to be developed for use in the RETF, is considered to have advantages over other methods, such as batch. These include, continuous exposure of the most difficult to dissolve fuel, constant flow and composition of off-gas, and improved rinsing of metal scrap. Off-Gas Handling (Iodine Treatment) - the objective was to provide assistance in the off-gas handling area of the RETF. With PNC gaining access to the prior work of the U.S. in iodine retention on solid-sorbents, including waste disposal methods. No test facilities were involved as of 1987.

(definition of off-gas handling (iodine treatment) - the removal of iodine gas that is released during the dissolution process, by means of carbon filters and silver-containing sorbents (including silver exchanged faujasites and mordenites).

Under the heading Solvent Extraction/Process Automation

Fluid Transfer - the objective was to provide fluid transfer devices (more commonly termed pumps) for installation in the RETF. Again years of experience gained under the CFRP would be made available to PNC. It was made clear that ORNL would be able to design and fabricate various pump designs for testing at Tokai.

(definition of fluid transfer - the spent fuel products once dissolved are in a liquid nitrate form, and require to be moved through the plant. Various pumping devices have been developed over the years to undertake this work. Due to the mechanical complexity and the vitally important role that they play in the reprocessing plant, reliability has been a major determining factor in the past.

Solvent Extraction Contractors - considered the key chemical operation in any reprocessing plant, it involves the separation of uranium and plutonium from fission products in the spent fuel. The long-term objective of this work was to complete centrifugal contactor development in the years to 1991/92. This would involve laboratory investigation, testing of alternatives, process control system development, and eventual demonstration of complete solvent extraction cycle with centrifugal contractors using uranium.

According to documents, PNC identified this area as one of their priorities for collaboration with the U.S. The latter's involvement was to specifically discuss and implement the integration of U.S. design technology for centrifugal contractors with the test facilities in Japan. To this end, a summary report of U.S. contactor design and process control, as well as of U.S. experience in operating centrifugal contractors was made available to PNC. This apparently included access to data from U.S. military facilities.

"Operating experience (of contractors) has included some 19 years of excellent plant operating experience at the Savannah River Plant on contractors (supplemental - of design similar to the present unnular mixing zone. Research continues on expanding our understanding of the various design parameters and on increasing the overall reliability of the contactor system."
Solvent Extraction Contractors (II.b.), p.45,5.2.2.1.

The Technical Document makes it clear that the U.S. was prepared to transfer all technology of the advanced contractors now under development. Research and development was to be centred at the ORNL site, including the IET facility and in Japan at EDF-1. The IET was developed under the CFRP partly to demonstrate new concepts for the control of advanced nuclear fuel reprocessing plants. Automation studies are a central activity at the IET. (definition of centrifugal contractors - in the case of DOEIPNC collaboration, the method of solvent extraction was the use of centrifugal forces. The separation and recovery of the uranium, plutonium and fission products can be inhibited by the degree to which products from solvent degradation build up. One option is to reduce the time exposure of the solvent to the radiochemical process. By using centrifugal contractors separation of the plutonium and other products can be speeded up. The start-up and shut-down times are also reduced, in contrast to the pulsed column method of solvent extraction. Flexibility for the operator is thus increased. Plant costs would be reduced due to the reduction in required headroom.

Laboratory tests were conducted before the end of the 1988; followed by a comparison of U.S. and Japanese technology, during the 1988-93 period, followed by final overall plan for contactor development in Japan.

Flowsheet Studies - a significant area of collaboration, as the intention under the Agreement was to prepare a breeder reprocessing flowsheet that was a result of DOE/PNC collaboration. The variety of processes that had been tested at ORNL and the resultant flowsheets that were compiled, were made available to Japan. Consequently, PNC stood to gain significantly from access to this data, especially since the higher plutonium and fission product content associated with FBR operation, required that variations on the Purex process be tested. This all added to the cost and the amount of time required to develop the most appropriate method of reprocessing, all of which PNC would have had to develop independently.

Fortunately for Japan, the United States had pursued these activities for as many as 15 years, including at the ORNL Solvent Extraction Test Facility (SETF). The result being that the optimum methods (at least so far researched) had already been identified.

Both parties were to prepare summary reports on such things as: partitioning chemistry, kinetic effects in the Purex process, fission product chemistry, and plutonium in dissolution residue. Limited laboratory tests were to be conducted, specifically the plutonium laboratory facilities at ORNL.

The ultimate objectives for PNC were described as the following: (note that for the design and early operation of the RETF, especially, data from items i-iii were required):

i - simplification of the extraction cycles (achieve fewer decontamination cycles (two cycles) by increasing DF's of Zr, Nb, Ru, and Np;

ii - reducing the MA waste, i.e. applying salt-free process on U/Pu partitioning and solvent cleanup;

iii - management of Neptunium as well U, Pu, i.e., developing the valency adjustment method for Neptunium in Purex solutions;
iv - utilizing the platinum group metals (pd, Ru, Rh) and Tc,
i.e., developing the recovery method (dissolution and extraction) in a Purex process.

We assume that a meeting of specialists, that was due to be held in May 1987, did in fact take place, though we cannot confirm this since we do not have the documents covering this period.
(definition of flowsheet - a chart that shows the successive stages of an industrial process, in this case the operation of a reprocessing plant)

SOLVENT TREATMENT - the objective was to establish an operating solvent treatment system in the RETF, with USDOE providing consultation and assistance to PNC. The RETF will utilise the salt-free method using carbonate or hydroxylamine/organic acid for solvent regeneration. The USDOE were to assist in planning of hot tests and in evaluating the RETF flowsheet.

(definition of solvent treatment - to dissolve the material within a spent fuel element which is necessary to access the plutonium and uranium oxides acids).

(definition of process monitoring - monitoring of the throughput of a reprocessing plant, in this case through computerisation. Identified as one of the major problems for safeguards at reprocessing plants, is the tracking of plant data which indicates such things as throughput. Through the employment of process monitoring technology and techniques it was believed that timely and sensitive safeguards analysis would be achieved.)

Under the heading of Remote Technology

Rack Experiments - the objectives were to identify the relationship between the maintenance system and equipment racks. To be followed by extensive tests including the RETF racking system. PNC were to provide an on-site representative for tests, as agreed in the Remote System Technology Exchange meetings.   Engineering design documents of the BRET facility in the U.S. were to be issued in time for incorporation into the design plans for RETF.

(definition of rack experiments - following advances in maintenance technology in the 1970's, the DOE developed equipment frames or racks, one area of ongoing R&D was to improve the rack equipment storage interface with the maintenance system.)

Remote Sampling - the objectives were to design a demonstration sampling vehicle, test system as to used in the EDF-III (Tokai) at the IET facility at ORNL, followed by further design and testing for the RETF sampler system.

The sampling of radiological material was an important activity within reprocessing, both as a means to reduce radiation exposure of workers (even more important with the high burn-up rates of FBR fuel) and to improve the safeguarding of nuclear materials.

ORNL has conducted extensive R&D in this area,with particular emphasis on automated sampling using an in-cell self-propelled vehicles, with on-board intelligence (a microprocessor).

According to the Technical Document the sampling system was to be tested at the ORNL ROMD facility. It will then be shipped to Japan and additional testing and personnel training will be performed in the ED-111, if required.

(definition of remote sampling - allows the operator to track the radiological make-up of the throughput. A remote tracking vehicle, extracts samples of process liquid from the in-cell processing area, which are then taken to the analytical cells for testing.)

Signal Transmissions--the objective was to install and test communications systems that will operate between in-cell mobile systems and fixed facility control rooms. Particular attention was necessary to the effects of radiation levels. A summary of past CFRP experience was to be presented to PNC.

(definition of signal transmissions - both audio and visual communications systems that are reliable and resistant to radiation effects, would be installed in a reprocessing plant, the form of transmission would be micro-wave.)

Low-Flow Ventilation/Environmental Test Chamber - the objective was to use the ORNL Environmental Test Chamber (ETC), in collaboration with PNC to test the reliability of in-cell equipment. As described by the Technical Document, the atmosphere of future reprocessing plants will be low oxygen concentrations and low humidity. The low-ventilation approach will discharge only enough cell gas to compensate for the small in-leakage of outside air into the cell, as well as supplying nitrogen to dilute the inleaking air. The concept will be tested as well as amassing data on the corrosive effects on materials in the cell area.
(definition of low-flow ventilation - to use only minimum transfer of gas to compensate for the leakage of outside air, so as to maintain the low-oxygen, low-humidity within reprocessing plants.)

Completion of Current Remote Systems Technology By Exchange - refers to an earlier agreement from 1983, that was to permit the design, development and testing of equipment for remotely maintained process equipment, necessary due to the hazardous environment within process areas.

Under the heading of Design Optimization of Facility

Radiation/Dose Effects - with the objective of testing their effects on such things as electronics and shear hydraulics.

Techniques developed at ORNL would be integrated into the RETF.

As reprocessing plants become more automated, the sensitive technology/electronics will have to withstand damaging radiation levels, ORNL test results will improve the operation characteristics of the equipment.

(definition of radiation/dose effects - refers in this instance to effects on microelectronics and other radiation sensitive equipment.)

Planning Assistance - the USDOE CFRP will advise the PNC on their R&D plans for breeder reprocessing technology based upon U.S. experience. No tests, rather ongoing advice and collaboration.

Rack Optimization - the objective was for CFRP experience in stacking equipment on structural frames or racks would be utilised by PNC. CFRP would provide the design guides of RETF racks. It was also stated that optimum rack designs would be applicable to other PNC facilities, these could include for example future MOX fuel plants and the Rokkasho reprocessing plant.

Appendix Three

Memorandum: Analysis of the Lawfulness of the Transfer of Sensitive Nuclear Technology from the United States to Japan.

LAW OFFICES
GARVEY, SCHUBERT & BARKER
FIFTH FLOOR
1000 POTOMAC STREET N.W.
WASHINGTON, D.C. 20007
(202) 963-7880

MEMORANDUM

VIA HAND DELIVERY

TO: Greenpeace

FROM: Eldon V. C. Greenberg

DATE: August 29, 1994

RE: Analysis of the Lawfulness of the Transfer of Sensitive Nuclear Technology from the United States to Japan

As requested, the purpose of this memorandum is to provide Greenpeace with my analysis of the lawfulness of any transfers by the United States of breeder reactor reprocessing technology to Japan. As set forth below, I believe that it appears likely that at least some of this technology, to the extent it is not available to the public, would be determined objectively to meet the definition of "sensitive nuclear technology" ("SNT") set forth in Section 4(a)(6) of the Nuclear Non-Proliferation Act of 1978, Pub. L. No. 95-242 (the "NNPA"), and Article 1(j) of the Agreement Between the United States and Japan Concerning Peaceful Uses of Nuclear Energy, H. Doc. No. 128, 100th Cong., 1st Sess. 8 (Nov. 9, 1987) (the "U.S.-Japan Agreement"). In such circumstances, under the terms of the NNPA and the U.S.-Japan Agreement, its transfer to Japan from the United States would be unlawful.

(1) Statement of Relevant Facts

In 1987, the United States Department of Energy ("DOE") and the Power Reactor and Fuel Development Corporation of Japan ("PNC") entered into a collaborative research and development program focused on "technology for breeder reprocessing". The parties' understandings were memorialised in a Memorandum of Agreement for Joint Collaboration in the Field of the Nuclear

Fuel Cycle: Liquid Metal Reactor (LMR) Reprocessing Technology, executed by DOE in January 1987 and PNC in June 1987. Appendix I to the Memorandum of Agreement contained the technical plan for the joint R&D program. Article 12 of the Memorandum of Agreement specifies, "Each party's activities under this Agreement shall be in accordance with its national laws and regulations and the applicable Agreement for Peaceful Nuclear Cooperation between the two Governments."

The collaborative effort has extended to the design of what is now called the Recycle Equipment Test Facility (the "RETF") -a facility which PNC plans to build at Tokai to process fuel and blanket material from the Monju and Joyo breeder reactors. The Government of Japan has indicated, in a diplomatic note presented to the United States, that the RETF is scheduled to be operational in April, 2000. The facility would be used for the "development of fast breeder reactor reprocessing technologies through engineering-scale hot demonstration tests on advanced equipment and acquisition of engineering data base for use in design and operation." It would have a nominal throughput of 1.3 tons/year of core fuel and 5 tons/year of blanket fuel.

Over the past several years, DOE's Oak Ridge National Laboratory ("ORNL") may have transferred to PNC substantial design information relevant to the construction of the RETF. Among other things, ORNL delivered to PNC copies of a design for the RETF Fuel Disassembly System. As far as Greenpeace is aware, such information does not appear to be available to the public. The collaborative agreement between DOE and PNC was supposed to run for a period of five years. However, although Greenpeace has not been provided documentation to this effect, it seems to have been extended, and there appears to be ongoing cooperation between DOE and PNC at least in the area of robotics for the RETF.1 It is Greenpeace's understanding that design information for the RETF was sent by ORNL to PNC as late as the summer of 1993.

1 Article 14 of the DOE-PNC Memorandum of Agreement, it should be noted, allows for extension of the Agreement "by mutual written agreement of the Parties."

In seeking more detailed information from DOE about the nature of its collaborative venture with PNC, Greenpeace asked DOE whether it had determined that no "sensitive nuclear technology" within the meaning of the NNPA and the U.S.-Japan Agreement was being transferred to Japan. In a letter to Greenpeace dated July 25, 1994, Terry Lash, Director of DOE's Office of Nuclear Energy, responded that DOE had determined "that SNT was not involved as a prerequisite for entering into the existing arrangement." The same letter noted that information "may be considered SNT if provided to a country with a less developed nuclear program."

The distinction drawn between the characterization of information when it is provided to a country such as Japan and when it is provided to a "less developed" nuclear country apparently derives from DOE's "Guidelines for the Designation of Sensitive Nuclear Technology", dated July 1986 (the "DOE Guidelines"). The DOE Guidelines, which were never noted for public comment or formally published, purport to allow DOE to determine whether particular information constitutes SNT in part based upon the "level of expertise of the information recipient". In other words, under the DOE Guidelines, hypothetically information may not constitute SNT if provided to a technically sophisticated recipient but would constitute SNT if provided to a recipient with more limited nuclear expertise.

(2) The Applicable Legal Framework for SNT Transfers

The legal framework applicable to SNT transfers is simple and straightforward. As noted above, activities under the 1987 Memorandum of Agreement are subject to the requirements of the NNPA and the U.S.-Japan Agreement. In essence, if information constitutes SNT as defined in the NNPA and the U.S.-Japan Agreement, then its transfer to Japan is prohibited.

SNT, as relevant to your inquiry, is defined in Section 4(a)(6) of the NNPA to mean:

any information (including information incorporated in a production or utilization facility or important component part thereof) which is not available to the public and which is important to the design, construction, fabrication, operation or maintenance of a...nuclear fuel reprocessing facility..., but shall not include Restricted Data....

There are thus three elements to a determination whether particular information is SNT. First, the information must not be "available to the public". Second, it must be "important to the design, construction, fabrication, operation or maintenance of a...nuclear fuel reprocessing facility." Third, it must not be "Restricted Data", i.e., data whose disclosure is restricted under Chapter 12 of the Atomic Energy Act .2

2 The DOE regulatory definition of SNT, it should be noted, is to the same effect, embodying the same three elements. See 10 C.F.R. # 810.3. It also underscores that "information may take a tangible form such a model, prototype, blueprint, or operation manual or an intangible form such as technical services."

As expressed in the NNPA, the standard of determination is objective and technology-based. There is no suggestion in the Act that information, for example, may be SNT for some purposes, i.e., an export to a less developed nuclear country, but not SNT for other purposes, i.e., an export to a country with a sophisticated nuclear program. Rather, as long as information is "important" from a technological standpoint in the context of facility design, construction, etc., regardless where that facility is located, then the "importance" criterion would appear to be satisfied.

Once it is determined that particular information constitutes SNT, then an array of requirements under the NNPA is applicable. Under Section 123 of the Atomic Energy Act, 42 U.S.C. # 2153, for SNT transfers to be permitted at all, agreements for cooperation must provide controls over such transfers equivalent to controls over transfers of facilities and fuel. Moreover, Section 127 of the Atomic Energy Act, 42 U.S.C. # 2156, establishes export criteria governing all "exports...of...any sensitive nuclear technology."3 Further, under Section 128 of the Atomic Energy Act, 42 U.S.C. # 2157, SNT may not be transferred to a non-nuclear-weapon state which does not have full-scope safeguards. As specified in DOE regulations, in connection with any technology transfers subject to DOE approval under Section 57b. of the Atomic Energy Act, 42 U.S.C. # 2073(b), and 10 C.F.R. Part 810, "the requirements of sections 127 and 128 of the Atomic Energy Act and of any applicable U.S. international commitments must...be met." 10 C.F.R. # 810.10(c).

3 Among other things, Section 127(6) mandates that no SNT may be exported unless the full panoply of MNPA Section 127 export requirements, i.e., application of safeguards, consent rights over reprocessing, consent for any subsequent retransfers, etc., be applied to "any nuclear material or equipment which is produced or constructed under the jurisdiction of the recipient nation or group of nations by or through the use of any such exported sensitive nuclear technology."

It is clear, in addition, that the NNPA requirements for SNT transfers apply to Government-to-Government transfers as well as to exports by private firms. The DOE Guidelines in fact expressly state (at 2):

[W]hile the DOE is exempt from Section 57b and the implementing regulations 10 CFR Part 810, the NNPA provisions related to SNT apply equally to all agencies of the government (including DOE) as well as private firms and individuals.

Consequently, NNPA requirements for SNT transfers govern collaboration between DOE and PNC of the sort provided for under the 1987 Memorandum of Agreement.

Finally, the export of SNT to Japan is expressly dealt with in the U.S.-Japan Agreement. Article 1(j) of the U.S.-Japan Agreement defines SNT in essentially the same terms as Section 4(b)(6) of the NNPA as information "not available to the public" and "important to the design, construction, n etc. of reprocessing facilities. The Agreement, however, does not contain the provision required by Section 123a.(9) of the Atomic Energy Act to authorize any SNT transfers. Instead, Article 2(1)(b) provides precisely to the contrary, stating, "Sensitive nuclear technology shall not be transferred under this Agreement." The Nuclear Proliferation Assessment Statement prepared in connection with the U.S.-Japan Agreement explains that the effect of this provision is to render the various NNPA export requirements "inapplicable by precluding transfers of sensitive nuclear technology from the coverage of the Agreement." H. Doc. No. 128, supra, at 229. See also ld. At 262. In short, under the terms of U.S. cooperation, there can be no SNT transfers to Japan.

(3) Analysis

Given the legal framework just described, the question presented by DOE-PNC collaboration under the 1987 Memorandum of Agreement in connection with the design, construction and operation of the RETF is whether the information and data provided to Japan by the United States can and should properly be characterized as SNT. If so, then the transfer is flatly inconsistent with the requirements of the NNPA and the U.S.-Japan Agreement.

As reflected in the July 25 letter from Terry Lash to Greenpeace, DOE's position seems to be that the information and data provided are not SNT because the recipient is Japan – a nation with substantial nuclear reprocessing expertise – even though, if the information and data were provided to another, less advanced nuclear country, they might well constitute SNT. Notwithstanding the language of the DOE Guidelines purporting to authorize such a differential approach to SNT determinations, I believe that such an approach is not sustainable under the NNPA.4

4 While Federal agencies are permitted some discretion in adopting "reasonable" interpretations of ambiguous statutes, where Congress has "directly spoken to the precise question at issue", the "unambiguously expressed intent of Congress" must be controlling, and an agency interpretation inconsistent with that intent cannot stand. Chevron U.S.A. Inc. v. Natural Resources Defense Council. Inc., 467 U.S. 837, 842-843 (1984); American Dental Ass'n v. Shalala, 3 F.3d 445, 446-448 (D.C. Cir. 1993). As noted earlier, the language of both the NNPA and the U.S.- Japan Agreement is objective in nature. Once a technical determination is made that particular information is "important" in connection with facility design, construction, etc., that should be the end of the matter. The "facility" -- and its design components -- are no different whether the facility is located in Japan or some other country. If the determination of what constitutes SNT is interpreted any other way, it becomes an endlessly subjective exercise, in which virtually any conclusion is warranted based upon the U.S. assessment of the "expertise" of the recipient.5

5 Significantly, even the DOE Guidelines recognize that the first (and presumably most important) decision in the categorization process involves the assessment of "the technical significance of the information proposed to be transferred." DOE Guidelines at 7. Other factors, such as the "level of expertise of the information recipient", are only considered "as a further help" in making SNT determinations. Id. at 8.

The need for a single, objective determination of what constitutes SNT -- as opposed to country-by-country differences on this point -- is fundamental to the operation of the NNPA.

Congress understood in 1978 that controlling the export of SNT was as important as controlling the export of production or utilization facilities or special nuclear material. Otherwise, restrictions on exports -- and basic non-proliferation criteria governing the most dangerous nuclear technologies, i.e., those such as enrichment or reprocessing that can be used directly in weapons production -- could be readily circumvented.

A simple example serves to underscore the point. If reprocessing technology could, for instance, be exported to Japan without being subject to the requirements of Sections 123, 127 and 128 of the Atomic Energy Act, Japan could, in turn, build a reprocessing plant based on that technology and proceed to export that plant to a third country, including a country which did not meet basic U.S. non-proliferation standards, free from statutory U.S. retransfer controls .6 This is precisely what Congress intended to avoid in the NNPA, and an interpretation of the law which would allow such a result would create an enormous loophole in the Act's coverage and cannot be squared with its statutory purposes.

6 The 1987 Memorandum of Agreement between DOE and PNC, while it does (in Article 7) effectively restrict the dissemination of both "proprietary information" and "non-proprietary technical information" to third parties without the consent of the transmitting party, does nothing to ensure that facilities built and/or nuclear material produced through the use of such information will be subject to appropriate non-proliferation controls, as would otherwise be required by the NNPA.

In fact, the Congressional intent is clear. Thus, the House Report on the NNPA stresses that the purpose of applying the same criteria to SNT exports as to facility and fuel exports was to ensure that any facility replicated from such technology would be subject to the criteria. n H.R. Rep. No. 587, 95th Cong., 1st Sess. 23 (Aug. 5; 1977), reprinted in Subcommittee on Energy, Nuclear Proliferation and Federal Services of the Senate Committee on Governmental Affairs, Legislative History of the Nuclear Non-Proliferation Act of 1978. H.R. 8638 (Pub. L. No. 95242), 96th Cong., 1st Sess. 436 (Jan., 1979) (hereinafter cited as "NNPA Legislative History"). See also id. At 14, NNPA Legislative History at 427 (discussing requirement in context of new agreements for cooperation). The Senate Report makes the same point, notably distinguishing reactor technology exports (not subject to parallel controls), "given the extensive exchange of such information...between the U.S. and other nations." S. Rep. No. 467, 95th Cong., 1st Sess. 23 (Oct. 3, 1977), NNPA Legislative History at 479. See also id. at 16, NNPA Legislative History at 472. Per contra, of course, where information is not widely disseminated, as in the case of reprocessing technology, controls over the retransfer of technology exports are of critical importance.

Last of all, if SNT is to be determined in reference to a country's nuclear sophistication, the prohibition on SNT transfers in the U.S.-Japan Agreement would effectively be rendered nugatory. Presumptively, however, the absence of statutorily-required provisions in the Agreement necessary to authorize SNT transfers and the Agreement's explicit prohibition against such transfers reflect an unequivocal decision that nonpublic reprocessing technology as a general proposition would not be exported to Japan. Certainly, that is the meaning that any reasonable reader would take away from the Executive Branch's 1987 submission to Congress in support of the Agreement. See H. Doc. No. 128, supra, at 229, 262. For the Executive Branch to suggest that the prohibition is inapplicable to breeder reactor fuel reprocessing technology of the sort embodied in the RETF - the kind of nuclear technology which certainly most members of Congress would consider "sensitive" in any context – is insupportable, and the adoption of such a suggestion would amount to a breach of faith with Congress.

Conclusion

In sum, DOE is not free to designate the same technology as SNT for some recipients and not for others. The DOE Guidelines, to the extent they are -construed to authorize such a result, cannot be reconciled with the terms of the NNPA and of the U.S.Japan Agreement. Consequently, at least some of the collaborative efforts in connection with the design and construction of the RETF, to the extent some transferred data and information are non-public and, as admitted by DOE, would likely constitute SNT if provided to other countries, would appear to be unlawful.

ENDS
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