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Citizens' Nuclear Information Center

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Monju's Never Ending Problems

Photo: On the beach facing Monju

On December 4, about 1,000 people gathered in Tsuruga City for a public meeting and demonstration to demand the closure of the Monju Prototype Fast Breeder Reactor (FBR, 280MWe). Demonstrations have been held at this time each year since the first anniversary of the December 8, 1995 accident at Monju, which involved a sodium leak and fire. The public meeting was hosted by six groups, including Fukui Prefecture Citizens Against Nuclear Power and Citizens' Nuclear Information Center.

The last edition of Nuke Info Tokyo discussed the failure of attempts to remove a 3-ton fuel relay device that is stuck in the reactor (NIT 139). On December 16 Monju's owner-operator, Japan Atomic Energy Agency (JAEA), announced a plan to remove the relay device together with the sleeve on which it is caught. JAEA says it will design a new item of equipment and attach it to the top of the relay device. There is all sorts of machinery in the reactor head, including the control rod drive mechanism, so undoubtedly the design, manufacture and installation of the new equipment will be very complicated. The process will be particularly difficult, because the reactor contains molten sodium, heated to over 200ºC, which would cause a fierce fire if it came into contact with air.

The next stage in the Monju tests is to start raising power output to 40%. This was scheduled to begin in June this year, but JAEA announced that because of the problems with the fuel relay device it is now aiming to commence the next stage by March 2011.

There have also been several other problems at Monju recently. On December 27 an operational error at Monju caused a drop in voltage in Hokuriku Electric Power Company's power transmission system. It was a momentary phenomenon, but as a result power was lost by 35,000 households and factories in Tsuruga City, Fukui Prefecture, where Monju is located. The following day, one of Monju's three emergency diesel generators released inflammable gas when it was damaged during testing. On January 13 a sodium circulation pump broke down for one hour. Then on January 14 a worker entered the controlled area without a dosimeter. Clearly, Monju's quality control problems have not been fixed.

Hideyuki Ban (CNIC Co-Director)

Contents

Problems at KK-3 and KK-7

1. KK-3 Problems

Seismic motion

Niigata Prefecture's subcommittee on equipment integrity and seismic safety began its review of the integrity of Kashiwazaki-Kariwa (KK) Unit 3 (BWR, 1100MW) on December 13, 2010. However it is likely to be a long road to a restart.

When the Chuetsu-oki Earthquake struck on July 16, 2007, KK Units 3, 4 and 7 were operating at full power. It is thought that Units 3 and 4 were affected much more than Unit 7, which on December 28, 2009 became the first reactor to resume commercial operations after the earthquake (see NIT 135).

The biggest problem with KK-3 is that the spectrographic record for the reactor building does not match the simulation results. Since Tokyo Electric Power Company (TECPO) does not understand how the reactor building responded to the Chuetsu-oki Earthquake, it is unable to guarantee the reactor's safety in the event that it is struck by another earthquake.

The following table compares the seismic motion observed at the base mat of KK-3 with the design basis.

Axis	Horizontal (south-north)	Horizontal (east-west)	Vertical
Observed value	308 Gal	384 Gal	311 Gal
Design basis	192 Gal	193 Gal	235 Gal

(Gal is a unit of acceleration. Gravitational acceleration at the earth's surface is 980 Gal.)

The Chuetsu-oki Earthquake was a magnitude Mj6.8 quake. If the design basis was so inadequate for this earthquake, imagine what would happen if the plant was struck by a magnitude 7 class earthquake.

The observed values for seismic motion do not match the simulated values in the 0.1-second and 0.5-second periods. TEPCO carried out calculations which considered whether the base of the reactor building was rigid, or whether it had some flexibility, and the degree of elasticity in the ground in which the building is situated. It also compared the results with those for KK-6 and KK-7. However it is yet to come up with a consistent and rational explanation.

The data shows that the behavior of KK-3 was different from KK-2 and KK-4 on either side. Clearly KK-3 was pushed up to a considerable degree, but the reason has not been discovered. The local people have always believed there were problems with the ground itself.

Cracked foundation piles

KK-3's exhaust stack has 52 foundation piles. Only four of these have been checked and cracks were found in all four. The biggest crack was 2mm wide and 2.08mm long. Kotaro Kuroda, a member of the subcommittee on equipment integrity and seismic safety, suggested that this should be assessed as level IV damage, but TEPCO assessed it as level II on the grounds that there was no exfoliation. One wonders about the condition of the other foundation piles. Clearly they should be checked.

2. KK-7 Problems

Radioactive leak

A leak of radioactivity from a fuel assembly in KK-7 was identified on September 10, 2010. TEPCO continues to operate the reactor with the leaking assembly, even though it has not been able to identify the cause of the problem. Since then, the radioactivity count at the off gas monitor continues to hover around 10 CPS (counts per second) compared to a normal reading of 1 CPS. In response to a question by committee member Masahiro Koiwa during the December 13 meeting of the subcommittee into equipment integrity and seismic safety, TEPCO admitted that a small amount of radioactivity continues to leak from the reactor. Even if the amount is not large, it is significant that TEPCO was forced to admit that it is operating a reactor that is leaking radioactivity.

Damaged control rods

On November 1, cracks were found in a spent control rod. Since then, more cracked control rods have been found. On January 7 TEPCO announced that it had discovered 28 damaged rods. This represents 61% of the 46 spent control rods stored in KK-7's spent fuel pool. We are very concerned about those currently in use in KK-7. TEPCO does not know how many of those might be cracked.

The control rods in question are the hafnium flat tube type. In 2006, problems with this type of control rod were found in Fukushima I-6 (see NIT 111). The insertion function of the 23 hafnium flat tube type control rods currently in use in KK-7 is being checked once a month, but that is all. We believe this is insufficient. TEPCO claims the control rods are functioning normally.

At this stage TEPCO considers the cause of the cracks to be cumulative neutron irradiation.

Yukio Yamaguchi (CNIC Co-Director)

Uranium Enrichment Plant Turns into a Big Waste Dump

The centrifuges at Japan Nuclear Fuel Ltd's (JNFL) Rokkasho Uranium Enrichment Plant, located four kilometers to the northeast of the Rokkasho Reprocessing Plant, have fallen silent. The last line was shut down on December 15 last year. Endless problems with the centrifuges finally forced the plant to cease producing enriched uranium completely.

Photo: Cascade at Rokkasho Uranium Enrichment Plant

A report released in November by Professor Siegfried S. Hecker of Stanford University revealing the existence of a uranium enrichment facility in North Korea caused an international uproar. Though not a major focus of media attention, the report contained one line of particular relevance to Japan. According to Hecker, the chief process engineer at the North Korean facility claimed that the components were "modeled after the centrifuges at Almelo [in The Netherlands] and Rokkasho-mura." If this were true it would have serious implications for Japan's non-proliferation credibility. JNFL immediately denied that its technology had been leaked to North Korea. Perhaps the North Korean engineer simply meant that the enrichment technology used by Japan and North Korea was in both cases based on the same URENCO technology. However, even if the North Koreans did somehow manage to get their hands on blueprints from the Rokkasho Uranium Enrichment Plan, considering the plant's unfortunate history, they might come to regret their choice of target for technology theft.

The Rokkasho Uranium Enrichment Plant was the first of the nuclear fuel cycle facilities built in Rokkasho. It was supposed to eventually have a capacity of 1,500 ton-SWU per year[1]. The first cascade (RE-1A) began operating in December 1992 with a capacity of 150 ton-SWU per year. Gradually more 150 ton-SWU cascades were added. The seventh and last cascade (RE-2C) began operating in October 1998, bringing the total capacity to 1050 ton-SWU per year. Thereafter, no further cascades were added, because one after the other malfunctioning centrifuges had to be stopped.

The current status of the plant is shown in the table below.

Status of Rokkasho Uranium Enrichment Plant

Cascade	Started Operation	Centrifuges Stopped	Status
RE-1A	March 1992	4244	Stopped April 3, 2000
RE-1B	December 1992	4216	Stopped December 19, 2002
RE-1C	May 1993	3499	Stopped November 30, 2005
RE-1D	September 1994	4096	Stopped June 30, 2003
RE-2A	October 1997	2646	Stopped November 30, 2006
RE-2B	April 1998	Over 3000	Stopped December 15, 2010
RE-2C	October 1998	2507	Stopped February 12, 2008

The amount of the fissile uranium-235 isotope in natural uranium is only about 0.7%. Most of the uranium in natural uranium is uranium-238, which does not readily fission. The basic principle behind centrifuges used for uranium enrichment is that when uranium hexafluoride (UF6) gas is fed into a cylindrical rotor rotating at immense speed the heavier U-238 isotope moves to the periphery, while the lighter U-235 isotope concentrates in the center of the stream. Enriched uranium for use in nuclear power plants is produced by repeating this process in cascades of many centrifuges connected in sequence to raise the U-235 concentration to between three and five percent ("low enriched uranium"). In the Rokkasho Uranium Enrichment

Plant uranium adhered to the rotors. This caused them to vibrate until the centrifuges eventually broke down.

Centrifuges are dual-purpose machines capable of producing low enriched uranium to fuel nuclear reactors to generate electricity, but also capable of producing highly enriched uranium (over 90% U-235) for nuclear weapons. The concern about North Korea's development of uranium enrichment technology stems from this fact. This is also the reason why details of the centrifuges in the Rokkasho Uranium Enrichment Plant, including their size, the mechanisms involved and the number of centrifuges in the plant, are not publicly available. On nuclear security grounds this is all classified as sensitive information. Photos of cascades of cylinders in uranium enrichment facilities are publicly available, but they only show the outer containers. The inner workings of the centrifuges are not shown.

JNFL only ever published the number of centrifuges that had stopped operating. When the number of centrifuges that had ceased operating in a cascade reached the point where the cascade was barely able to continue enriching uranium, the whole cascade was closed down. As can be seen from the table, in April 2000 the RE-1A cascade was first to shut down. At the time, 4,244 centrifuges in this cascade had ceased to operate. Each of the seven cascades was forced to shut down after around ten years of operation. RE-2B was the last remaining operational cascade, but by 2007 part of this cascade was already out of operation and by 2008 3,000 centrifuges had stopped rotating. However, if the whole cascade were shut down this would in effect have meant that the whole plant was out of service. To save face, JNFL kept this last cascade going, but it was operating in form only. The RE-2B cascade was finally shut down in December 2010, so now there are no centrifuges rotating at the Rokkasho Uranium Enrichment Plant.

The physical reason why the plant had to be shut down altogether was the breakdown of large numbers of centrifuges, but the underlying cause was the failure of technological development carried out within the context of a government, bureaucracy and industry structure where no one took responsibility. Former Japan Nuclear Fuel Service (predecessor of JNFL) President Masatoshi Toyoda effectively admitted this in a memo entitled "Uranium Enrichment - the Void of 20 Lost Years". Toyoda, who in 1989 was a member of the Japan Atomic Energy Commission's "Uranium Enrichment Technology Expert Commission", said, "The demonstration testing of the centrifuge developed by the Power Reactor and Nuclear Fuel Development Corporation (PNC) was insufficient. On the grounds that the product was defective and uneconomic, I opposed transfer of development to the private sector, but was over-ruled by the Atomic Energy Commission and the nuclear plant makers."

Although JNFL refutes this claim, it plans to start again from scratch by replacing the existing centrifuges with a new design. The existing centrifuges have a metal rotor. They were designed by PNC (now Japan Atomic Energy Agency) along with Japan's three nuclear plant makers, Hitachi, Toshiba and Mitsubishi Heavy Industries. However major problems, including accretion of uranium and cracking of the base, were identified with this and a revised design. Now JNFL plans to replace the old centrifuges with a new type of centrifuge. The new centrifuges were developed by Sumitomo Electric Industries and IHI Corporation and have a composite carbon fiber rotor. JNFL intends to install them in stages between 2011 and 2020 and bring the capacity of the plant up to the originally planned capacity of 1500 ton-SWU per year.

However, the work to remove the uranium that has adhered to the existing centrifuges is proving to be time consuming, so it is very likely that the schedule for introducing the new centrifuges will be delayed. Even if the plant achieves its design capacity of 1,500 ton-SWU per year without problems, it will still only be able to supply a quarter of Japan's enriched uranium demand. Furthermore, the cost will be much higher than procuring enrichment services abroad, so it will never be an economic enterprise.

By Masako Sawai and Philip White

1. SWU = Separative Work Unit.
"Separative work" represents the amount of separation done by an enrichment process. It is a function of the concentrations of the feedstock, the enriched output, and the depleted tailings. It is expressed in units which are so calculated as to be proportional to the total input (energy / machine operation time) and to the mass processed. (Wikipedia)

Rokkasho Reprocessing Plant Update

The Rokkasho Reprocessing Plant has entered the third year since active testing using spent nuclear fuel came to a halt in December 2008 due to problems with the vitrification facility (see NIT 129). Japan Nuclear Fuel Ltd (JNFL) is now preparing to carry out tests at a mock up facility (KMOC) at Japan Atomic Energy Agency's (JAEA) Tokai Reprocessing Facility (see NIT 138). JNFL will use the tests to compare data from the vitrification furnace in Tokai with data from its Rokkasho plant.

JNFL blames the failure of testing of the vitrification facility on a failure to accurately measure the temperature within the vitrification furnace. To address this problem it plans to equip the facility with additional thermometers. It also plans to go ahead with tests on vitrification furnace B before completing tests on the damaged vitrification furnace A.

For the purpose of comparison with the mock up facility, instead of using real radioactive liquid waste it plans to recommence tests using imitation liquid waste. Thereafter it will use real radioactive liquid waste to make 20 to 30 glass canisters.

This is the plan that JNFL submitted to the government and which the government approved on December 10, 2010.

In other words, JNFL proposed and the government approved a plan in which the Rokkasho Reprocessing Plant can begin 40 years of commercial operation on the basis of 20 successfully produced glass canisters. Obviously they are so desperate to allow the plant to begin commercial operations that they are willing to go to any lengths to minimize the requirements for passing the pre-operational tests.

Masako Sawai (CNIC)

Continued from page 14 (TEPCO) to install reactor Higashidori-1 (ABWR, 1385 MW). After receiving permission, on the same day TEPCO submitted an application for approval of the first construction plan. Construction is scheduled to commence in January 2011 with the goal of beginning commercial operation in March 2017.

Stage set for submission of application for permission to install Sendai-3

On December 16, the Minister of Economy, Trade and Industry handed the president of Kyushu Electric Power Company a notice designating Sendai-3 (APWR, 1590MW) as "an important electric power development". The notice was issued after Kagoshima Prefecture's governor gave his consent on November 19 and a conference of related ministries on December 9 raised no objections to such a designation. Having received the designation, Kyushu Electric will now commence procedures for applying for permission to install the nuclear reactor.

Pluthermal permission for Tomari-3

On November 26, the Minister of Economy, Trade, and Industry gave permission to Hokkaido Electric Power Company (HEPCO) for its pluthermal plan in Tomari-3 (PWR, 912MW). Pluthermal will be implemented at Tomari-3 in spring of 2012 at the earliest. On December 1, HEPCO contracted to buy about 40 kilograms of plutonium from Tokyo Electric Power Company for use in MOX fuel. While HEPCO possesses about 68 kilograms of plutonium stored in France, this is insufficient for fabrication of 4 MOX fuel assemblies.

Pluthermal starts at Takahama-3

On December 5, eight MOX fuel assemblies were loaded into Kansai Electric Power Company's (KEPCO) Takahama-3 (PWR, 870MW) reactor. On the 22nd the reactor was activated, on the 23rd it reached criticality, and on the 25th electrical generation began.

Pluthermal postponed in Hamaoka-4

On December 6, Chubu Electric Power Company announced that it had postponed implementation of pluthermal at its Hamaoka-4 reactor (BWR, 1137MW). It had planned to start up the reactor with MOX fuel in January 2011 after loading MOX in December 2010 during a periodic inspection.

The reason given for the delay is that the government's seismic safety evaluation, based on seismic design guidelines revised in 2006 (see NIT 112 and 114), is running behind schedule. Since the loading of new fuel is usually carried out during periodic inspections, the delay could extend to 2012 or beyond.

Problems with Extending the Time between Periodic Inspections

Higashidori-1: application for extended operation cycle

On October 15 Tohoku Electric Power Company announced that it planned to increase the length of continuous operation of its Higashidori-1 reactor (BWR, 1110 MW) from the current 13-month cycle to a 16-month cycle.

Until now, Japanese nuclear power plants had to be shut down for periodic inspections after 13 months of operation, even if there were no incidents or damage. During periodic inspections, nuclear power plants are examined by the Nuclear Industrial and Safety Agency (NISA). In addition, the electric power company inspects equipment that is not subject to NISA inspection and replaces fuel assemblies. The plant may only resume commercial operations after it has cleared these inspections.

The inspection system ordinance was amended on August 29, 2008 (see NIT 126). The new system, which came into effect on January 1, 2009, allows for the possibility that reactors may be operated continuously for up to 24 months. However, for the first five years after the new system came into effect the maximum continuous operating time is 18 months. Tohoku Electric wants to take advantage of these new rules in the operation of its Higashidori-1 plant.

Also, it was reported on October 30 that Shikoku Electric Power Company plans to extend the period of continuous operation for its Ikata Nuclear Power Plant.

On November 10, Tohoku Electric submitted a revision under the Electricity Business Act to its "Operational Safety Plan, Electric Industry Electric Facilities for Business Use (Facilities for Nuclear Power Generation)". At the same time, it applied for a variation under the Reactor Regulatory Act to the "Higashidori Nuclear Power Plant Reactor Facilities Operational Safety Plan", which stipulates the conditions it must fulfill in operating the plant.

Objective of new inspection system is improved capacity factor

Outlined below are some of the problems with the Higashidori-1 plan, based on documentation being considered by government subcommittees reviewing Tohoku Electric's application.

I accept the notion of requiring electric power companies to produce quality assurance plans for checks and safety assurance and permitting extended operation cycles as a reward for accident- and incident-free operation. However, Japan's prime objective for introducing the system introduced in the United States in the 1990s is to raise the capacity factor. Even Tohoku Electric's press release and explanatory documentation state, albeit in muted tones, that an objective of lengthening the time of continuous operation is to raise the capacity factor.

One senses danger when the priority in introducing this system is not safety, but continuous operation.

Longer time between equipment checks

By lengthening the period of continuous operation, the time between equipment checks is also lengthened for those items of equipment that can only be checked when the plant is not operating. This increases the risk that damage and degradation will go unnoticed. Under pressure to raise the capacity factor, there is a danger that when the chance to check the equipment finally comes around adverse results will be ignored.

It is argued that new technology for inspecting the state of a nuclear power plant's equipment while it is still operating will be introduced to supplement the periodic inspections. This new technology includes vibration diagnostics to identify abnormalities in the vibration of rotating equipment such as turbines and motors, lubricating oil diagnostics to detect deterioration of lubricating oil and wear and tear on shafts, and infrared thermography diagnostics to detect localized overheating. However, judging from the status of Tohoku Electric's trials, this technology is still in the testing stage and cannot be used with confidence.

The Higashidori-1 technical assessment selected 37 representative items of equipment, based on similarity of material quality and use conditions. These were chosen from about 1,000 important items of equipment that cannot be repaired or replaced while the plant is operating. For those 37 items, the assessment first confirmed whether appropriate responses to past accident examples

had been taken. Then, based on checks of equipment deterioration data gathered during the latest periodic inspection, and research results published by other organizations, the assessment confirmed that the plant could be operated continuously for 26 months without repairs or replacements to this equipment. In light of this result, Tohoku Electric applied to operate the plant continuously for 16 months.

I do not believe that the selection of 37 items of equipment based on similarity of material quality and use conditions has any scientific basis. Reports appear frequently about deterioration of items of equipment such as recirculation pump seals. A strict assessment would probably conclude that 16 months continuous operation is difficult for such items.

Problems of fuel management arising from extended operating cycles

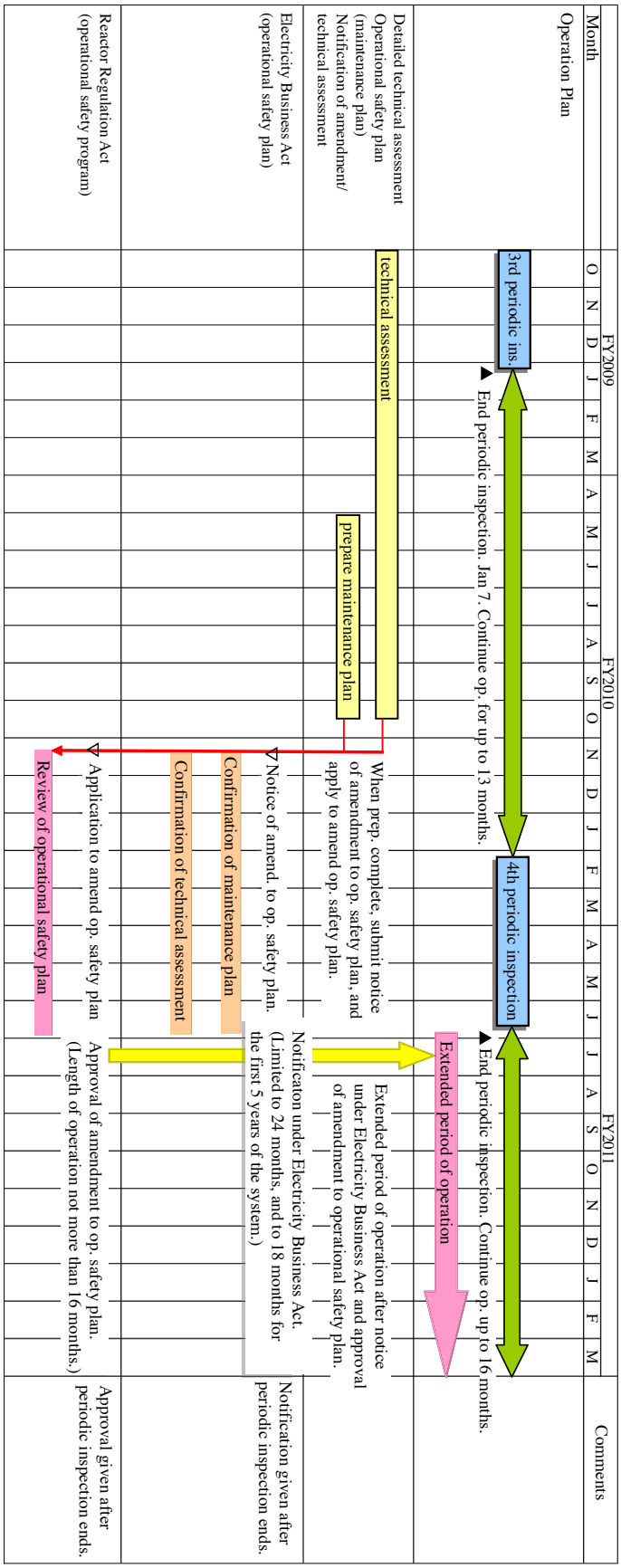
Extended operating cycles require correspondingly more fuel (more fissile material). The level of uranium enrichment is stipulated in the application for a reactor establishment license. So, unless the license is amended, more assemblies must be replaced during refueling.

However, since it is not possible to burn this at full power immediately, the core has to be managed more carefully than in the past, for example by including substances which absorb neutrons, such as gadolinia, in the fuel assemblies, or inserting some of the control rods into the reactor during operation.

For this reason, we would expect to see more fine damage to fuel assemblies and cracking of control rods. Also, a report by the working group assessing the safety implications of an extended operating cycle for Higashidori-1, assessed that there would be a slight reduction in the stability of the core. Although the assessed reduction in stability is small, this is not a problem that should be treated lightly.

Chihiro Kamisawa (CNIC)

Higashidori-1 extended operation cycle schedule (based on information published by Tohoku Electric)



Petition Concerning Feasibility Study for Construction of Nuclear Power Plant in Viet Nam

December 15, 2010

Mr. Akihiro Ohata
Minister of Economy, Trade and Industry

Petition Concerning Feasibility Study for Construction of Nuclear Power Plant in Viet Nam
~Japanese Government Support for Exports of Nuclear Power Plants~

We are seriously concerned that the Japanese Government's use of public funds for the incautious promotion of exports of nuclear power plants will give rise to large nuclear proliferation and nuclear safety risks, that it could cause huge social and environmental impacts on local communities where nuclear power plants are constructed, and that Japan's taxes will be used for the profit of a limited number of companies. These concerns are the basis of this petition.

I. Background

At the moment the Japanese Government is providing official support in all sorts of ways, including top-level diplomacy, technical cooperation and feasibility studies, in order to achieve exports of nuclear power plants by Japanese companies to countries including the United States, Viet Nam, Thailand, Kazakhstan and Jordan.

For example, at the end of October this year, at a meeting between the Prime Ministers of Japan and Viet Nam, it was announced that the Vietnamese Government had decided to choose Japan as its cooperation partner for building two reactors.[1] The agreement included conducting feasibility studies with Japanese funds and low-interest loans for the project.

Meanwhile, last year the Nuclear Energy Policy Planning Division in the Electricity and Gas Industry Department of the Ministry of Economy, Trade and Industry's Agency for Natural Resources and Energy called tenders for a "low carbon electricity generation industry international expansion study project".[2] It selected Japan Atomic Power Company from two bids received during the tender period. According to the Nuclear Energy Policy Planning Division, 1.999 billion yen was awarded for a feasibility study related to Viet Nam's nuclear power plant construction project. Due to delays in Viet Nam's selection of a partner, the study project was carried over to the 2010 fiscal year. However, it appears likely that tenders for the abovementioned "2009 fiscal year low carbon electricity generation industry international expansion study project" were called with the Viet Nam project in mind.

It is envisaged that public finance and insurance for nuclear exports will be provided by Japan Bank for International Cooperation (JBIC) and Nippon Export Investment and Insurance (NEXI). Both these organizations intend to produce guidelines related to review of support for nuclear exports.[3]

II. Our perspective

We believe the current policy of promoting nuclear exports is the result of an underestimation of the financial risks, as well as the social and environmental risks associated with nuclear energy in relation to nuclear proliferation, accidents, radioactive waste, worker exposure to radiation and other issues. Furthermore, in view of the many problems experienced with nuclear power plants in Japan, we question the wisdom of using public funds to promote the export of nuclear power plants. Above all, proceeding with nuclear projects in developing countries, which face additional problems in relation to issues such as governance, technical capacity and democratic participatory processes, entails great risks for local communities. In addition, when considering the use of taxes as an "economic measure", we question spending taxpayers' money to promote nuclear exports from which only a very limited number of Japanese companies will profit.

For the above reasons, we believe the Japanese Government's policy of investing extravagant amounts of public money to promote nuclear exports is inappropriate.

Nevertheless, bearing in mind the current situation where nuclear exports are already being promoted, we believe that at the very least, when the Japanese Government provides support for studies related to nuclear exports, or when it provides public credit for nuclear exports it is necessary to ensure adequate transparency and to carefully examine the abovementioned nuclear risks.

III. Demands

We demand the following in regard to feasibility studies carried out in relation to the construction of nuclear power plants overseas.

1. Since the Vietnamese feasibility study will be carried out with Japanese taxpayers' money, with the exception of details of bids, the study report should be published in its entirety.[4]
2. The topics to be covered in the feasibility study should be decided taking into account the views of stakeholders, including NGOs.
3. The topics of the feasibility study should include consideration of whether or not information disclosure concerning the whole project and consultation with residents will be assured in the decision-making process for construction of the nuclear power plant.
4. The topics of the feasibility study should include consideration of whether or not information disclosure and consultation with residents concerning safety etc. will be assured in relation to operation of the nuclear power plant.
5. The feasibility study should also include an assessment of the risks posed by the project covering the radioactive waste management system, accident response, accident liability, protection of workers from exposure to radiation, safety assurance, as well as other social and environmental risks.

References

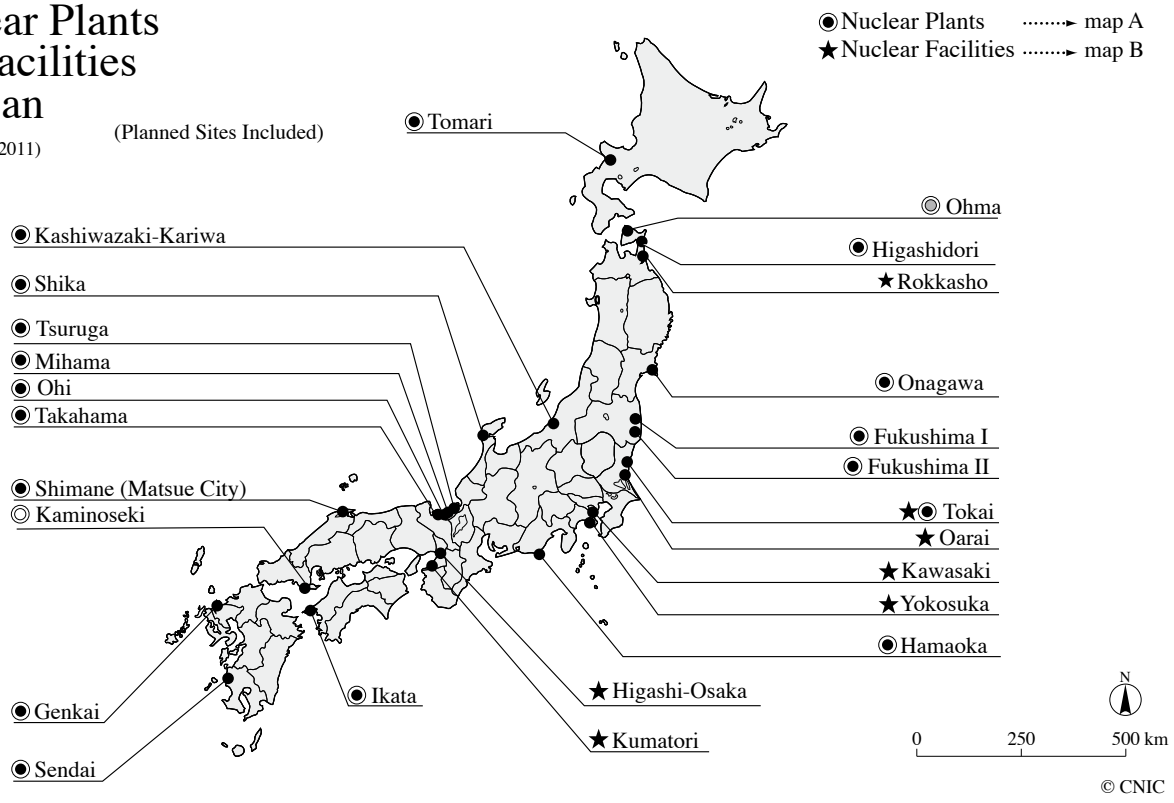
1. The October 31, 2010 Japan-Viet Nam Joint Statement contains the following: "The Vietnamese side affirmed that ... [it] had decided to choose Japan as the cooperation partner for building two reactors at the second nuclear power plant site in Ninh Thuan Province, Viet Nam."
http://www.mofa.go.jp/region/asia-paci/vietnam/joint1010.html
2. "Concerning the result of tenders for 2009 fiscal year low carbon electricity generation industry international expansion study project", Nuclear Energy Policy Planning Division, Electricity and Gas Industry Department, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, October 16, 2009
http://www.enecho.meti.go.jp/info/tender/tenddata/0910/091016c/091016c.htm
3. In regard to the production of nuclear guidelines by JBIC/NEXI, in July 2009 NGOs submitted demands including the following:
• Public support should not be provided for nuclear-related projects in regions of tension and regions where terrorism is rife, or for projects in politically unstable countries.
• Safety standards at least as high as those in Japan should be required.
• The details and the efficacy of safety plans and management and disposal plans for radioactive waste, including spent nuclear fuel, should be confirmed.
• Appropriate standards and monitoring systems in regard to worker radiation exposure should be in place.
• Adequate access to information and stakeholder involvement and consent should be assured
• Proposals should be reviewed by an independent review committee.
4. The results of feasibility studies funded the Ministry of Economy, Trade and Industry and carried out by the Japan External Trade Organization (JETRO) in support of Japanese companies are, in principle, made public, in accordance with JETRO's environmental and social guidelines.
http://www.jetro.go.jp/disclosure/environment/guideline-e.pdf

(Endorsed by 79 groups (52 Japanese and 27 overseas) and 132 individuals (129 Japanese and 3 overseas))

Nuclear Plants and Facilities in Japan

(as of Jan. 2011)

(Planned Sites Included)



Commercial and Research Nuclear Facilities in Japan

(as of Jan. 2011)

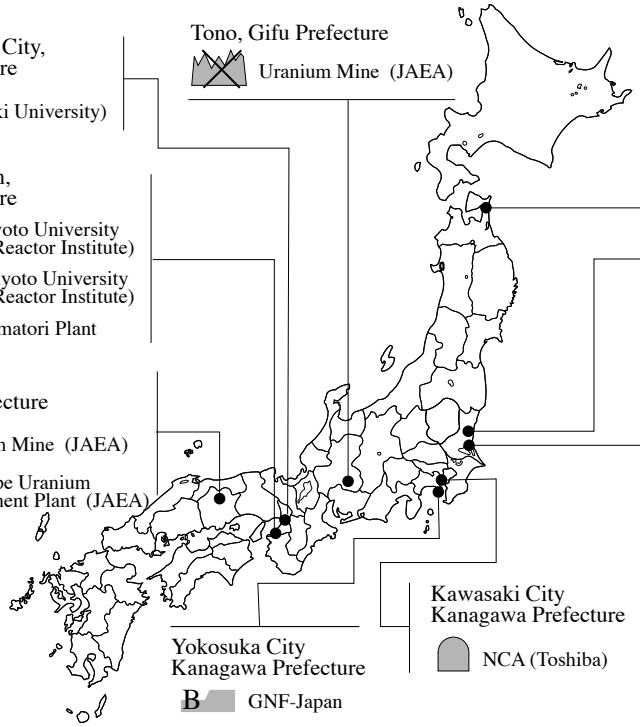
Type of Facility

- ····· Research reactor (CA = Critical Assembly)
- B ····· Uranium fuel manufacturing plant for BWR
- P ····· Uranium fuel manufacturing plant for PWR
- Mox ····· MOX fuel manufacturing plant
- ····· Uranium reconversion
- ····· Uranium enrichment plant
- ····· Reprocessing plant
- ····· Mine
- ····· Others

Status

- Operable
- Under construction
- Permanently shut down

GNF-Japan - Global Nuclear Fuel - Japan
JAERI - Japan Atomic Energy Research Institute
JNC - Japan Nuclear Cycle Development Institute
JNFL - Japan Nuclear Fuel Ltd.
NFI - Nuclear Fuel Industry



Higashi-Osaka City, Osaka Prefecture
- UTR (Kinki University)

Tono, Gifu Prefecture
- Uranium Mine (JAEA)

Kumatori Town, Osaka Prefecture
- KUR (Kyoto University Research Reactor Institute)
- KUCA (Kyoto University Research Reactor Institute)
- P NFI Kumatori Plant

Ningyo-toge, Okayama Prefecture
- Uranium Mine (JAEA)
- Prototype Uranium Enrichment Plant (JAEA)

Kawasaki City Kanagawa Prefecture
- NCA (Toshiba)

Yokosuka City Kanagawa Prefecture
- B GNF-Japan

Rokkasho Village, Aomori Prefecture
- Mox MOX Fuel Fabrication Plant (JNFL)
- Reprocessing Plant (JNFL)
- Uranium Enrichment Plant (JNFL)
- Low-level Radioactive Waste Disposal Center (JNFL)
- High-level Radioactive Waste Storage Center (JNFL)

Tokai Village, Ibaraki Prefecture
- Mitsubishi Nuclear Fuel
- P Mitsubishi Nuclear Fuel
- JCO Tokai Plant
- B NFI Tokai Plant
- Mox Plutonium Fuel Production Facility (JAEA)
- Reprocessing Plant (JAEA)
- Vitrification Facility (JAEA)
- JRR-3 (JAEA)
- TCA (JAEA)
- JRR-4 (JAEA)
- FCA (JAEA)
- NSRR (JAEA)
- TRACY (JAEA)
- Yayoi (Tokyo University)
- STACY (JAEA)

Oarai Town, Ibaraki Prefecture
- HTTR (JAEA)
- JMTR (JAEA)
- Joyo Experimental Fast Reactor (JAEA)

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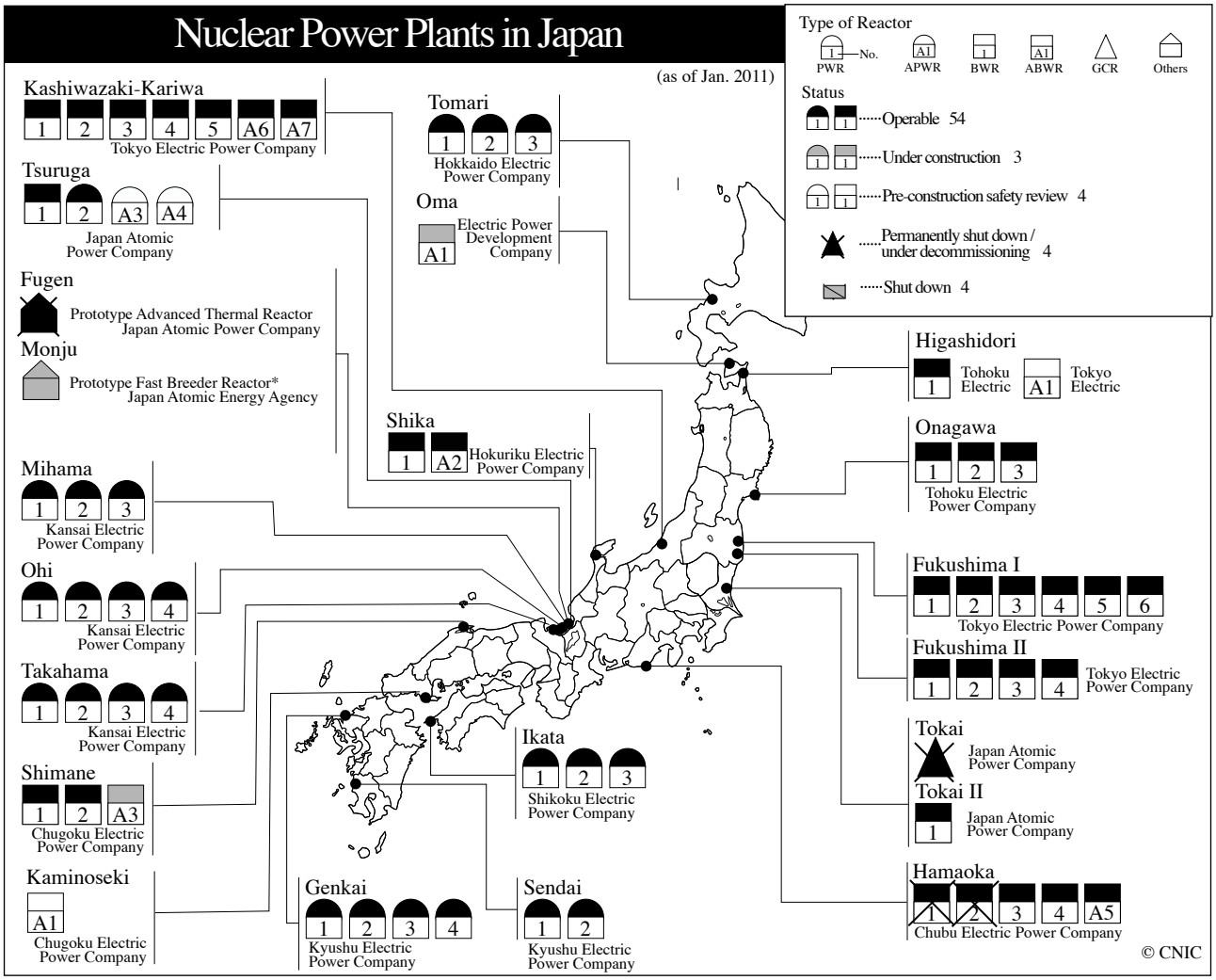
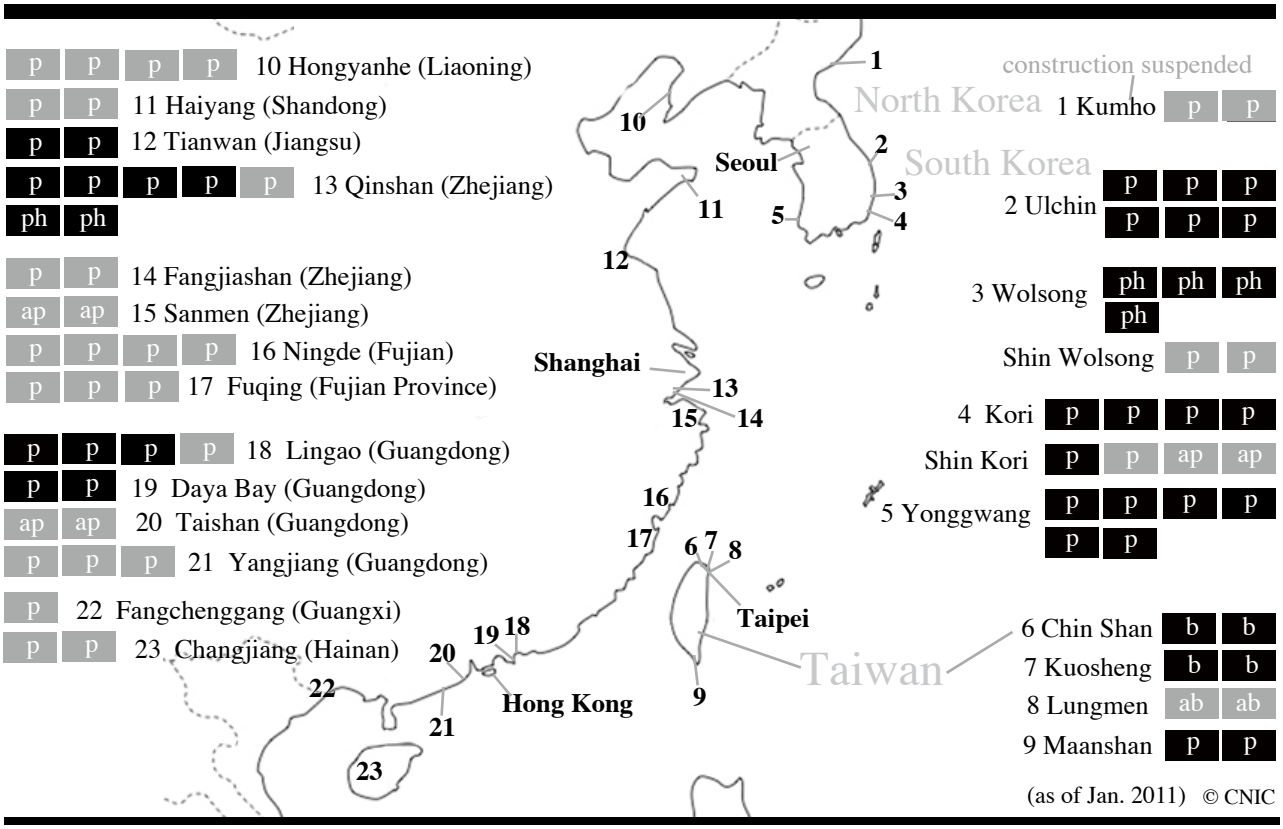


Nuclear Plants in East Asia - data taken from IAEA's PRIS web site.

operational under construction p - PWR ph - PHWR b - BWR ab - ABWR ap - AP1000/EPR/APR



Group Introduction

Miyagi Wind

By Hironori Shinohara*

Opposition to nuclear energy has been continuing in the Tohoku region for many years. *Miyagi Wind* is heir to this rich tradition.

Just before the Three Mile Island nuclear accident in 1979, a citizens' activist group opposed to nuclear energy was formed in Sendai City, sixty kilometers from Tohoku Electric Power Company's Onagawa Nuclear Power Plant. The *Sendai Anti-Nuclear Energy Group* tackled issues associated with nuclear power by organizing events such as public meetings, film nights and concerts.

Strong opposition by local fisher folk made it very difficult for Tohoku Electric to begin construction of the Onagawa NPP, but eventually power and money ground down the resistance and construction began in December 1979. In response, local residents took out a lawsuit calling for termination of construction. Lodged in December 1981, the lawsuit was the first in which the electric power company was the defendant. It was a civil case, whereas all previous lawsuits had been administrative cases with the government as the defendant (see NIT 104). Through a civil lawsuit the plaintiffs were able to address the full range of nuclear issues.

The *Onagawa Nuclear Power Plant Lawsuit Support Network* took over the activities of the *Sendai Anti-Nuclear Energy Group*. For the next twenty years, until the Supreme Court's final verdict was delivered, the *Support Network* continued to carry out activities in opposition to nuclear energy, while also acting as the driving force in the lawsuit. In the end the Supreme Court dismissed our demands. But although we failed to change government policy, thanks to the cooperation of a large number of people, the weighty record of the lawsuit remains.

The *Support Network* was dissolved and in 2001 *Miyagi Wind* was formed to breathe fresh air into the movement. The word "wind" was chosen to reflect our desire to promote the introduction of renewable energy and also because we wanted to generate winds of social change towards a phase out of nuclear energy.

The group is engaged in a wide range of activities. Some members have become stockholders in Tohoku Electric Power Company. This enables us to attend shareholder meetings and debate the board of directors, to submit questions and force the

company to release all sorts of data. Data released in response to our questions revealed the high radiation doses incurred by workers during inspection and maintenance work. Workers received doses of up to 2.45 milli-sieverts in a single day and up to 29.26 milli-sieverts during the course of a periodic inspection. It would be no surprise if workers exposed to this level of radiation developed radiation related illnesses.

Forty years have passed since Japan's first nuclear power plants began operating. The number of nuclear industry workers over that time is between 450,000 and 500,000 people. Many have suffered from, or even died as a result of radiation related illnesses. However, the government and the electric power companies have continued to conceal this fact. In order to shine a light on the issue, in autumn 2010 *Miyagi Wind* hosted a photographic exhibition and public meeting with photographer Kenji Higuchi, who has followed the fate of nuclear workers (see NIT 86).

Many of the participants commented, "I am astonished. This is the first I knew of this situation."

A major issue facing us now is Tohoku Electric's plan to introduce pluthermal[1] at its Onagawa NPP. We are currently engaged in a fierce debate with the company about the pros and cons of this plan.

No matter how determined the government and the electric power companies may be to push ahead with their plans, we will not give up. We intend to continue to work to create a nuclear free society as soon as possible.

1. The term 'pluthermal' refers to the use of plutonium in light water reactors. The fuel is made from a mixed oxide of plutonium and uranium (MOX).

**Hironori Shinohara is a member of Miyagi Wind (see Who's Who column in NIT 100).*

NEWS WATCH

New nuclear policy drafting process begins

The first meeting of a committee to review Japan's nuclear policy was held on December 21. The committee intends to draft a new policy over a period of about a year. The current *Framework for Nuclear Energy Policy* was established by the Japan Atomic Energy Commission in 2005.

CNIC Co-Director Hideyuki Ban is once again a member of the review committee (refer NIT 109). Most of the other 25 committee members are nuclear energy proponents, or at least tolerant of nuclear energy. Nevertheless, some statements critical of the current situation were heard from among the other committee members at the first meeting.

Mihama-1 passes 40 years operation

On November 28 Kansai Electric Power Company's (KEPCO) Mihama-1 Nuclear Power Plant (PWR, 340MW) passed the 40-year mark. Prior to this, on November 8 the governor of Fukui Prefecture and the Mayor of Mihama Town communicated to KEPCO their consent for the plant to operate for up to ten more years.

On November 24 KEPCO announced its intention to launch its own feasibility study in regard to a replacement for the Mihama-1 reactor. It began the study on December 13 with a survey of the distribution of land plants and animals.

Rush to sign nuclear agreements

South Korea: On December 20 Japanese Foreign Minister Seiji Maehara and South Korean Ambassador Kwon Chul-hyun signed a nuclear cooperation agreement between the two countries. Clause 9 of the agreement, which has not yet been submitted to the Diet for approval, states, "nuclear material recovered or produced as a by-product shall not be enriched to twenty percent or more in the isotope uranium-235 or reprocessed within the jurisdiction of the State of the receiving Party without the prior written consent of the supplying Party." This is weaker than the same clause of the agreement signed with Jordan on September 10, 2010, which states, "Nuclear material transferred pursuant to this Agreement and nuclear material recovered or produced as a by-product shall not be enriched or reprocessed within the jurisdiction of the Hashemite Kingdom of Jordan." (Refer NIT 138.)

Vietnam: A bilateral nuclear cooperation agreement between Japan and Vietnam was signed on January 20, but the text has not yet been released.

India: The third round of negotiations for a nuclear agreement between Japan and India were held from November 22-24. Previously negotiations were held in June and October. According to the November 26 edition of the Denki Shimbun (Electric Daily News), official sources said that India would not budge from its claim that "development of nuclear weapons for deterrence is itself peaceful use" and that India was unsympathetic to Japan's demand that nuclear equipment exported by Japan be used only in facilities covered by IAEA safeguards. Reports were more sanguine after former Prime Minister Yukio Hatoyama met Indian Prime Minister Manmohan Singh in New Delhi on January 17. Hatoyama was variously reported as saying that negotiations were in the final stages and that Japan wanted wording in the text of the bilateral agreement or associated documents to the effect that India promises not to conduct a nuclear test.

Turkey: A "Memorandum of Cooperation between the Ministry of Economy, Trade and Industry of Japan and the Ministry of Energy and Natural Resources of the Republic of Turkey in the Development of a Nuclear Power Program in the Republic of Turkey" was signed on December 24. Turkey is planning to construct nuclear reactors at two sites. Russia will build nuclear reactors at a site in southern Turkey, but it is said that negotiations with South Korea for reactors at a site on the coast of the Black Sea have broken down and that Turkey has turned to Japan instead.

Saudi Arabia: On January 8, during a visit to Saudi Arabia by Minister of Economy, Trade and Industry Akihiro Ohata (replaced by Banri Kaieda

in a Cabinet reshuffle on January 14), Japan and Saudi Arabia agreed to expand cooperation in the nuclear field. It is expected that they will sign a Memorandum of Cooperation in the near future, but it is unclear when they will sign a legally enforceable bilateral cooperation agreement. The latter is required before Japan can export nuclear material, equipment and technology. To sign such an agreement with Saudi Arabia before it signs and ratifies an Additional Protocol (AP) with the International Atomic Energy Agency would undermine Japanese non-proliferation policy. In a joint submission to last year's Non-Proliferation Treaty Review Conference (NPT), Japan and Australia proposed that NPT states, "call on all states to apply this [AP] safeguards standard to the supply of nuclear material and equipment." However, undoubtedly there is strong pressure from industry to relax this condition, given that in July last year Japanese nuclear power plant maker Toshiba and United States companies Shaw Group and Exelon agreed to jointly bid for contracts for nuclear power projects in Saudi Arabia.

Industry nuclear cooperation agreements

Japan Atomic Power Company (JAPCO) and Electricity Generating Authority of Thailand (EGAT) signed a technical cooperation agreement regarding Thailand's nuclear power program on November 22. Thailand plans to begin operating its first nuclear power plant (1000MW scale) in 2020 and to have five plants operating by 2030. It is said that four potential sites are being considered.

Kansai Electric Power Company announced on November 17 that it had signed a cooperation agreement with EDF relating primarily to information exchange in the nuclear field, including aging of nuclear power plants.

Mitsubishi Heavy Industries (MHI) announced on December 27 that its US subsidiary Mitsubishi Nuclear Energy Systems had agreed with Dominion to continue pre-construction, engineering and planning work for a US-APWR at Dominion's North Anna site. Dominion submitted a combined construction permit-operating license application for North Anna-3 to the Nuclear Regulatory Commission at the end of June 2010, but spokesman Richard Zuercher said on December 27 that the agreement with Mitsubishi does not indicate Dominion intends to build the unit.

Mitsubishi Nuclear Fuel Co. and Areva have formed US Nuclear Fuel, a 50-50 joint venture that plans to produce nuclear fuel in the United States for MHI's US-APWRs (1700MW).

Toshiba announced on December 21 that it had signed a technical development agreement relating to construction of a nuclear power plant with Finland's Fennovoima. Along with its subsidiary Westinghouse, Toshiba is proposing a 1600MW ABWR reactor. Fennovoima has also signed a technical development agreement with Areva in regard to its EPR and plans to choose a plant supplier in 2012.

Japanese Electric Power Companies Join French Uranium Enrichment Project

On November 4 Kyushu Electric Power Company and Tohoku Electric Power Company announced that they would participate in the George Besse (GB) II uranium enrichment plant, constructed at Tricastin in southern France by Areva NC. They join Kansai Electric Power Company and Sojitz Corporation, which had already invested in the project. On September 17 the four Japanese companies established Japan France Enrichment Investing (JFEI). JFEI gained a stake in GB II by acquiring shares in SET Holdings (the holding company which will operate GB II) from Areva. SET Holdings shareholders are Areva NC (88%), GDF Suez (5%), Korea Hydro and Nuclear Power (2.5%), Kansai Electric (2%), Kyushu Electric and Tohoku Electric (1% each) and Sojitz (0.5%).

Permission granted for installation of TEPCO's Higashidori-1

On December 24, the Minister of Economy, Trade and Industry gave permission to Tokyo Electric Power Company *Continued on page 5*

Nuke Info Tokyo is a bi-monthly newsletter that aims to provide foreign friends with up-to-date information on the Japanese nuclear industry as well as on the movements against it. It is published in html and pdf versions on CNIC's English web site: http://cnic.jp/english/

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