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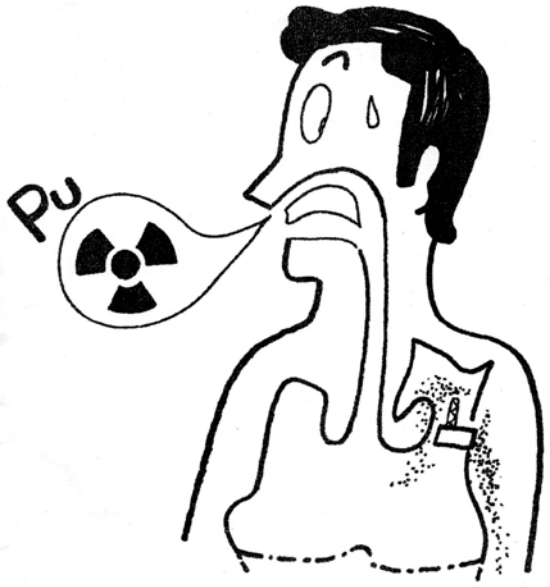
Active Tests at the Rokkasho Reprocessing Plant



Cartoon by Shoji Takagi

As reported in NIT 112, active testing ("hot tests") of the Rokkasho reprocessing plant commenced on 31 March 2006. The tests are scheduled to continue for 16 months until July 2007, during which time 430 tons of spent nuclear fuel will be reprocessed. Construction of the Rokkasho reprocessing plant was virtually complete in 2001. Chemical tests were carried out from September 2002 and uranium tests using depleted uranium were conducted from December 2004. During the hot tests, plutonium will be recovered for the first time and the release of radiation has begun.

Circumstances surrounding start of active tests

In order to start the tests, the electric power companies, Japan Nuclear Fuel Ltd (JNFL), Aomori Prefecture, the Atomic Energy Commission and the Nuclear and Industrial Safety Agency (NISA) banded together to force matter through the political procedures. Their priority was to meet the schedule to commence operations in August 2007. The plan for the hot tests was submitted to the government and approved even before the report on the uranium tests had been completed. The results of the uranium tests were only confirmed afterwards. The Nuclear Safety Commission's (NSC) policy was to carry out the tests in stages, proceeding to the next stage only after the results of the previous stage had been confirmed, but this process was completely ignored.

One major reason for the rush was that by starting hot tests JNFL could begin to receive payments for reprocessing. Japan's fiscal year runs from April 1st to March 31st, so by commencing the tests on March 31st JNFL became eligible for a portion of the 2005 fiscal year payments after doing just one day's work. All JNFL did on that day was move one PWR fuel assembly from the storage rack in the spent fuel pool to a position before the shearing machine. For this JNFL received 52.9 billion yen. If JNFL continues to extract plutonium at Rokkasho, it will receive the sum of 280 billion yen per year from the electric power companies.

There is a lot of opposition to the hot tests, not just within Aomori Prefecture, but also in Iwate Prefecture immediately to the south. Liquid radioactive waste from the Rokkasho reprocessing plant is released into the Pacific Ocean from a pipe

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3 kilometers out to sea. At this point the current flows from north to south, so there have been strong expressions of concern from the governor of Iwate Prefecture and from the fishing industry that the radioactivity released will affect the fishing industry (see NIT 108 Group Introduction). JNFL therefore held two explanatory meetings in Iwate Prefecture in Kuji City and Miyako City, but participation was restricted to members of the local councils and fishermen. In an extraordinary move, the general public was excluded from these meetings. In the end, JNFL provided only formula explanations and questions were cut short on the grounds that time had run out. The process was criticized by both participants and residents alike.

Outline of the tests

According to JNFL's "Hot Test Plan (Comprehensive Tests Using Spent Fuel)", a total of 430 tons of spent fuel (approximately 210 tons of PWR type spent fuel and 220 tons of BWR type spent fuel) will be processed over a period of 16 months. The whole process will be broken up into 5 steps as follows:

Step 1, approximately 30 tons of PWR fuel in 2 months;
Step 2, approximately 50 tons of PWR fuel and 10 tons of BWR fuel in 4 months;
Step 3, approximately 20 tons of PWR fuel and 50 tons of BWR fuel in 5 months;
Step 4, approximately 110 tons of PWR fuel in 3 months;
Step 5, approximately 160 tons of BWR fuel in 3 months.

Steps 1 to 3 make up the first stage of the process. This stage will begin with small quantities of less radioactive low burn-up fuel that has been cooled for a long time. It will test whether individual machines and equipment perform within design parameters. Steps 4 and 5 make up the second stage. The plan for this stage is to test spent fuel close to real conditions (burn-up of 45,000 MWd/t[1]). The plant will be operated continuously at near real operating conditions to confirm whether or not it is capable of processing 800 tons per year.

One important issue is the quantity of radioactivity released into the environment. In particular, the amount of radioactivity released on a daily basis, in the form of aerial releases and liquid releases, will be measured. The Rokkasho reprocessing plant's benchmarks for annual radioactive releases assume that all krypton and tritium will be released. This is a problem in itself. However, in regard to the other radionuclides, it is unclear whether they will be held within their allocated benchmarks. There are also problems with the evaluation of the test results. There are "hold points" after Step 1 and Step 2 to assess the amount of radioactivity released. However, there are no hold points after the later steps. On the basis of the evaluation of the tests up to the end of Step 2, which involve low amounts of radioactivity, the go sign will be given to reprocess the remaining 340 tons. This reveals that there are major problems with the intentions of the government and JNFL.

Step 1 was completed on June 26th. Naturally, the amount of radioactivity released so far is low, because of the 30 tons of PWR spent fuel which has been reprocessed, 16 tons had a burn-up ranging from 12,000 to 17,000 MWd/t (cooling period of about 20 years), and 14 tons had a burn-up ranging from 30,000 to 33,000 MWd/t (cooling period of 10-18 years). When compared to the benchmarks, there don't appear to be major problems. However, it should be pointed out that there is a tendency for Iodine-129 (3.8×10^7 Bq) to be higher than it should be at this stage in the tests.

Plutonium in rice?

JNFL published estimates of the impact that the radioactivity released from the Rokkasho reprocessing plant will have on the surrounding environment in future. For example:

1 kilogram of rice produced in the surrounding area will contain 90 becquerels of carbon-14, 100 becquerels of tritium, 0.05 becquerels of ruthenium-106 and 0.0003 becquerels of plutonium;
seaweeds such as kelp and wakame will contain 0.02 becquerels of plutonium and 0.08 becquerels of ruthenium-106;
fish will contain 0.005 becquerels of plutonium and 300 becquerels of tritium;
shell fish will contain 0.01 becquerels of plutonium;
and so on.

However, this estimate is based on calculations which are very advantageous to JNFL. The estimate assumes that radioactivity released will be dispersed and diluted in accordance with these calculations and that radioactivity will not

accumulate. It is inconceivable that contamination of the surrounding environment will be held within these levels. Apparently JNFL thought that by publishing these figures it could suppress future civil unrest, but in fact these figures have given rise to serious concerns among consumers living in other regions. It is quite conceivable that in future questions will be raised in the marketplace about radioactive contamination of agricultural products and seafood from Rokkasho.

Internal exposure to plutonium

Internal exposure to plutonium was one major issue to arise during Step 1 of the hot tests. Already two such cases have occurred, both in the Analysis Laboratory Building. Liquid containing uranium and plutonium is sent from the whole reprocessing plant to the Analysis Laboratory Building. There the constituents and concentration of the liquid are analyzed and calculated. The two cases of radiation exposure occurred during continuous processes related to the analysis of plutonium-containing liquid waste.

The first case occurred on May 20th. A 35 year-old subcontractor worker was exposed to radiation while handling an analysis sample under a "hood"[2]. The worker was not wearing a mask at the time and was internally exposed by inhaling alpha emitting radioactivity including plutonium by nose and mouth. JNFL announced that the committed effective dose (dose received over a 50 year period) was 0.014 milli-sieverts. The radiation exposure was not detected when the worker left the area where the exposure occurred. It was not until two days later that the radiation exposure was recognized.

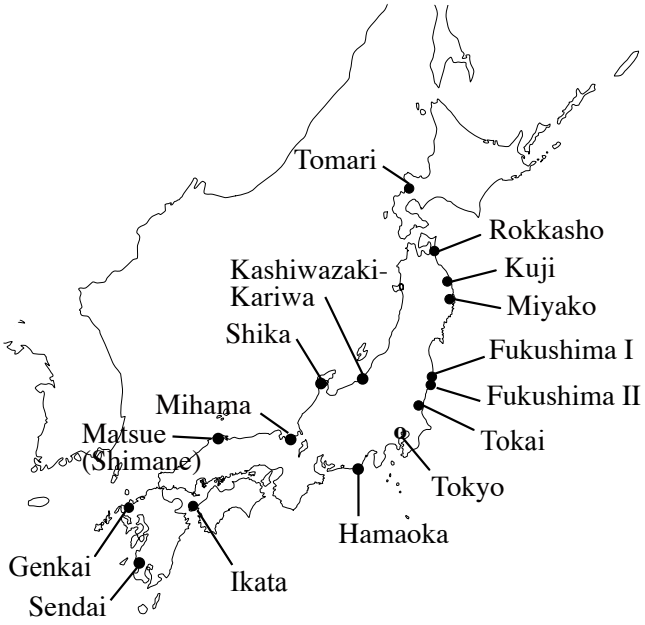
The second case occurred on June 24th. A 19 year-old subcontractor worker was exposed to radiation while carrying out analysis in the room next door to the room where the first incident occurred. On this occasion radioactivity was detected on both gloves and on the right leg when the worker left the room. Again the worker was not wearing a mask. A smear test of the nose membrane was carried out immediately and alpha emitters including plutonium were measured at 0.7 becquerels. Tests were carried out on the worker's urine and feces for the next 5 days, but no radioactivity was detected. JNFL pronounced that there had been no internal exposure. However, plutonium had already been detected on the worker's nose. If plutonium was inhaled deep into the lungs, it would not have shown up in JNFL's tests. The plutonium particles would not dissolve and be carried away in the blood. They would lodge in the lungs and continue to irradiate the worker until, if ever, they are expelled from the body.

As a result of these problems and other factors the hot tests are currently running one month behind schedule.

Masako Sawai (CNIC)

1. Burn-up is measured in megawatt days per ton.
2. A "hood" is a ventilated box-like structure, which is used to prevent dispersal of radioactive materials and chemicals during handling.

Map of places mentioned in NIT 113



Haiku for the season

my tiny space
surrounded by raindrops
from the umbrella

by Rumi Kamishima

Cost of Nuclear Power in Japan

This article considers costs associated with nuclear energy which were not included in an electricity generation cost comparison published in 2003 by the Agency for Natural Resources and Energy (ANRE). ANRE's figures are shown in Table 1. Costs are shown for general hydro, fossil fuels (3 types) and nuclear, based on 40 years' operation. The main conditions are also shown.

Table 1: Cost of electricity generation

(yen/kWh)		General Hydro	Oil	LNG	Coal	Nuclear
40 years of operation		10.6	10.5	6.1	5.4	5.1
conditions	First year fuel price	-	27.41$/b	28,090 yen/t	35.5$/t	5.5 million yen/t*
	Rate of fuel price increase (%)	-	0.20	0.27	0.77	0.00
	Energy efficiency (%)	-	39.4	48.4	41.8	34.5
	Power (MW)	15	400	1,500	900	1,300
	Unit price of construction ($/kW)	6,001	2,205	1,344	2,230	2,287
	Capacity factor (%)	45	80			
	Discount rate (%)	2				

*Price of uranium ore

Based on this comparison, nuclear energy has been promoted as being cheaper, or at least no more expensive than other energy sources. Looking at the above table, one immediately notes the dubious assumption that nuclear fuel prices will remain constant for 40 years. The discount rate also has a significant impact on the calculation of the cost of nuclear power plants. ANRE's calculation assumes that disposal of high level waste begins 48 years from the date the reactor commenced operations and continues till 90 years from that date. By applying ANRE's discount rate, the cost of disposal is reduced to one fourth the undiscounted cost.

However, by delving a little deeper, one discovers that there are costs peculiar to nuclear energy which were completely omitted from the calculation.

Nuclear energy costs not included in the above calculation

The Japanese government spends more than any other government on energy research and development. Nuclear energy receives 64% of this, by far the greatest portion. By comparison, only 8% is spent on renewable energy, while 12% is spent on energy efficiency etc.. It is reasonable to say that this R&D funding is necessary in order for nuclear energy to be able to continue.

The government's nuclear energy budget is published in an official nuclear energy white paper. The nuclear energy budget for the last 10 years is shown in Figure 1. It amounts to about 500 billion yen each year.

Around one third is from general revenue. The rest is from special accounts. There are two special accounts, one for the "diversification of electric power" and one for "site establishment". The funds for these special accounts come from a special purpose tax called the Electric Power Development Tax. Currently the tax is collected from consumers via their electricity bills at the rate of 400 yen per 1,000 kWh. The revenue is distributed in accordance with the Law for the Adjustment of Areas Adjacent to Power Generating Facilities.

This system was introduced in 1974. The Prime Minister at the time was Kakuei Tanaka, the Treasurer was Takeo Fukuda, and the Minister of International Trade and Industry was Yasuhiro Nakasone. During the debate in the House of Representatives, many reasons were given why local agreement would be hard to obtain. Environmental and safety problems were raised. The point was made that "The increased employment and the stimulation to the local economy from nuclear power plants are much less than can be expected from other industries." The above system was introduced in order to "smooth the introduction of nuclear power by promoting the provision of public facilities necessary to improve the welfare of people living in areas adjacent to power generating facilities." Minister Nakasone remarked, "People living where nuclear power plants are built suffer considerable inconvenience." He went on to say, "A balance cannot be achieved if residents do not receive some welfare benefits in return." It can be said that this is a peculiarly

Japanese system.

Each year around 154 billion yen ($1.4 billion) is provided to local self-governing bodies. It is used for such things as the construction of roads, government office buildings, libraries and hospitals. Recently the system was amended to make it possible to also use these funds for the maintenance of these facilities. According to the Fukui Newspaper, this system was "the most effective thing in gaining local approval for the expansion of nuclear power plants". The increasingly aggressive use of the system is also very striking. For example, as a result of a modification introduced in the 2004 fiscal year, the subsidy is increased for local governments which accept pluthermal (see NIT 100).

The system was changed in 1980 so that, in addition to providing subsidies to adjacent areas, revenues from the Electric Power Development Tax could be spent on research and development for the electricity generation system. Subsidies for adjacent areas came from the site establishment account, while funds for R&D came from the electric power diversification account. Indeed, the majority of the funds from the electric power diversification account have been used to fund nuclear energy related R&D. At the time the change was made, all of the R&D expenses of Power Reactor and Nuclear Fuel Development Corporation (PNC later became JNC and is now absorbed into JAEA - see NIT 109) were funded from this account. Thus, the government's nuclear energy R&D spending came to be funded from a special account separate from general revenue.

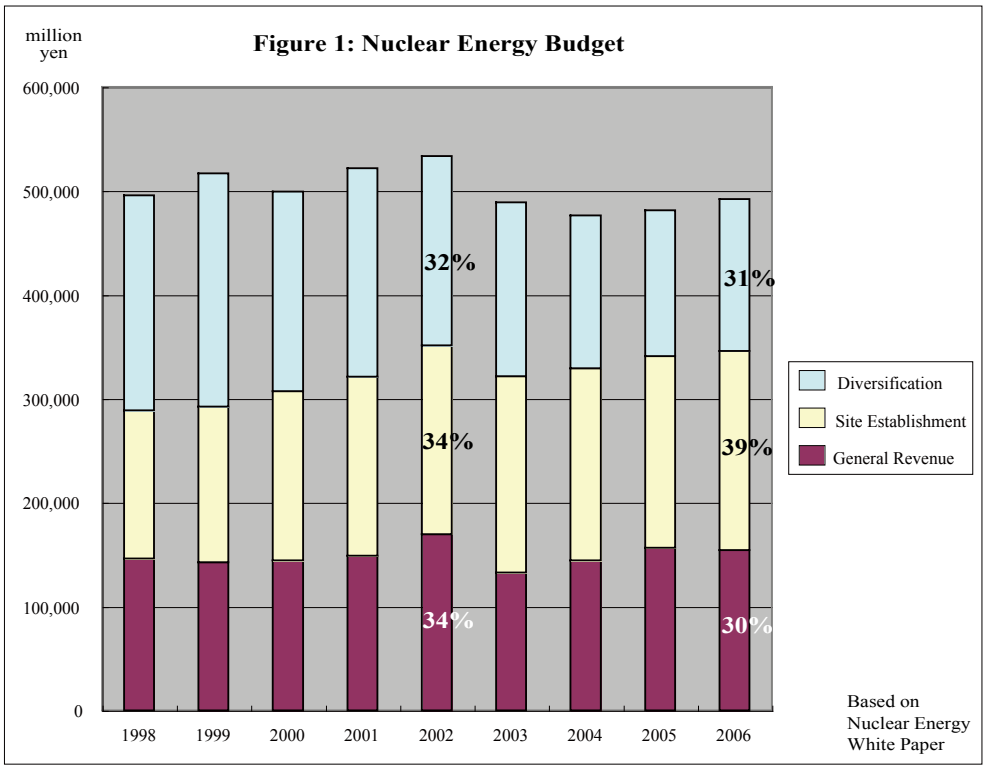
The government's nuclear energy budget hovers around 500 billion yen ($4.5b). Private R&D investment (27 billion yen ($247m) in 2003) is well below 10% of government spending on nuclear energy, so clearly the government has provided huge subsidies to the nuclear industry. Without these subsidies, the industry wouldn't have survived.

The 2004 nuclear energy budget was 465 billion yen ($4.2b). If the 37 billion yen ($335m) allocated to accelerator and fusion-related work is deducted, this comes to 428 billion yen ($3.9b). Nuclear power generation in 2004 was 282,442 million kWh, so the government's subsidy to nuclear energy works out at 1.5 yen/kWh (1.38 cents/kWh). (Japan's nuclear energy policy is based on the fuel cycle, so the government's spending on the nuclear fuel cycle is included in this figure.)

Strictly speaking, this 1.5 yen/kWh subsidy cannot simply be added to the cost of nuclear energy generation shown in Table 1. This is because the cost of nuclear energy calculated by ANRE is averaged over 40 years. Nevertheless, it is clear that nuclear energy in Japan is not as cheap as it is made out to be.

Hideyuki Ban
(CNIC Co-Director)

Figure 1: Nuclear Energy Budget



Statement by CNIC and Green Action about GNEP

11 July 2006

Japan Should Withdraw its Opportunistic, Cynical and Impractical Offer to Cooperate with the US Global Nuclear Energy Partnership

Japan has opportunistically jumped on President George Bush's Global Nuclear Energy Partnership (GNEP) bandwagon. Just when doubts were being expressed about the proliferation dangers of separating plutonium at the Rokkasho reprocessing plant in Aomori Prefecture, GNEP was like a gift from Uncle George.

The government is treating GNEP as a great opportunity to gain recognition of Japan's unique position as the only Non Nuclear Weapons State (NNWS) member of the Non Proliferation Treaty with access to the full nuclear fuel cycle. Japan is the only NNWS with industrial scale facilities for both uranium enrichment and reprocessing of spent nuclear fuel.

The government also hopes that GNEP will provide a lifeline for Japan's ailing nuclear industry. The nuclear research establishment can scarcely conceal its delight and nuclear manufacturers, faced with shrinking sales each year, will be only too happy to pick up any contracts that come their way. However, it is far less clear that electric power companies share this enthusiasm. They are the ones who will have to sell any electricity produced by the reactors envisaged under GNEP and they are under no illusions about the likely price.

Somewhere in all of this, the Japanese government has lost site of the fact that it is highly unlikely that GNEP could help provide the Japanese public with any substantive source of energy in any reasonable length of time.

Even if the government is not inclined to look the GNEP gift horse in the mouth, we believe that before Japan makes any firm promises and commits any money, a more balanced assessment is required. The following brief analysis highlights some major problems that the government has not addressed.

Key components of GNEP

Though the details are far from clear, GNEP promises to develop the following:

- proliferation-resistant spent nuclear fuel reprocessing technologies;
- "advanced burner reactors" that can use plutonium mixed with other radioactive wastes as fuel;
- small-scale reactors suitable for developing countries; and
- nuclear fuel supply arrangements whereby a limited number of "fuel supplier nations" provide fuel services to "user nations" which forego the right to fuel cycle technology.

Spent fuel would be returned to the supplier countries for reprocessing. This "cradle-to-grave" fuel leasing approach is supposed to reduce the risk of proliferation and reduce the radioactive waste going to geological repositories. Researchers and NGOs in the US have already debunked these promises, so here we restrict ourselves to stating a few of the reasons why GNEP will not achieve what it claims.

The proliferation-resistance of the proposed new reprocessing technologies is based on the idea that plutonium will not be separated in pure form. It is claimed that by including other radioactive elements (referred to variously as transuranics or actinides) in the final product their radioactivity will act as a barrier to people who might wish to divert the plutonium to nuclear weapons. However the radioactivity of the product will be well below the level the International Atomic Energy Agency considers to be "self-protecting". Hence, these new reprocessing technologies cannot be said to be proliferation-resistant. GNEP offers no solution to the proliferation problems of reprocessing. Rather, by highlighting the dangers of the separation process currently used, the so-called "PUREX" process, GNEP confirms that the Rokkasho reprocessing plant is dangerous from the perspective of nuclear proliferation.

The proposed advanced burner reactors and small-scale reactors don't exist yet and there are huge technological, safety and economic obstacles to be overcome. They will not be commercially viable for decades, if ever, and in the meantime the plutonium stockpile and the radioactive waste mountain continue to grow.

As for the idea of establishing a group of authorized fuel supplier nations (the US Department of Energy referred to them as a "consortium", but a more honest label would be a "cartel"), it is hard to believe that the rest of the world will willingly subject itself to eternal dependence on a handful of privileged countries.

Japan's offer of cooperation

Clearly GNEP is far from being a practical proposal promising a solution to the current pressing problems associated with nuclear energy and the nuclear fuel cycle. Nevertheless, the Japanese government is falling over backwards to appear supportive. A May 5th Ministry of Education, Culture, Sports, Science and Technology document outlined five areas of research and development cooperation:

1. joint collaboration on the design of a US nuclear recycling facility.
2. joint development of FR/FBR fuel utilizing Joyo and Monju.

3. joint development of structural material for streamlined, compact reactors.
4. joint development of major components (such as steam generator) for sodium-cooled reactors.
5. joint development of safeguards concepts for nuclear fuel recycling facility based on Japan's experience.

(Note: The English translation includes "FR/FBR" in item 2, although no corresponding words appear in the Japanese version.)

Japan is already doing research in all of these areas. Rather than offering anything new, the government is hoping to gain recognition for its existing programs and to be part of the action in the massive long-term spending program that GNEP will entail. However, besides being very expensive and totally impractical, GNEP has other features which will inevitably prove to be indigestible for Japan.

The issue that will attract the broadest opposition is the "cradle-to-grave" approach to fuel supply. GNEP envisages fuel supplier nations taking back the spent fuel, reprocessing it and burning the plutonium and minor actinides in advanced burner reactors. Japan does not now have the capacity to reprocess all the spent fuel from its own nuclear reactors and it is stretching the imagination to think that it will ever have the capacity to reprocess spent fuel from overseas. However, even if the capacity problem could be solved, prefectural and local governments are unlikely to agree to accept spent nuclear fuel from overseas. GNEP is vague about what will happen to the waste from reprocessing foreign spent fuel, but it implies that the fuel supplier nations will also end up providing the final waste repositories. Given the difficulty of finding a repository for Japan's own high-level waste, it is inconceivable that there will be any volunteers to accept foreign waste.

Anticipating this problem, the Japanese government has already indicated that it will not take back spent fuel from overseas. This undermines Japan's aspirations to the status of "fuel supplier nation". We believe GNEP's chances of success are zero in any case, but when aspiring fuel supplier nations pick and choose in this way, GNEP is exposed for the fraud that it is.

Japan is promoting its fast breeder reactor program as an area of potential GNEP cooperation. There is an inherent contradiction in this. GNEP does not propose the use of fast breeder reactors. It talks about fast burner reactors. Breeder reactors are designed to "breed" plutonium in a blanket of uranium around the core. The plutonium produced in this way is "super weapons grade", because of the very high percentage of the isotope of plutonium-239. Breeder reactors are therefore completely incompatible with non-proliferation. Other than the breeding component, the basic technology for fast breeders and fast burners is the same, but if GNEP is really set up to address proliferation concerns, the Japanese government will have to abandon its dream of nuclear power based on breeder reactors.

The government's offer of cooperation involving the sodium-cooled fast reactors Joyo and Monju, both of which were designed to be breeder reactors, is a good illustration of the cynical way it is approaching GNEP. No doubt it hopes the US will relent and expand the scope of GNEP to include breeders. It would have been encouraged by President Bush's remarks at a press conference during Prime Minister Koizumi's recent visit to the US:

> "We discussed...our contributions to some research and development that will help speed up fast breeder reactors and new types of reprocessing so that we can help deal with the cost of globalization when it comes to energy..." (White House, 29 June 2006)

The President might not understand the difference between "fast burner reactors", as originally proposed for GNEP, and "fast breeder reactors". However, if he does, then his comment is an early indication that Japan's involvement in GNEP, far from strengthening the non-proliferation system, is more likely to further undermine any spurious non-proliferation claims that might be made for GNEP.

There are also other ways in which Japan's involvement in GNEP will undermine the non-proliferation system. The Non Proliferation Treaty (NPT) enshrines discrimination between Nuclear Weapons States (NWS) and Non Nuclear Weapons States (NNWS). Japan adds a further level of discrimination between nuclear fuel cycle states (NFCS) and non nuclear fuel cycle states (NNFCS). Japan's involvement in GNEP will reinforce this discrimination. However, as Mohamed ElBaradei has repeatedly pointed out, the discrimination between NWS and NNWS is unsustainable. Likewise, discrimination between NFCS and NNFCS will be unsustainable. Japan's defacto status as a NFCS is already generating envy overseas and experts have warned that operation of the Rokkasho reprocessing plant could undermine international efforts to discourage other countries from building their own reprocessing and enrichment facilities. The whole framework of GNEP ignores these basic obstacles.

Costs

Japan's nuclear fuel cycle program has been under development in the name of "energy independence" for half a century. Where has it gotten Japan? Despite spending several trillion yen (tens of billions of dollars) of ratepayer and taxpayer money, closing the Japanese fuel cycle has been an economic failure and a detriment to public safety.

Japan's Rokkasho reprocessing plant, located in Aomori Prefecture in the north of Japan, is now undergoing "active testing" leading up to commercial operation scheduled for August 2007. The plant is slated to separate

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Hamaoka-5 Low Pressure Turbine Vane Takes Flight

Only the most hard boiled egg heads took much notice when on June 15 the Hamaoka-5 reactor (ABWR 1380 MW) shut down automatically due to "excessive turbine vibration", so it was quite a shock when Chubu Electric Power Company announced the reason for this excessive vibration. A vane on one of the wheels of low-pressure turbine B had broken completely off the turbine shaft and fallen into the lower part of the turbine (see diagram). Of course, when a turbine is rotating at 1,800 revolutions per minute, a broken vane does not simply fall, it flies. Not surprisingly, therefore, Chubu Electric found that "there was some scoring damage and denting on other vanes and parts in the surrounding area."

Fractures or cracking were found in connectors (forks) at the roots of the vanes in all three of the turbines. Cracking was also found in some of the vane connectors on the shaft. As at July 11th, besides the vane that flew, fractures or cracks had been discovered in 247 vanes (of 279) in low-pressure turbine B. Fractures or cracks had also been found in 185 (of 280) and 230 (of 280) vanes in low-pressure turbines A and C respectively.

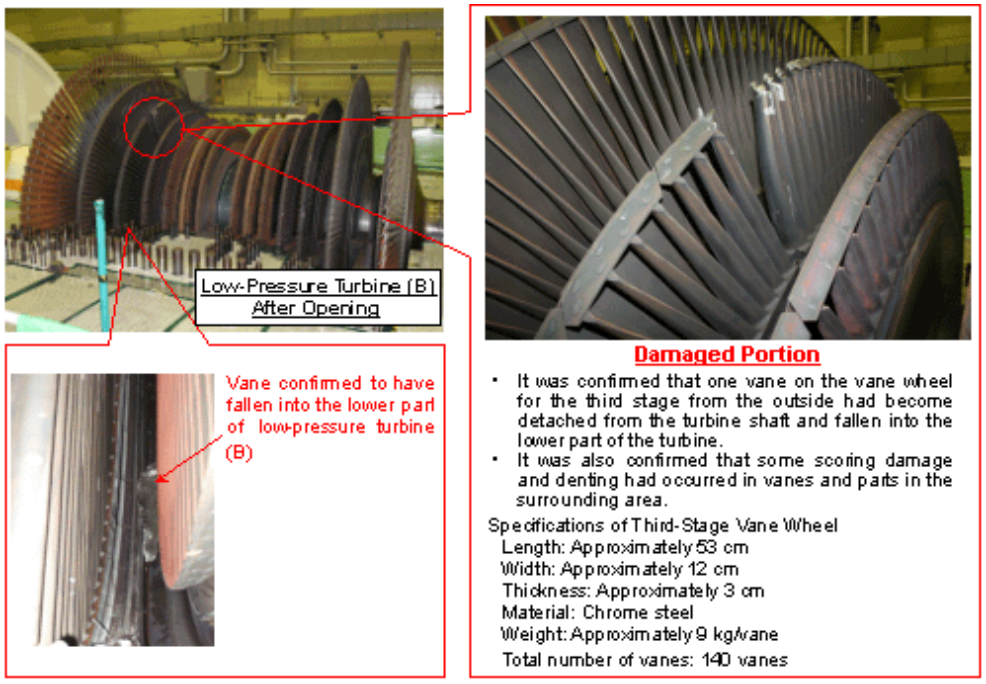
Hamaoka-5 is the third last reactor to come on line in Japan. It commenced operations on 18 January 2005. It is one of four advanced boiling water reactors (ABWR) in Japan. The turbine was made by Hitachi and is the same design as Hokuriku Electric Power Company's Shika-2 (ABWR 1358 MW) reactor, which commenced operations on 15 March 2006. The Nuclear Industrial and Safety Agency ordered Hokuriku Electric to shut down Shika-2 for inspection and some cracks have already been found. (As reported in NIT 112, Shika-2 should by rights have been closed down after a March 24th verdict of the Kanazawa District Court, which concluded that it was unsafe to operate in the event of an earthquake.)

Hitachi has admitted that it believes the cracked and broken vanes are the result of a design problem and that it will probably take some time to resolve the problem. This is good news for earthquake safety, since it means two particularly unsafe reactors could be down for quite a long time. However, it is bad news for Japan's nuclear manufacturers. They are very proud of their ability to build ABWRs and are eager to market this type of reactor world-wide. As reported in NIT 101, Toshiba and Hitachi exported ABWR reactor pressure vessels for Taiwan's No. 4 Nuclear Power Plant. Also, Hitachi is lining up to sell ABWRs to a US utility (see News Watch).

The problems with Hitachi's ABWR turbine vanes will not help its reputation as a reliable nuclear power plant maker. Indeed, the day may come when it will say, "Because of those vanes our export efforts were in vain."

Philip White (NIT Editor)

Diagram and explanation by Chubu Electric



Major Incidents at Nuclear Facilities April 2005- March 2006			
Date	**Company Facility**	**Incident Description**	**Comments**
28 April 05	KEPCO Mihama-1	While conducting a visual inspection during periodic inspection of the auxiliary building exhaust stack, it was discovered that two drain pipes on the base of the exhaust stack had become detached and that there were cracks in the base plate.	This exhaust stack is located beside the reactor containment vessel. The cracks were caused by fatigue from repeated vibration.
12 May 05	Shikoku Ikata-3	An abnormal noise was noticed during inspection of a chiller used for air conditioning. Flaws were found in the suction portion of the impellers and in the seal ring.	
3 July 05	TEPCO Kashiwazaki-Kariwa-5	While preparing to shut down the reactor for periodic inspection, a deterioration of condensor vaccum caused the reactor to trip automatically.	When switching operation of turbine gland sealing steam from the steam evaporator side to the auxiliary boiler side, the auxiliary boiler steam supply valve opened only 5%. The fault was not noticed and the operation was continued.
6 July 05	Chugoku Shimane-1	During adjustment operation, the degree of closure of the drywell vacuum break valve was displayed incorrectly. The reactor was shut down manually.	Caused by a defect in the microswitch.
10 Aug. 05	JAPCO Tokai-2	During start-up operation, the outlet valve stem broke in the motor-driven feedwater pump.	The valve stem had become brittle due to cracks along the crystal grain boundary, a feature of grain boundary type stress corrosion cracking. The stem broke when a load was applied.
22 Aug. 05	TEPCO Fukushima I-5	During periodic inspection, it was discovered that the necessary flow rate for the reactor core spray system was not secured. The reactor was shut down manually in order to check the flow rate control valve.	Discovered that the flow rate control valve stem was broken.
29 Sep. 05	KEPCO Mihama-1	While operating at 50% power for inspection and maintenance, an alarm indicated an increase of the safety valve outlet temperature of pressurizer-B. The reactor was shut down manually to check for a possible leak from the valve sheet.	
9 Oct. 05	TEPCO Fukushima I-2	The recirculation pump stopped automatically following an alarm related to problems with control of the pump. The reactor was operated at reduced power until it was shut down manually on October 10th.	The inverter stopped automatically due to a bad connection in the fuse holder.
1 Nov. 05	TEPCO Fukushima II-2	During periodic inspection, it was discovered that the metal mesh in a sea water strainer in the residual heat removal component cooling system was ruptured.	The damage was caused by vibration and wear and tear.
6 Jan. 06	Hokkaido Tomari-1	During periodic inspection, 6 cracks were found near the welded portion of reinforcement metal in an emergency exhaust stack within the controlled area of the reactor building. 5 of these cracks penetrated right through the walls of the stack.	7 cracks were also found near the welded portion of reinforcement metal in the main exhaust pipe. 6 of these cracks penetrated right through the walls of the stack. The cracks were caused by fatigue due to vibration.
9 Jan. 06	TEPCO Fukushima I-6	During periodic inspection, cracks were found in sheaths and tie rods of 9 hafnium blade type control rods. The sheath of one of the control rods was significantly damaged.	The cracks were induced by neutron irradiation. One control rod had failed to insert when the reactor was shut down on 21 December 2005.
13 Jan. 06	Kyushu Sendai-1	During periodic inspection, damage was found in 13 tubes in the steam generator.	Stress corrosion cracks were found in the tube expansion zone of the hot leg side.
13 Jan. 06	Hokuriku Shika-2	During start up for trial operations, one valve failed to close fully when testing opening and closing of the steam supply isolation valves in the reactor core isolation cooling system. The reactor was shut down manually.	The electromagnetic contactor was stuck in the "valve-open" position. Part of the contact point was slightly deposited due to prolonged "chattering" (repeated rapid opening and closing).
11 Mar. 06	TEPCO Fukushima I-3	During periodic inspection cracks were found in sheaths and tie rods of 5 hafnium blade type control rods. The sheath of one of the control rods was significantly damaged.	The cracks were initiated by neutron irradiation.
14 Mar. 06	TEPCO Fukushima I-2	A recirculation pump stopped automatically causing a power reduction. The reactor was shut down for inspection when damage was discovered in the electric circuit in the inverter.	

Note: Only incidents that were reportable under the Reactor Regulation Law have been included. A much longer list, including other incidents that CNIC judged to be significant, was included in our Japanese newsletter No. 385.

Anti-Nuke Who's Who

Tetsuya Tanaka: the greatest organizer that ever came to Noto

by Hideki Hayashi*

In 1967, immediately after the plan for the Shika Nuclear Power Plant (NPP) was announced, the Togifukuura Alliance was formed to oppose the plant. A big movement evolved including landowners, fishermen and labor unions. Fifteen years later, in 1982, Tetsuya Tanaka (then 39) came to the Noto region from Osaka as a union organizer. (The former name of Shika NPP was Noto NPP. (Ed.))

At the time, the opposition movement was facing its greatest crisis. Until then the thing which had prevented construction of the NPP was the Saikai fishing cooperative. One of the main fishing cooperatives in Ishikawa Prefecture, it had resolutely opposed the plant. However, determined to push ahead with construction, Ishikawa Prefecture adopted the mean spirited tactic of terminating the Saikai fishing cooperative's fishing license.

After the accident at the Three Mile Island nuclear power plant in March 1979, city-based activists like me from Kanazawa City and Toyama City often visited the site of the proposed reactor. It was there that I met Tetsuya Tanaka, who was in there with the locals giving encouragement to the movement.

He realized that if the Saikai fishing cooperative collapsed it would be impossible to prevent construction. He spent many days in the solidarity hut (built on site by the opposition movement) thinking of how to organize a movement in which the locals would not come out as losers. Eventually he lit upon the idea of organizing with the locals around the issue of "nuclear disaster prevention". At the time this was a taboo topic, because it implicitly accepted that construction would proceed. Of course everything was done to prevent construction, including election campaigns, petitions, protest demonstrations and visits to local residents, but in the end we couldn't prevent construction.

Construction began on the 540 MW Shika-1 reactor in December 1988. On the same day, 200 plaintiffs lodged an appeal to the court for the termination of construction. It is very difficult to maintain opposition when new facts on the ground are being created all the time. However, though few in number, there was firm solidarity among the members of the movement. Tetsuya Tanaka continued at the center of the court case and the independent nuclear disaster prevention movement. For the latter, residents themselves made submissions to Ishikawa Prefecture and Shika Town, conducted their own evacuation drills and developed their own radiation measurement network.

Tetsuya Tanaka with a radiation detector

Joy came to us this year, 17 years after the case against Shika-1 reactor was launched. On March 24th the Kanazawa District Court handed down the verdict to terminate operation of the Shika-2 reactor[1]. It was the first such verdict ever in Japan. Tetsuya Tanaka said he wept when he heard the verdict to think of all the people who had died too soon to see this day. He has retired as a union organizer, but he has become a thorough local. He loves to drink and to debate. He is like a monk in training[2] and no doubt his activism will continue until nuclear power is eliminated.

1. As discussed in NIT 112, operation was not terminated, because the verdict was appealed. However, as explained on page 8 of this edition of NIT, it is not operating now. (Ed.)
2. This might seem incongruous with the image of a great drinker, but apparently Japanese don't see a contradiction. (Ed.)

* Hideki Hayashi runs an equipment design office and is a member of the plaintiff's coordinating committee.

NEWS WATCH

Green light for MOX use at Shimane

On June 16th, Nobuyoshi Sumita, governor of Shimane Prefecture, told the prefectural assembly that he "basically approves" the planned use of MOX fuel at Chugoku Electric's Shimane-2 reactor (BWR, 820MW). It is reported that the governor will wait for the decision of Matsue City before sending his response to Chugoku Electric. The city of Matsue has adopted a cautious attitude and is not expected to respond to Chugoku Electric until after September, after a symposium scheduled for August. (Hideyuki Ban, a co-director of CNIC, will participate as a panelist).

Governor Sumita explained that he will allow the utility to apply to the central government for a license. He will not grant final approval until the government completes the safety assessment. However, his final approval will be a formality, as the prefecture does not plan to do its own assessment or to hold a public hearing. In regard to a newly discovered active seismic fault just south of the nuclear power plant, he takes the view that "that is a different issue".

Kyushu Electric sends delegation to Melox

Kyushu Electric Power Company, which proposes to use MOX fuel at its Genkai-3 reactor (PWR, 1180 MW), sent a mission to the Melox MOX fuel plant of the French nuclear conglomerate Areva. The mission visited the plant on July 4th and 5th to observe the operation of the quality control system. Inevitably the report from the mission will conclude that there are no problems with the plant as a source of MOX fuel, thus paving the way for a decision to order MOX fuel for Genkai.

License application for "clearance"

On June 2nd Japan Atomic Power Company (JAPCO) submitted an application to the Minister of Economy Trade and Industry for approval of its method of measuring and evaluating the radioactivity concentration of decommissioning waste from the Tokai nuclear power plant (GCR, 166MW). The approval has been sought in order to receive "clearance" for a portion of the metal that will arise when the reactor building is dismantled. JAPCO hopes to obtain clearance for approximately 2,000 tons of metal. (The clearance system was established through an amendment to the Reactor Regulation Law in May 2005. It allows radioactive waste with less than a certain concentration of radioactivity to be treated as non-radioactive waste (see NIT 104, 105 and 106).)

If the application is approved, JAPCO will measure and evaluate the radioactivity, then submit another application for confirmation of the results. Approval of this application will make it possible for the company to remove the metal from the Tokai plant.

In accordance with a nuclear industry agreement, metal which is cleared will not be circulated in the public sphere for the time being. It is proposed that the metal from Tokai be used at the Japan Proton Accelerator Research Complex, which is jointly owned by the Japan Atomic Energy Agency and the High Energy Accelerator Research Organization.

Hitachi and GE to receive US order

On June 21st, NRG Energy, a nuclear major in the US, announced plans to build two new nuclear reactors (total 2700 MW). It is reported that the reactors will be ABWRs manufactured by Hitachi and GE. Though the contract will not be signed officially until next year, if Hitachi is chosen this will be the first direct order from a US utility to be received by a Japanese manufacturer.

CFIUS approves Toshiba's WH acquisition

On June 5th, a spokesperson for the U.S. Department of Treasury said that the Committee on Foreign Investments in the United States (CFIUS) had approved the merger and acquisition of Westinghouse by Toshiba. According to news reports, Toshiba will provide 57% of the capital, with the remainder coming from Marubeni (20%), U.S.-based construction firm Shaw Group (20%) and Ishikawajima-Harima Heavy Industry (3%).

Continued from page 7 plutonium from spent nuclear fuel for use in Japan's nuclear reactors. At a cost of 2.3 trillion yen (about 20 billion U.S. dollars) to ratepayers, it is said to be the most expensive plant ever built in the history of the world. The Japanese government and utilities estimate that the total bill for choosing the reprocessing option and operating the Rokkasho reprocessing plant will be 19 trillion yen4 (about $160 billion U.S.), far more than disposing without reprocessing. Critics say it will cost far more. A second reprocessing plant will be needed for the spent fuel that Rokkasho cannot handle. This is estimated to raise costs to 43 trillion yen (about $375 billion U.S.).

Other parts of the nuclear fuel cycle program fare no better. Scheduled to have started in 1999, the use of mixed plutonium-uranium oxide (MOX) fuel in commercial nuclear reactors is yet to begin. With the exception of minor testing undertaken years ago, the program has to date produced no electricity. The third pillar of Japan's nuclear fuel cycle program is its fast breeder reactor program, which after 50 years of development has produced a grand total of 1 hour of electricity. Future prospects appear no brighter. The government's current nuclear energy policy has the fast breeder commercialized by 2050, an astonishing 70 years behind the original schedule set in 1961.

With a record like this, one would have thought that, rather than jumping on the GNEP bandwagon, the Japanese government would be looking for a way out of its nuclear fuel cycle program. Pursuing the elusive dream of "closed" nuclear fuel cycles, such as those promised by GNEP, will mire Japan and the US in a quagmire of higher nuclear power costs, increased plutonium surplus, and snowballing nuclear waste headaches.

Conclusion

GNEP will not reduce the risk of nuclear proliferation. It will not reduce the burden of radioactive waste produced by nuclear power plants. Nor will it contribute to meeting the world's energy demand. The money wasted on GNEP would be far better spent on sustainable alternatives to fossil fuels and nuclear power.

The PUREX process of separating plutonium from spent nuclear fuel, used at the Rokkasho reprocessing plant, gives rise to serious proliferation risks. Likewise, there are serious proliferation risks associated with fast breeder reactors, including the Monju prototype fast breeder reactor. These risks are in addition to the safety and radioactive waste risks associated with the Rokkasho reprocessing plant and Monju.

The Japanese government is not in a position to make a substantial contribution to GNEP's purported aims. Rather, the government's offer to cooperate with GNEP is opportunistic, cynical, and impractical. Like its contribution to the "coalition of the willing" in Iraq, its contribution to GNEP will be purely symbolic.

Demands

1. The Japanese government should withdraw its opportunistic, cynical, and impractical offer to cooperate with GNEP and engage in a public debate about the proliferation, safety and radioactive waste problems arising from its nuclear fuel cycle policies. Unlike the deliberations of the Atomic Energy Commission's Nuclear Policy-Planning Council, which led to the production of the Framework for Nuclear Energy Policy, a process should be established in which serious problems are debated honestly and scientifically. Conclusions should not be reached on the basis of pre-rigged numbers on committees, but on the basis of the merits of the arguments.
2. Active testing of the Rokkasho reprocessing plant should be stopped.
3. Japan's fast breeder program, including moves to restart the Monju prototype fast breeder reactor, should be stopped.

Hideyuki Ban (Co-Director, CNIC) Aileen Mioko Smith (Director, Green Action)

References are available on the web version of this statement: http://cnic.jp/english/news/newsflash/2006/gnep11Jul06.html

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