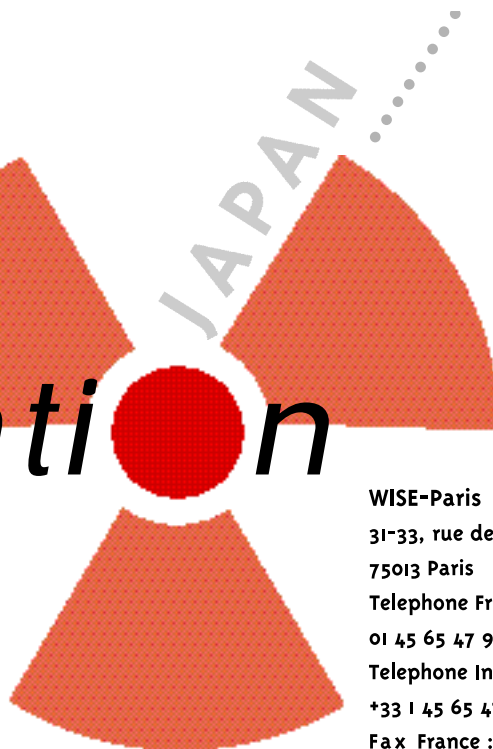


# Plutonium *Investigation*

N°2 JANUARY 1998  
Monthly - 20 FF



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## EDITORIAL

### Last In First Out

Japan is a latecomer. Japan is not a nuclear weapon state and therefore not in a position to develop plutonium technology in the framework of a nuclear weapons program. Japanese plutonium separation technology and plutonium fuel fabrication heavily depend on the French and US governments.

When the demonstration fast breeder reactor Monju experienced a severe sodium fire and was shut down in December 1995, it had been generating electricity for barely four months. The equivalent French reactor, Phenix, had at that time, been connected to the national grid for 22 years, while the British PFR had been disconnected from the national grid since 1994 after 20 years of operation.

Japan is lucky to be a latecomer. Considering the spectacular failure of the multi billion dollar plutonium investments in other countries, Japan ironically has more freedom of choice than others. While France and the UK have - so far - proven notoriously incapable of adapting their 30 year old plutonium policies to current realities and Germany has exported its plutonium problem to France and the UK, Japan is still able to avoid the pursuit of projects which have proven inefficient and expensive elsewhere: such as the large scale fast breeder, Superphenix, which was shut down on Christmas day, 1996, after 10 years of unprecedented bad performance or massive reprocessing facilities like those of Sellafield in Britain or La Hague in France, which have been stockpiling dozens of tons of plutonium at a horrendous cost and a zero market value. Last in first out ?

## JAPAN

Japanese electricity utilities operate 54 nuclear reactors, 51 of them being Light Water Reactors (LWR). These plants generated 293 billion kWh in 1996, which accounted for about 34% of the total electricity generation in Japan. Japan is with Belgium and Germany one of the three non nuclear weapon states to have developed a commercial reprocessing industry which produces the primary nuclear fuel and bomb ingredient, plutonium.

Demonstration facilities are operated by the state owned Power Reactor and Nuclear Fuel Development Corporation (PNC) while the commercial power plants are operated by regional utilities. The Japanese plutonium industry is today at a crucial point of its development because:

- it is between the demonstration and industrial stage; many decisions have yet to be taken even though earlier objectives have not yet been reached;

CONTINUED ON PAGE 2

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- its credibility has recently been deeply questioned with several significant accidents at various facilities during which the operator has each time tried to cover-up the extent of the damage from the authorities and the population. In all cases the operator was the State nuclear research organisation PNC.

**Plutonium Policy Objectives**

Japan is officially still planning to reprocess all of the spent fuel unloaded from its reactors. However, this objective is already far off. By the end of 1996, Japanese utilities had produced about 12,000 metric tons of LWR spent fuel of which 5,598 metric tons were earmarked for reprocessing contracts in France and the UK; at this date, some 1,579 metric tons had already been reprocessed in France and a few hundred tons in the UK. After having reprocessed roughly 13% of the spent fuel produced, Japan has had to change its policy - at least in the short term - and to stockpile more and more spent fuel. Japan is going to operate an already built 3,000 MT capacity spent fuel intermediate storage facility (pool type) on the Rokkasho-mura reprocessing plant site and is planning a further "away from reactor" intermediate storage facility.

Whereas the authorities have stated that the plutonium industry should be developed without generating a plutonium stockpile, requiring that only as much separated plutonium is produced as is necessary for the MOX production facilities, the inventory of Japanese separated plutonium has been increasing, and will increase over the next few years. At the end of 1996, the inventory of Japanese civil plutonium was one of the largest in the world with 20.1 metric tons of plutonium located in Japan and abroad.

**The Plutonium Industry**

Since Japan is not a nuclear weapon state, it has not developed reprocessing capacities to produce plutonium for a weapons program. Instead of building a plutonium industry from scrap, it has bought the technology from nuclear weapon states which had already made the heavy investments necessary. France is the most important supplier of this technology and know-how through SGN, an engineering subsidiary of COGEMA; this cooperation has enabled a demonstration reprocessing plant to be built at Tokai-mura, and the present day building of an industrial reprocessing plant at Rokkasho-mura. The amount paid for the blue print transfer is not known, but it is possibly lin-

ked to the multi billion dollar uranium enrichment services COGEMA supplies to Japanese utilities.

PNC operates a demonstration reprocessing plant at Tokai-mura, which, since 1977, has been reprocessing, on average about 45 metric tons of spent fuel per year -about half of its design throughput- (mostly from light water reactors). Since 1993, the nuclear fuel management company, JNFL, has been building an 800 MT annual capacity industrial reprocessing plant at Rokkasho-mura, based on the design of the two plants operating at La Hague, France. Japanese nuclear industry sources recently confirmed that the reprocessing plant will not be finished as planned in 2003, and its construction is "seriously behind schedule", as only 3% of the plant has been built. Earlier seismic requirements were not considered safe enough and were upgraded after the 1995 Kobe earthquake. Also, more severe aircraft falling and crashing scenarios have been considered in structural redesigns. Utility shareholders already expect future reprocessing costs to be 40% above those of BNFL and COGEMA.

PNC also operates two demonstration MOX fuel fabrication plants, which have produced fuel for the demonstration fast breeder reactor Monju and the demonstration advanced thermal reactor Fugen.

The Japan Atomic Energy Commission developed a "Long-Term Program for Research, Development and Utilisation of Nuclear Energy" in 1994. This program has defined clear objectives for the long term development of a plutonium industry, comprising at least one reprocessing plant, a MOX fabrication plant, together with the construction of commercial fast-breeder reactors. These objectives would necessitate the pursuit of research and demonstration programs in the short term period.

Even the owner JNFL admits that both construction and operation costs for the Rokkasho-mura reprocessing plant will be way above expected levels. This will seriously affect the economic viability of the MOX use policy. In 1994, AEC was already estimating that MOX would be "somewhat more costly than direct disposal". An independent analysis carried out in the framework of the International MOX Assessment Project (IMA, see box page 3) shows that MOX made in Japan would raise the fuel costs of LWR's by a factor of about 2.5. The subcontracting of reprocessing and MOX fuel fabrication to European companies would make

the process cheaper but would considerably increase transportation costs, in particular for the waste products generated in reprocessing operations.

### **New Delays in Schedules?**

After delays in the fast-breeder and the reprocessing industry programs, due mostly to the accidents at the Monju fast-breeder and the Tokai-mura reprocessing plant (See page 4), there seems to be a general questioning of the viability of the entire plutonium program. There has also been local opposition to the use of MOX fuel, notably from local governments.

The national government has requested the reorganisation of the research institution, PNC, which has lost much credibility with cover-ups after the two accidents at Monju and Tokai. PNC has started negotiations with private-sector entities on partial transfer of its commercial fuel-cycle technologies and resources. PNC will continue with research and development activities, on FBR's, FBR fuel fabrication and reprocessing facilities and the disposal of high-level radioactive waste. At the beginning of July 1997, a committee set up by the government to recommend measures to be respected by PNC stated that commercial activities should be entirely transferred to the private sector. It also stated that the Japanese designed advanced thermal reactor (Fugen) was to be abandoned - both the prototype and the demonstration program.

### **Future use of MOX fuel in Japanese reactors**

At the beginning of 1997, the Federation of Electric Power Companies (FEPCO) outlined its plans concerning the use of MOX fuel. FEPCO intends to use MOX in 18 reactors before the year 2010. Kansai Electric has planned to load two of its PWRs, Tokyo Electric two of its BWRs with MOX between 1999 and 2000. An unrealistic schedule given the fact that no Japanese reactor currently has a MOX license.

Japan does not have a commercial Light Water Reactor MOX fabrication facility. Japanese utilities are willing to accept plutonium recovered from spent fuel reprocessed in France and the UK converted into MOX fuel supplied by European MOX fuel fabrication plants. A first batch of MOX fuel will be produced in Dessel in Belgium with 483 kg of plutonium from the La Hague plant. The transfer of this plutonium from France to Belgium required a trilateral agreement between Belgium, Japan

and the European Atomic Energy Agency Euratom. Further transfers are not yet agreed upon.

Recently, the Japan Atomic Energy Research Institute (JAERI) issued a report analysing the plutonium industry in Japan. One of the results is to show that a future shortage of spent fuel storage capacity is foreseen for the year 2010. JAERI proposes not only increasing spent fuel storage capacity, but - acknowledging the delay in the building of the Rokkasho-mura reprocessing plant - to have more spent fuel reprocessed in France and in the UK. However, little attention is given to possibilities to enlarge the existing spent fuel storage capacities, on-site or away-from reactor.

**The International MOX Assessment Project (IMA)**, directed by Dr. Jinzaburo Takagi, after a two year study period, issued its final report in November 1997 (see p. 8 to order a copy). A certain number of recommendations was made to Japanese politicians, institutions and organisations; these recommendations are undoubtedly applicable to many other countries. Here are three extracts treating transparency, interim storage and MOX fuel fabrication:

#### **On Transparency**

The classification of information concerning nuclear matters should be entirely reviewed by a Commission, set up under the auspices of the Diet, its members should stem from civil society and be independent of any nuclear interests. The Commission should elaborate recommendations as to relevant future restrictions of access to information. The principle to be achieved is that information on nuclear matters is a priori public, and confidentiality, if ever necessary, has to be justified on a case by case basis.

#### **On Interim Storage of Spent Fuel**

Consultations should be engaged immediately with local governments and residents on potential intermediate storage sites for spent fuel. These locations include reactor sites as well as away-from-reactor facilities. The prior aim of the consultations should be the evaluation of the conditions for the acceptability of interim storage for spent fuel currently covered by reprocessing contracts.

Additional intermediate spent fuel storage capacity should be evaluated in a second step preceded by the elaboration of alternative energy scenarios, including the phasing out of the operation of a given nuclear plant.

#### **On MOX Fuel Fabrication**

The Japanese utilities have signed contracts with European MOX manufacturers before any impact assessment of its use in Japanese light water reactors has been accomplished and before any license for its use has been granted. These agreements should be cancelled, the utilities should not be permitted to build up a *fait accompli* in the debate over plutonium production and use in Japan.

## TWO ACCIDENTS HAVE LEFT THEIR TRACES: MONJU AND TOKAI

### Sodium Leak and Fire at Monju

On 8 December 1995, the secondary cooling circuit of the Monju reactor leaked 700 kg of molten sodium, the largest (known) sodium leak ever during the operation of a reactor. The leak occurred after the rupture of a measuring device (a thermometer well). The rupture was caused by a very basic design fault combined with the absence of an efficient system to detect such errors. A subsequent fire occurred as sodium burns when in contact with air and reacts violently when added to water. The fire and the chemical reaction attacked the metal lining on the floor up to a depth of 3 cm. The sodium corrosion products were spread throughout the plant because of a delay in shutting down the ventilation system. Furthermore, the failure to quickly shut down the 260 MWe demonstration fast-breeder reactor demonstrated a surprising weakness in PNC's sodium handling technology.

Two years after the accident, it is unclear yet if the reactor will resume operation.

One of the characteristics of fast-breeder reactors is the reactor coolant which consists of molten sodium rather than the water coolant used in light water reactors. The secondary cooling circuit, which removes heat from the primary cooling circuit transferring it to the electricity generating water circuit, is also molten sodium. The presence of hundreds or in some cases thousands of tons of sodium in fast-breeder reactors generates chemical risks which do not exist with water reactors. Even though extensive research programs on safety problems related to sodium have been pursued over the last thirty years, the chemical reactivity of sodium is not completely understood. On 31 March 1994, during the dismantling of the small research fast-breeder reactor, Rapsodie, at Cadarache, France, an unexpected reaction involving about 100 kg of sodium led to a violent explosion. A technician, an outspoken sodium expert, died in this accident and four others were injured.

The Monju sodium leak was not a severe nuclear accident, since it did not involve the release of radioactivity into the environment nor the injury to any of the reactor's personnel. The repercussions of the Monju accident are however very severe in terms of financial costs, the credibility of the operator, PNC, and for that matter, the credibility of the entire plutonium program. The operator was apparently unprepared for such a leak and the shut down procedure was not triggered as early as it should have been. PNC officials have also admitted trying to conceal information from the public, notably through the editing of a biased video tape which was distributed to the media. An investigation on the responsibilities of the accident has had a dramatic episode: the Deputy Administration Manager at PNC's head office, who had been designated chief investigator, killed himself after stating to the press that the head office had a responsibility in the cover-up.

The safety bureau of the government Science and Technology Agency (STA) suspended at the beginning of August 1997 Monju's operating license for a year. A local court also found PNC and two managers of the plant guilty of giving incomplete information in a report on the accident for STA. The governor of the Fukui prefecture, where Monju is located, appears to be opposed to the restart of Monju, at least in the near future. However, without his approval Monju cannot be restarted.

### Fire and Explosion at Tokai-mura

During the morning of 11 March 1997, a fire occurred in the bitumen waste facility of the demonstration reprocessing plant at Tokai-mura. The fire was not completely extinguished and about ten hours later, after chemicals had accumulated, an explosion occurred which ruptured the confinement of the facility. At least 37 workers were internally contaminated with radioactive cesium and 10 billion becquerels or more of radionuclides released into the environment. Radioactive cesium released during the accident was detected in Tsukuba, in the Tokyo suburbs, about 160 km from the Tokai-mura site.

Bitumen is used to solidify intermediate-level activity liquid radioactive waste. The fire apparently occurred after errors made in monitoring a chemical reaction.

The accident was rated as level three on the International Nuclear Event Scale (INES) defined by the International Atomic Energy Agency. This is the first, and only, level three accident in Japan, and one of the few level three accidents in the world since the establishment of the international scale at the beginning of the 1990's. The plant will be shut down until at least 2001, and further operation is not envisaged without the installation of new waste handling facilities.

As in the case of the Monju accident, PNC, operator of the plant, demonstrated mismanagement of both internal and external information. Before the explosion, a report sent to the STA authority falsely stated that the fire had been extinguished, although no such information had been issued by the site. Photos taken by PNC workers were destroyed. PNC also waited five hours before informing the authorities that there was a radiation leak. The first figures concerning the release of radioactivity during the accident were underestimated by a factor of ten to twenty.

Apart from the general disapproval of this, one reaction was that for the first time STA filed a formal complaint against PNC and police raided two PNC offices. The credibility of PNC was all the more criticised since a similar cover-up had happened after the sodium accident at 1994 Monju - also operated by PNC - and that PNC should have changed its attitude concerning public information since. Monju and the reprocessing plant are two of the most important components of the plutonium industry in Japan.



# Who's Who and Where's What?

## STATE and INDUSTRY

**FEPCO** The *Federation of Electric Power Companies (FEPCO)* federates nine private electricity utilities in Japan which operate nuclear power plants, corresponding to nine cities or regions (Hokkaido, Tohoku, Tokyo, Chubu, Hokuriku, Kansai, Chugoku, Shokoku, Kyushu). The utilities in FEPCO provide about three quarters of Japan's electricity.

**KEIDANRENN-KAIKAN BUILDING, 9-4, 1-CHOME, OHTE-MACHI, CHIYODA-KU, TOKYO**  
TEL: +81-3 3279 2180

**STA** The *Science and Technology Agency (STA)* is the state body for the planning and administration of nuclear research and development. STA is also the regulatory authority for research reactors and activities related to nuclear fuel. STA oversees PNC.

**2-2-1 KASUMIGASEKI, CHIYODA-KU, TOKYO 100**  
TEL: +81-3 3581 5197 - FAX: +81-3 3581 5198

**AEC** The *Atomic Energy Commission* is a consultative body for the government on nuclear issues. It defines general policies. AEC is notably responsible for the 1994 Long-Term Program for Research, Development and Utilisation of Nuclear Energy.

**2-2-1 KASUMIGASEKI, CHIYODA-KU, TOKYO**  
TEL: +81-3 3581 2585 - FAX: +81-3 3581 2487

**PNC** The *Power Reactor and Nuclear Fuel Development Corporation (PNC)* operates most of the country's nuclear research activities. It operates research reactors (the advanced thermal reactor, Fugen, and the fast-breeder reactor, Monju) and demonstration facilities for nuclear fuel services (enrichment, fuel fabrication, reprocessing). It is involved in radioactive waste management and uranium mining activities. PNC, also known as Donen in Japanese, is to be reorganised, following several events at PNC facilities.

**1-9-13 AKASAKA MINATO-KU, TOKYO 107**  
TEL: +81-3-3586-3311

**JNFL** The *Japan Nuclear Fuel Limited (JNFL)* is the industrial company set up by the electricity utilities for nuclear fuel services. It operates an industrial enrichment plant and is building a large scale reprocessing plant at Rokkasho-mura.

**1-2-15 HON-CHO, AOMORI-SHI, AOMORI 030**  
TEL: +81-177-73-7171

**MITI** The *Ministry of International Trade and Industry (MITI)* has overall governmental responsibility for the elaboration and application of nuclear energy policy in Japan.

**3-1, 1-CHOME, KASUMIGASEKI, CHIYODA-KU, TOKYO**  
TEL: +81-3 3501 1511

**JAIF** The *Japan Atomic Industrial Forum, Inc. (JAIF)* is the main lobby organisation of the Japanese nuclear industry. It hosts every year a prestigious international conference and facilitates meetings amongst various actors in the field of nuclear energy.

**1-13,1-CHOME, SHIMBASHI MINATO-KU 105, TOKYO, JAPAN**  
TEL: +81-3-35 08 24 11- FAX: +81-3-35 08 20 94

## OPPOSITION ACTIVITIES and CONTACT ADDRESSES

**CNIC** The *Citizens' Nuclear Information Center (CNIC)* is the largest organisation representing critical citizens and scientists in Japan, both in terms of membership and staff. The organisation's director, Dr. Jinzaburo Takagi, a winner of the 1997 Alternative Nobel Prize, is a key reference for independent information on national and international nuclear matters. CNIC publishes an excellent, well-known newsletter in English, *Nuke Info Tokyo*.

**KOTOBUKI BLDG, 3F, 1-58-15 HIGASHI-NAKANO NAKANO-KU, TOKYO 164**  
TEL: +81-3-53 30 95 20 - FAX: +81-3 53 30 95 30  
e-mail: cnic-jp@po.ijnet.or.jp

**Stop the Monju** is based in the Osaka area, but conducts a nation-wide campaign against the Monju fast breeder reactor, currently particularly against its restart.

**STOP THE MONJU, FUKIKO IKEJIMA**  
**2F DAINI HAMADA BLDG, 9-4 KAWAHARA -MACHI HIRAKATA-SHI, OSAKA 573**  
TEL&FAX: +81-720-43-1904  
e-mail: VEA04661@niftyserve.or.jp

**People of Fukui Opposing Nuclear Power** is a prefecture-wide anti-nuclear organisation, currently working on Monju in particular. The Prefecture of Fukui has one of highest concentrations of Japanese nuclear installations with 15 reactors in one small area.

**MIWAKO OGISO, 2-1-8 HOEI, FUKUI-SHI, FUKUI 910, JAPAN**  
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**Plaintiffs Against Nuclear Fuel Cycle Facilities** is an organisation based in the Prefecture of Aomori, opposing the Rokkasho-mura fuel cycle facilities.

**KOUJI ASAISHI, NEJIRO TOKO 33, HACHINOHE-SHI 031 AOMORI, JAPAN**  
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**Green Action** is a small group coordinated by Aileen M. Smith, a very active and dynamic American-Japanese, concentrating on plutonium and other nuclear issues.

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e-mail: aileen@goldcoast.co.jp

**Gensuikin** *Japan Congress Against Atomic and Hydrogen Bombs (Gensuikin)* is a nation-wide anti-nuclear weapon/peace movement supported by trade unions. Gensuikin is also opposed to the nuclear power program. It sponsors a series of highly respected international events during the Hiroshima-Nagasaki Day season in August every year.

**5F HITOTSUBASHI KI BLDG., 3-7-11 KANDA JINBO-CHO CHIYODA-KU, TOKYO 101, JAPAN**  
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**Greenpeace-Japan** is campaigning in particular against the transportation of plutonium and waste.

**YOYOGIKAIKAN 4F, 1-35-1, YOYOGI, SHIBUYA-KU, TOKYO 151, JAPAN**  
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**Plutonium Action Hiroshima** is a local group opposing plutonium production and use with good national and international contacts.

**SATOMI OBA, 1673-17 ICHIKAWA, SIRAKI-CHO, ASAKITA-KU 739-14, HIROSHIMA CITY, JAPAN**  
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# Plutonium

## IN JAPAN

### **NUCLEAR POWER PLANTS**

Japanese power plants (as of 1 January 1998):

- 1 gas-cooled reactor (GCR), 28 boiling-water reactors (BWRs), 23 pressurised water reactors (PWRs), one advanced thermal reactor (ATR), and one fast-breeder reactor (FBR)

### **REPROCESSING PLANTS**

Tokai: Demonstration reprocessing plant

Rokkasho-mura: 800 metric tons reprocessing plant, under construction.

### **MOX FUEL FABRICATION**

Tokai-mura: Two small scale demonstration MOX fuel fabrication plants are in operation.

### **REACTORS TO BE LOADED WITH MOX**

There is currently no reactor licensed to load MOX fuel. However, it is currently believed that Tokyo Electric will start to request licenses for Fukushima I-3. Also under discussion is the Kashiwasaki-3 unit. Kansai Electric has planned to have its Takahama-3 and -4 PWRs loaded with MOX fuel in 1999 and 2000 - an unrealistic time frame.

## FIGURES OF THE MONTH

Japan's plutonium inventory practically doubled between 1993 and 1996 from almost 11 tonnes to over 20 tonnes. The largest increase stems from overseas reprocessing in particular at the French La Hague plant. Unfortunately, figures for 1996 are not yet available as detailed as for the other years. However, the evolution of the Japanese plutonium stock is a clear demonstration of the lack of adaptability in the planning departments of utilities and government.

FACILITY	Amount of plutonium, as of end of year (kg, total plutonium)			
	1993	1994	1995	1996
<b>Reprocessing plant</b>	<b>326</b>	<b>836</b>	<b>753</b>	<b>602</b>
of which				
- as nitrate	288	710	597	
- stored as oxide	38	126	156	
<b>MOX fuel fabrication plant</b>	<b>3,269</b>	<b>3,018</b>	<b>3,146</b>	<b>3,132</b>
of which				
- stored as oxide	2,339	2,032	1,980	
- under test or processing	790	948	985	
- completed fuel	140	38	181	
<b>Reactor sites</b>	<b>1,089</b>	<b>499</b>	<b>823</b>	<b>1,298</b>
of which				
- Joyo	15	6	31	
- Monju	637	15	367	
- Fugen	12	53	0	
- Critical assemblies	425	425	425	
<b>Overseas reprocessors</b>	<b>6,177</b>	<b>8,720</b>	<b>11,378</b>	<b>15,090</b>
of which				
- BNFL (UK)	1,266	1,412	1,418	
- COGEMA (France)	4,911	7,308	9,960	
<b>TOTAL</b>	<b>10,881</b>	<b>13,073</b>	<b>16,100</b>	<b>20,122</b>

(Sources: STA, as quoted by CNIC, Tokyo)

## QUOTE OF THE MONTH

***"It was said that we would send back everything. Therefore we will send back everything. We have started with vitrified waste, because it was the first to be conditioned, and above all because it contains virtually all of the radioactive inventory. It seemed to us that we should start with what represents the essence of the radioactivity. But we envisage sending back everything, moreover, in containers of identical volume and shape. (...)***

***The law prevents [us from keeping the waste] and we respect the law. It is not because anti-***

***nuclear organisations try to make you believe the opposite (...) by constantly repeating erroneous assertions that this is true (for all that). We will send back everything."***

COGEMA Boss Jean Syrota on the Return of Radioactive Waste from the Reprocessing Plant at La Hague to Foreign Clients, during a press conference in Paris, on 4 December 1997.

## YET ANOTHER INCONVENIENCE OF MOX

Plutonium-uranium mixed oxide fuel (MOX) is much more expensive than standard uranium fuel, more complex to use, less safe during reactor operation, etc... Moreover, spent MOX fuel requires much more space in an underground storage site. According to an official expert committee, the Permanent Group of Belgian Administration, in a note to the Belgian government: "The [thermal] power output of [spent] MOX assemblies is four times higher than that of UO<sub>2</sub> [uranium oxide] assemblies. MOX fuel containers therefore reach higher temperatures, which are close to 200°C. Consequently, it is envisaged to have only one MOX fuel container per underground storage section"... instead of the four containers used for spent uranium oxide fuel. Costly extra space.

## MANY SHIPMENTS TO COME

Whereas the last spent fuel shipment (according to Japanese utility sources), implicated in current light water reactor fuel reprocessing contracts between Japanese utilities and the French company COGEMA (the so-called base-load-customer contracts) left Japan for Europe, the third "boomerang" transport of high-level radioactive waste left Cherbourg on 21 January 1998. The special cargo ship transports three casks each containing 20 canisters of vitrified high-level radioactive waste. For the first time a ship with this type of radwaste is planned to take the short cut through the Panama Canal.

If the promises of the French Government and industry representatives come true (see quote of the month) and all wastes which have been generated by the processing of foreign spent fuel are to be sent back, then this shipment represents only the beginning of a series of several hundred shipments of radwaste to Japan. In fact, while the high active waste contains a large proportion of the radioactivity, the biggest volumes correspond to low and intermediate level wastes - which are still to come. *Bonne route !*

## WORSENING A BAD POSITION

The latest shipment of high-level radioactive waste leaves France for Japan exactly three months after the Japanese State company Power Reactor and Nuclear Fuel Development Corp. (PNC) acknowledged on 24 October 1997 that it had omitted to proceed with legally compulsory safety controls on 93 of the 133 transport casks which were used for the spectacular shipment of 1.7 metric tons of plutonium from France to Japan aboard the Akatsuki-maru in 1992-1993. This omission is only one out of some 1,700 problems, of which 13 have broken the law, identified in an internal PNC report. After a whole series of serious mishaps and accidents, public confidence in PNC is likely to have waned for ever.



## WORTH READING

**"The Dutch Plutonium Dead End"**, by *Mathieu Pavageau and Mycle Schneider, WISE-Paris, September 1997, published in January 1998, commissioned by Greenpeace-Netherlands, 42 pages.*  
The report analyses the Dutch plutonium policy,

reprocessing and breeder reactor cooperation. It evaluates production, current and future stocks of Dutch plutonium. The current plutonium stock is estimated at about one metric tonne. Most of it is certainly stored at La Hague. If the Netherlands did carry out the entire reprocessing contracts, it would have to deal with about four tonnes of plutonium. It should be emphasised that the country has a plan to shut down the country's last remaining reactor by 2004. There is no use for that plutonium in the country.

While the report led to public controversy in the Netherlands in early 1998, Mycle Schneider, director of WISE-Paris, has revealed to the Dutch radio station VPRO that the French utility EDF denied a request by the Dutch utility to take over the Dutch plutonium. The Dutch utility EPZ confirmed on VRPO that, given its own large plutonium stockpiles, EDF will first use its own material before using plutonium from other countries. The WISE-Paris report argues that the Dutch utility should cancel the remaining reprocessing contract and investigate means to mix its plutonium with high level radioactive waste and vitrify it to become a final waste package.

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- "Comprehensive Impact Assessment of the Use of MOX Fuel in Light Water Reactors", Jinzaburo Takagi, et al., CNIC, Tokyo, 335 pages; 400 FRF (NGOs 160 FRF) + 60 FRF postage + VAT for Europe (contact CNIC for US and Asia, fax: 81-3-53 30 95 30).  
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**Published by**  
WISE-Paris  
**Director:**  
Mycle Schneider  
**Chief Editor and  
Director of the publication:**  
Mycle Schneider  
**Editor:**  
Mathieu Pavageau  
**Lay-out:**  
Nathalie Saigot and  
Jean-Luc Thierry  
ISBN/CPPAP : en cours  
**Dépôt:** January 1998  
The  
**Plutonium Investigator**  
project is supported by the  
**W. Alton Jones Foundation.**