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CNIC Citizens' Nuclear Information Center

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Indonesian Anti-Nuclear Activists Visit Japan/Korea

Public meeting in Tokyo (left), with local Hamaoka activists (top), in front of KEPCO in Seoul (right)

Two Indonesians opposed to their government's plan to introduce nuclear power visited Japan from July 3-9. From Japan, they continued on to South Korea before returning to Indonesia on July 12. Their visit was sponsored by NGOs working on environmental, nuclear and Indonesian solidarity issues in Japan and South Korea. It was organized in recognition of the importance of international solidarity in opposing moves to expand nuclear power in Asia.

Background

In the 1990s, Indonesia had a plan to introduce nuclear power, but that plan was suspended due to the 1997 financial crisis. However, it resurfaced in 2002 and now the government says it will call tenders for a nuclear power plant on the Muria Peninsula of Central Java (Jepara Regency) as early as next year (see NIT 116).

The movement opposed to nuclear power in Indonesia was very active in the 1990s, but it went into hibernation after the nuclear power plan was suspended. It was slow to respond to the latest plans, but it came back to life with a vengeance in the last couple of months. In June this year, thousands of people, including the Regent of Kudus (next to Jepara), participated in demonstrations in Central Java. The issue is now front-page news in the Indonesian press. A major reason for the concern is the fact that the area around the proposed site is highly dependent on fishing and agriculture. Residents are concerned about damage to their livelihoods and industry is concerned about damage to the reputation of its products. People are already adversely affected by a nearby coal-fired power plant and they fear that in many ways a nuclear power plant would be even worse.

Japan and Korea are keen to participate in construction of nuclear power plants in South-East Asia. Both countries are seeking to present themselves in as favorable a light as possible to the Indonesian government and have various nuclear cooperation programs in place. Japan assists Indonesia's nuclear program through such things as training in technical and regulatory skills, seminars

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in Indonesia and Japan, and leadership of the ministerial level Forum for Nuclear Cooperation in Asia (FNCA). South Korea is even more proactive than Japan. For example, in December 2005 Korea Electric Power Corp. and Indonesia's state electricity company, PLN, signed a memorandum of understanding concerning the introduction of nuclear power to Indonesia.

The Japanese government's policy, as stated in its Nuclear Power National Plan, released by the Ministry of Economy Trade and Industry (METI) in August 2006, is to "actively support the global development of the Japanese nuclear industry". The government's interest is motivated by the fact that Japanese nuclear power plants alone will not provide enough work to sustain Japan's nuclear industry through 2030. Hence, Japan's nuclear industry needs to win contracts overseas in order to maintain its capacity to support Japan's own nuclear program.

In 2006 METI commissioned the Japan External Trade Organization (JETRO) to carry out a study into the potential for introducing nuclear power to Indonesia and Vietnam. CNIC obtained a copy of JETRO's March 2007 report through a freedom of information request. The report identifies major obstacles that must be overcome before Indonesia will be ready to introduce nuclear power. In particular, it stresses the lack of trained manpower. Other issues include the fact that no entity has been chosen to implement the program and the fact that problems raised in an IAEA study (NPP Site Confirmation and Structural Safety 1997-2002) still have not been fully addressed.

In addition to the above problems, it is far from clear that nuclear power is the best solution to Indonesia's energy needs. JETRO's report makes the following points.

- Indonesia has great geothermal energy potential and there is also potential for hydroelectric power, but the utilization rate of these is very low.
- Indonesia's distribution infrastructure (pipelines, electricity grid, rail transport) is not in place.
- Indonesia's energy use is very inefficient. At 470 TOE (tons of oil equivalent) per $1 million GDP, it is five times less efficient than Japan.

We would qualify JETRO's reference to hydroelectric power with demands for stringent environmental and social justice conditions. The same applies to biomass, another energy source with great potential, but which is not mentioned in JETRO's report. However, the above points should be enough to make people suspicious of claims that Indonesia has no alternative but to introduce nuclear power.

Illustration by Shoji Takagi

Stop Japan exporting nuclear reactors to Indonesia!

Visit of two activists

While in Japan, Nuruddin Amin ("Gus Nun" - a local Jepara leader in Indonesia's largest Islamic organization, Nahdlatul Ulama) and Nur Hidayati ("Yaya" - climate and energy campaigner for Greenpeace South-East Asia) lobbied government and industry, calling on them not to support Indonesia's nuclear power plan. They also took part in public meetings in Tokyo and Osaka and met local activists opposed to the Hamaoka nuclear power plant. Because of its location directly above the predicted Tokai earthquake, Hamaoka is arguably the most dangerous nuclear power plant in the world. Since earthquakes are a problem shared by Japan and Indonesia, this meeting was an invaluable opportunity for Gus Nun and Yaya to get ideas, which they will be able to use in their local and national campaigns. The clearest message to come out of the Hamaoka meeting was "stop it before it starts". Once nuclear power plants are built, they become like a drug habit that the town cannot kick.

In Tokyo, meetings were held with the Japan Bank for International Cooperation (JBIC), the Ministry of Foreign Affairs (MoFA) and the Ministry of Economy Trade and Industry (METI). Gus Nun and Yaya also visited Japan's main nuclear power plant makers, Mitsubishi Heavy Industries, Toshiba and Hitachi. An officer from the newly formed Hitachi-GE Nuclear Energy Ltd. agreed to listen to their concerns, but Toshiba and Mitsubishi refused to meet them. Indeed, they even refused to receive messages in writing. However, they were put on notice that they will not be able to build a nuclear power plant in Indonesia without facing protests in Indonesia and in Japan.

MoFA officials stated that the basic principals

of Japan's international nuclear cooperation are non-proliferation, safety and security. The latter covers not only weapons-usable materials, but also radioactive materials that could be used by terrorists. The officials confirmed that Japan does not have a bi-lateral nuclear cooperation agreement with Indonesia and said that at present there are no plans to enter into such an agreement. However, they also confirmed that such an agreement would be a pre-condition for exporting a nuclear power plant to Indonesia.

While there was no conflict between the statements from MoFA and METI over principals, METI officials acknowledged no responsibility in regard to the safety of any plant constructed by Japanese companies in Indonesia. They said that Japanese laws do not include safety requirements for exports of nuclear power plants. They took the attitude that responsibility for the project rests entirely with the Indonesian government. Furthermore, METI officials acknowledged no obligation to consider the wishes of the local population in regard to the cooperation currently being provided. By contrast, JBIC has environmental and social guidelines, which place importance on the participation of stakeholders, including local residents and local NGOs affected by the project.

The visit of Gus Nun and Yaya was a first step towards generating international support for their opposition to the introduction of nuclear power in Indonesia. Besides seeking support for their campaign, they also appealed to NGOs in Japan, Korea and other countries for protection. Anti-nuclear activists were subjected to various forms of oppression in the 1990s and they fear that this might be repeated. Such oppression is less likely to occur if the international NGO community is watching.

Indonesia has an active civil society, so it is a good place to begin an international campaign against nuclear power in South-East Asia. Let us not forget, however, that Vietnam also plans to introduce nuclear power and the Thai government recently announced that it wants to introduce nuclear power too. There are also noises from other countries indicating interest in nuclear power. Given that the introduction of nuclear power in one country is likely to strengthen calls for nuclear power in others, the principle of "stop it before it starts" should be extended to the whole South-East Asian region. The message to the region must be "Don't get hooked like we did!"

Philip White (NIT Editor)

Continued from page 6 struck. In particular, we saw how the confusion caused by the earthquake led to errors and lapses of judgment. We saw equipment failures which in themselves might be manageable, but which, when compounded with the many other failures that earthquakes inevitably cause, could have been catastrophic.

Unfortunately, there is no indication that the government will prioritize safety over the narrow economic interests of the power companies. The following quote starkly illustrates the obstacles to change:

> The official said that during the discussions on new standards in 2006, it was clear that above a level of about 6.7, "there would be a lot of backfitting required" to keep reactors operating. Were Japan in the aftermath of this week's quake to make a quake of 7.0 the design basis event, he said, for some plants the amount of upgrading needed could be economically prohibitive. (*Nucleonics Week*, Volume 48, Number 29, July 19, 2007)

Clearly it is important to change the priorities of the central government. Mr. Amari Minister of Economy, Trade and Industry ordered that the reactors remain shut down until safety has been confirmed. One wonders what criteria he might use to determine when they are safe again, but it is hard to imagine that his criteria would be based on good sense and sound science. Possibly the best hope lies at the local level. The mayor of Kashiwazaki City invoked his right under fire safety provisions to order that the reactors remain shut down. The issue will then come down to the mood of the local population. The earthquake shook the people of Kashiwazaki-Kariwa in more ways than one. What will it take to convince them that it is safe to operate the reactors again?

Hideyuki Ban (CNIC Co-Director)
Philip White (NIT Editor)

Haiku for the season

Strolling by night
wishing to bridge and cross
the Galaxy

by Hitoshi Ichinose

Japan's Nuclear Earthquake Safety Shaken to the Roots

At 10:13 am on July 16 a magnitude 6.8 earthquake struck just off the coast of Niigata Prefecture on the Japan Sea side of Honshu, Japan's largest island. As a result of the quake, four reactors (units 2, 3, 4 & 7) at Tokyo Electric Power Company's (TEPCO) Kashiwazaki-Kariwa nuclear power plant shut down automatically. At the time, unit 2 was being started up after a periodic inspection, while the other three units (1, 5 & 6) were still shut down for periodic inspection.

We express our condolences to the families and friends of those who lost their lives as a result of the earthquake. So far eleven people are reported to have died. We are also concerned for the well-being of those who survived, some of whom are members of CNIC. Their suffering is likely to continue for some time. Perhaps the only fortunate thing amidst this misery is that the nuclear reactors shut down. If they had not done so, there could have been a nuclear disaster in which a huge amount of radioactive material was released into the environment.

Fire in a transformer

As a result of the quake, a fire occurred in a transformer outside a building in unit 3. The transformer was part of the external power supply system. It appears that a short in an electric circuit gave rise to a spark, which set fire to insulating oil. The ground beneath the transformer was raised by 30 cm, while the ground next to the transformer, where the electric cables ran, subsided by 15-25 cm. TEPCO believes that the relative movement caused a short circuit and that this gave rise to the fire.

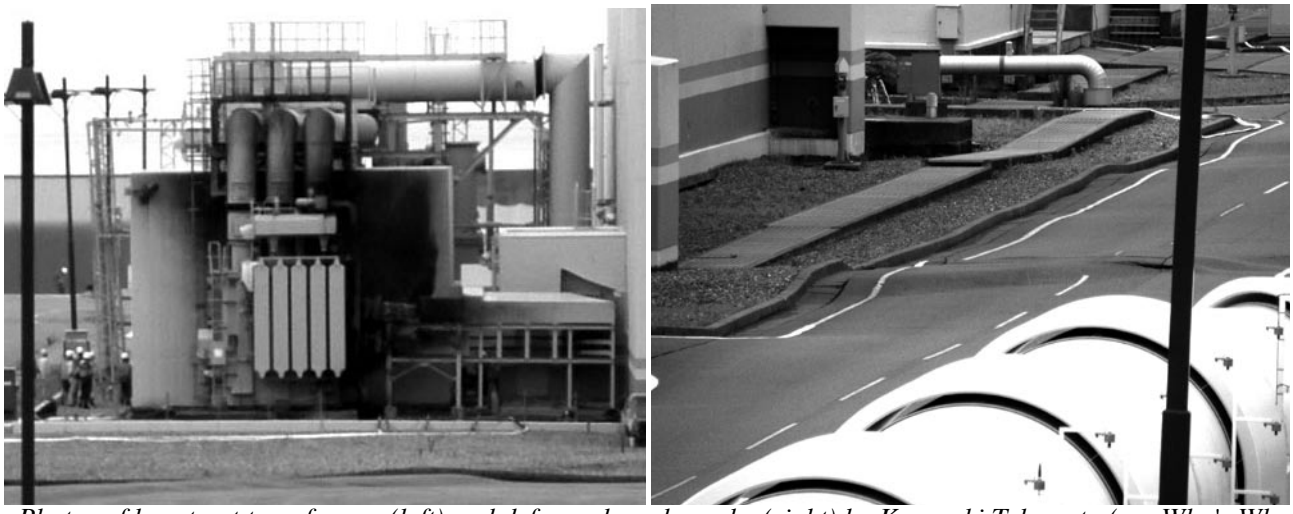
The fact that it took two hours to put out the fire exposed TEPCO's lack of preparedness. However, it turns out that TEPCO is not the only power company that is ill prepared to respond to such situations. Responses by power companies to a survey by the Mainichi Shimbun revealed that although power companies prepare for fires, no special consideration has been given to the particular problems of fires which occur as a result of earthquakes (Mainichi Shimbun, 20 July 2007). This is incredible, given that throughout Japanese history, whenever there was an earthquake, fires caused at least as much damage as the earthquakes themselves.

Despite the potential seriousness of this fire, TEPCO failed to announce whether there was a continual external supply of power and whether the emergency generator started up. This is very important information, because if the external power supply and diesel generators had failed, it would have been impossible to maintain a continual flow of coolant to the reactor. Even after automatic shutdown, the fuel in the reactor core is still extremely hot. Failure to maintain a continual supply of coolant could result in a core meltdown, leading to the release of highly radioactive material into the environment. There would then be a double disaster: a nuclear disaster on top of an earthquake disaster.

Radioactivity released to the environment

Water containing radioactive material was released from unit 6 into the sea. TEPCO originally said the quantity of radioactivity involved was 60,000 becquerels, but it later increased its estimate to 90,000 becquerels. One would not expect this amount to have any impact on the environment or on human health, but TEPCO took far too long to report the release. The following account is based on a report published on the *asahi.com* web site on July 21.

At around 12:50 pm, a pool of water was found



Photos of burnt out transformer (left) and deformed road nearby (right) by Kazuyuki Takemoto (see Who's Who 111). Kazuyuki is a member of CNIC's board of directors. His car port was flattened by the earthquake.

inside the reactor building, but outside the controlled area. Within about an hour and a half, workers had analyzed samples and found that they contained radioactive material. However, because it was outside the controlled area they doubted their results. They collected new samples and repeated the analysis twice. It wasn't until about 20:30 pm that TEPCO finally reported the release to the authorities. It seems that TEPCO employees are still under the spell of the safety myth. They are still more inclined to believe the theory rather than the evidence before their eyes.

TEPCO also took a long time to work out how the leak occurred. Apparently the spent fuel pool overflowed and the liquid leaked out to the uncontrolled area through electric power cable tubing. Spent fuel pools frequently overflow during earthquakes, so the fact that radioactive material was released to the sea shows that TEPCO failed to adequately address this problem.

On July 17, TEPCO announced that iodine, chromium (Cr-51) and cobalt (Co-60) had been released to the atmosphere from the main exhaust stack of unit 7. At the time, TEPCO indicated that the release had stopped, but it subsequently corrected this, saying that the iodine (I-131, I-133) release continued until July 18. TEPCO said that due to a failure to manually shut down the turbine grand steam exhaust fan after the reactor shut down, iodine and particulates that had accumulated in the condenser were sucked out and released through the exhaust stack. That is plausible, given that in boiling water reactors (unlike pressurized water reactors) the same water that cools the reactor is converted into steam to drive the turbines and then condensed in the condenser. It is, therefore, to be expected that some radioactive material will find its way from the reactor to the condenser. Nevertheless, release of these radionuclides automatically raises suspicions of damaged fuel assemblies. However, TEPCO stated that, given the low level of iodine in reactor water samples and off-gas monitor readings, there is no indication that fuel assemblies were damaged. TEPCO estimated that the total amount of radioactivity released from the main exhaust stack of unit 7 was 4×10^{8} becquerels (radiation dose of 2×10^{-7} milli-sieverts from iodine and 7×10^{-10} milli-sieverts from particulate matter).

The earthquake knocked over several hundred drum cans in the storage building for low-level solid waste. Of these, around 40 were found without their lids on. About 16 liters of liquid leaked, but TEPCO says that no radioactivity was found and none was released into the environment.

63 problems identified

As of July 21, TEPCO had identified a total of 63 problems. Fifteen of these were related to radioactivity. The spent fuel pools of all 7 units overflowed, although only unit 6 involved a release of radioactivity to the environment, and ducts in the exhaust stack of all reactors were displaced. There was also some radioactivity found in a massive pool of water from damaged pipes in the fire extinguishing system of unit 1 (40 cm deep (1,670 m^3), fifth floor basement, auxiliary building).

Besides these, the following are just a few of the problems that did not involve radioactivity. The water level of the spent fuel pools of units 1, 2 and 3 dropped, then recovered mysteriously. Work platforms in the spent fuel pools of units 4 and 7 fell onto the spent fuel storage racks. There were oil leaks from several transformers. Some pumps are out of order. Blow-out panels in turbine and reactor buildings came off. Regular power supply to the administration building was lost and the emergency power supply had to be activated.

However, beyond these readily identifiable problems, the question of how much the buildings, pipes and equipment were weakened by the earthquake remains unanswered. Detailed checks are required, but since the impact of the earthquake would not have been uniform, it will not be possible to provide complete assurance that the plant is capable of withstanding the next earthquake.

Earthquake Resistance Design

Under Japan's old earthquake resistance guidelines, the design basis for nuclear power plants (NPP) assumed a "maximum design earthquake" (S1) and an "extreme design earthquake" (S2), where S2 was greater than S1 (see NIT 112, 103). The "extreme design earthquake" was thought to be impossible in reality, but it was taken into account just to be on the safe side. However, the earthquake that hit on July 16 exceeded the S2 design basis earthquake. Indeed, based on the information released by TEPCO, for unit 1 the peak ground acceleration at the plant was 2.5 times greater than assumed for the S2. The peak ground acceleration in the east-west direction was recorded at 680 Gal, compared to the design basis of 273 Gal (see tables). (Only peak ground acceleration data is available, because the earthquake exceeded the monitoring system's recording capacity.)

Peak Ground Acceleration 16 July 2007 (Gal)			
Location	**North-South**	**East-West**	**Vertical**
Unit 1	311	680	408
Unit 2	304	606	282
Unit 3	308	384	311
Unit 4	310	442	337
Unit 5	277	442	205
Unit 6	271	322	488
Unit 7	267	356	355

Peak Ground Acceleration S2 (Gal)			
Location	**North-South**	**East-West**	**Vertical** (static design)
Unit 1	274	273	(235)
Unit 2	167	167	(235)
Unit 3	192	193	(235)
Unit 4	193	194	(235)
Unit 5	249	254	(235)
Unit 6	263	263	(235)
Unit 7	263	263	(235)

It is believed that this earthquake was caused by movement of an approximately 30 km long and 25 km deep fault. This fault was not taken into account during surveys carried out for the design of the Kashiwazaki-Kariwa nuclear power plant. Instead, the S2 design basis earthquake that was chosen was a magnitude 6.9 quake at an active fault 20 kilometers away. This was the fault which caused an earthquake in the same region in 2004. On that occasion, reactor number 5 shut down automatically, but peak ground acceleration did not exceed predictions.

From analysis of the distribution of the after shocks from the 16 July 2007 quake, it is now believed that there is an active fault extending directly under the Kashiwazaki-Kariwa NPP. Since Japan's earthquake resistance guidelines do not permit NPPs to be built directly above active faults, Kashiwazaki-Kariwa would not have been chosen to host a NPP had this been known at the time. However, it now appears that this should have been recognized. After the recent earthquake, Professors Takashi Nakata (Hiroshima Institute of Technology) and Yasuhiro Suzuki (Nagoya University) analyzed the data in TEPCO's license application and concluded that it indicated a fault five times longer than one identified by TEPCO (Asahi Shimbun, 20 July 2007). Between 1979 and 1985, using sonic testing, TEPCO found 4 small faults off the coast of Kashiwazaki-Kariwa, but it concluded that they were either not active or not important. However, Nakata and Suzuki said that the data indicated that three of these small faults were connected and were in fact one long 36-kilometer fault and that the fault was probably active.

Professor Nakata is the geomorphologist who last year proved that there is a previously unidentified active fault near the Shimane nuclear power plant (NIT 114). Earthquake studies for Japan's nuclear power plants have largely ignored the work of geomorphologists. They are taken more seriously now under new earthquake resistance guidelines approved in September 2006, but their role is still vague. It seems that the nuclear industry does not like them, because they are too good at finding active faults.

Clearly Japan's earthquake safety standards are inadequate. This fact can no longer be disputed. Given that the size and location of this earthquake was not predicted by TEPCO's survey, nor in the government's screening process, it is essential that an independent geological survey be carried out of the surrounding area, both on land and at sea. However, it would appear from the evidence that has already come to light that Kashiwasaki-Kariwa is not a safe site for a nuclear power plant and that the plant should be shut down permanently.

In just two years, three earthquakes (off the coast of Miyagi Prefecture on 16 August 2005, off the Noto Peninsula in Ishikawa Prefecture on 25 March 2007, and now this one) have exceeded the S2 design basis earthquake assumed at the time the plants were built. Since the earthquake resistance guidelines were revised, Japan's nuclear power companies have been carrying out geological surveys and safety checks on the basis of the new guidelines. However, the July 16 earthquake demonstrates the inadequacy of these measures. For example, detailed surveys are only required for a 5 km radius around the plant and power companies have until 2012 to complete safety checks. By rights, all nuclear power plants should be shut down until these surveys and safety checks have been completed. The Nuclear Industrial and Safety Agency (NISA) should review its policy of allowing reactors to continue to operate while these surveys and checks are carried out. However, at a press conference on July 18, NISA's spokesperson, Akira Fukushima, repeatedly dodged questions directed at this problem. As usual, the government's priority is to keep nuclear power plants operating, regardless of safety concerns.

Lessons to be learnt

This was not the biggest earthquake that could possibly hit Japan. This one was just a warning. There were enough failures this time to enable us to imagine what might happen if a bigger earthquake

Continued on page 3

Rokkasho Update
active tests, earthquake faults

Possible increase of spent fuel to be reprocessed during active tests

Step 3 of the active tests currently being carried out at the Rokkasho reprocessing plant were completed in April (see NIT 118). On July 19 the Nuclear Fuel Cycle Safety Subcommittee of the Advisory Committee for Natural Resources and Energy approved Japan Nuclear Fuel Ltd's (JNFL) progress report on step 3. During step 3 (January 29 - April 26) 49.5 tons of BWR and 19.9 tons of PWR spent fuel were reprocessed. JNFL's main objective for the active tests is to pass the government's inspections. These inspections will be carried out during steps 4 and 5, so for most of the buildings the step 3 progress report was written in terms of whether the conditions for carrying out these inspections had been met. The report concluded that they had.

However, it is clear that changes will be made to the program for functional testing of the high active liquid waste vitrification building. JNFL says that the radioactivity concentration of the high active liquid waste from steps 1 and 2 was too low to test the high active liquid waste vitrification process, so it will use liquid waste from the high burn-up spent fuel reprocessed from step 3 onwards. The maximum burn-up reprocessed during steps 1 and 2 was 21,000 MWd/t for BWR and 36,000 MWd/t for PWR spent fuel. However, the maximum burn-up during steps 3 and 4 is 36,000 MWd/t for BWR and 47,000 MWd/t for PWR spent fuel. The Nuclear Industrial and Safety Agency (NISA) says that all that is required is for JNFL to produce vitrified waste and pass the tests. It is up to JNFL to decide what liquid waste to use. To ensure that there is sufficient liquid waste to conduct the tests (planned for step 5), NISA says that it will permit JNFL to reprocess more spent fuel.

If the vitrification testing program is changed, some other tests which were planned for step 4 will have to be carried out during step 5 as well. Tests to confirm the quantity of liquid and aerial releases must take into account the increased radioactive releases from the operation of the vitrification facility. NISA says that it will confirm whether the necessary conditions are in place after it receives JNFL's report on step 4 of the active tests.

JNFL's real reason for wanting to use liquid waste from higher burn-up fuel for the tests is not clear. The main processes used at the Rokkasho reprocessing plant were imported from France based on the LaHague UP3 plant. However, Rokkasho's vitrification facility is based on Liquid Fed Ceramic Melter (LFCM) technology developed at the Tokai reprocessing facility. For the melting system, LFCM employs ceramic bricks which are said to be resistant to fire, heat and corrosion. High active liquid waste and glass ingredients are fed and melted continuously. Glass canisters were first produced at Tokai in 1995 and to date 62 have been produced. However, there have been lots of problems and repeated design changes have been necessary during the construction of the Rokkasho facility.

Fault directly beneath Rokkasho reprocessing plant

The government approved design changes to correct earthquake safety design flaws in fuel handling equipment and the channel box shearing machine (see NIT 118). However, after the July 16 earthquake, it was discovered that a fault runs right under the Kashiwazaki-Kariwa nuclear power plant (see article page 4). As a result, the government's earthquake safety standards are in total disarray. As can be seen from the map on page 14, there are also faults running under the Rokkasho reprocessing plant (f-1, f-2) and a short distance away there is a much larger fault (west of Dedo). JNFL says that these are not active faults and the government has accepted this, but after the Kashiwazaki-Kariwa earthquake, who can be sure that a big earthquake will not occur at Rokkasho?

By Masako Sawai (CNIC)

Towards Monju Restart

completion of modifications, sodium refill, functional tests

The Japan Atomic Energy Agency (JAEA) has been carrying out modifications on the Monju Prototype Fast Breeder Reactor (FBR, 280 MW) in preparation for restart (see NIT 110). These modifications are almost complete and the secondary cooling pipes have been refilled with sodium. In June JAEA announced that the work was 98% complete.

Monju's secondary cooling system has three loops. Since the accident in December 1995, an electric motor has been pumping sodium, electrically heated to 200ºC, through the pipes of one of these loops. After the sodium leak and fire, sodium was removed from the loop where the accident occurred. A few years later, sodium was removed from another loop and replaced with argon gas.

Before replenishing the sodium, the secondary system thermocouples were replaced. The cause of the Monju accident was a problem in the design of the casing of these thermocouples. They have been changed from a stepped design to a tapered design and shortened from 185.5 mm to between 60 and 110 mm (see illustration in NIT 110). Also the number of thermocouples in the secondary system has been reduced from 48 to 42.

The modifications involved 1) improved measures to address the problem of sodium leaks in the secondary system, and 2) improved detection of sodium leaks in the steam generator. In regard to the first of these, besides redesigning the thermocouple casing, the following changes have been made:

- The diameter of the drain pipes have been increased to improve sodium drainage.
- TV monitoring has been improved.
- To prevent sodium coming in contact with concrete, steel panels have been fitted over the concrete walls.
- A system has been added to fill the secondary pipe rooms with nitrogen in an emergency.

In regard to the steam generator, the number of pressure detectors has been increased from two to three. In order to minimize the damage from sodium-water reactions, it is necessary to quickly detect leaks of water from cracks or pin-holes in the steam generator into the sodium coolant. A sodium-water reaction could cause steam tubes to rupture, resulting in a serious accident. The reason for increasing the number of detectors was that during the court case it was revealed that there had been a cover-up regarding the assessment of the damage that could be caused. As a result, the assessment had to be redone.

Monju has been closed down for 12 years. Power generation equipment was taken apart and stored. While it has been out of operation, circulation of sodium has been maintained in the primary system. The fuel was not removed, so altogether it has been submerged in sodium for over 13 years. As mentioned above, two of the secondary loops have been filled with argon gas. Loop C, in which the leak occurred, will be filled with sodium (228 m^3) for the first time in eleven and a half years.

The question is, are these measures adequate? JAEA's checks have been piecemeal. There are concerns about the fuel cladding, but external checks using cameras have been carried out for only one fuel assembly in the core and one in the blanket out of a total of 370 fuel assemblies (198 core, 178 blanket). Also, we are concerned that there will be no visual checks of the inside of secondary system piping, especially of pipes from which the sodium was removed. It would be expected that in some places sodium would have stuck to the pipes, but this will not be checked. In regard to the heat conducting pipes of the steam generator, eddy current tests and visuals checks will be carried out to check for damage to the inside, but there will be no visual checks of the outside of the pipes. This is the part which was in contact with sodium. The leaked sodium vapor from the accident spread through about 70% of the secondary system building. Sodium adhered to electric equipment, such as distribution boards and cables. JAEA wiped this off, but only what could be seen.

Also, earthquake safety checks are being redone, but this only involves boring within the site limits. No investigations are planned offshore. The earthquake at Kashiwazaki-Kariwa showed clearly that this is not sufficient. The anxieties of the local residents will not be allayed by such perfunctory investigations.

The schedule is to start up the reactor in May 2008, after the functional tests. The reactor cannot be started up just with the fuel which is currently loaded. The reason for this is that half of the pulutonium-241 in the reactor has already decayed to americium. Therefore, 78 new replacement fuel assemblies will be loaded. These have already been made.

Hideyuki Ban (CNIC Co-director)

Taiwan-Japan Civil Society Forum

I was invited to attend the Taiwan-Japan Civil Society Forum, held in Taiwan on June 16-17. The forum addressed the question of how to build grassroots networks. It was sponsored by the Taiwan Environmental Protection Union and eight other groups and was supported financially by the Taiwanese government (Ministry of Foreign Affairs, Ministry of the Interior, Ministry of Education, etc.). Cooperating organizations included the Association of East Asia Relations and Interchange Association Japan (which acts like an embassy). The main organizer on the Japan side was the Waseda University Research Institute of Taiwan.

Based on a recognition of the importance and potential of the role of NGOs in the public spaces within the activities of government and industry and in citizens' daily lives, the objective of the meeting was to activate networking and interchange between NGOs of both countries. The meeting brought together 26 groups from both countries working on a wide range of issues, including environmental protection, AIDS, children's rights, education, aged care, the constitution and young people's issues.

On the second day we broke up into six working groups. I joined the first working group, which dealt with citizens' action in response to global warming. In my presentation I pointed out that nuclear energy drives up electricity consumption and hence increases CO2 emissions. Like the Japanese government, Taiwan's national electric power company, Taipower, touts nuclear energy as an effective response to global warming. Taiwanese delegates explained that this was a public relations stunt to justify construction of Taiwan's highly contentious fourth nuclear power plant. Both Japan and Taiwan are very earthquake-prone countries. From the discussion in this working group, I discovered that, like Japanese NGOs, Taiwanese NGOs are very concerned about the ability of nuclear power plants to withstand earthquakes.

This time I was on a very tight schedule, so I did not have time to visit Taiwan's No. 4 power plant. It was reported that new funding has been made available and that construction is continuing. However, I was told that it is only about 60% complete. The policy of the ruling Democratic

Participants in global warming working group

Progressive Party is to continue construction of the two Taiwan No. 4 reactors (both ABWRs exported by Japanese companies), but not to build any more reactors after that and to gradually phase-out nuclear power. There are hopes of enacting a nuclear phase-out law, but unfortunately, as long as the Nationalist Party has a majority in the Legislative Yuan (Taiwanese parliament), draft legislation will not be submitted.

In regard to global warming, all participating NGOs agreed on the need to create a low-carbon society. We exchanged ideas about concrete examples of initiatives being taken. After the meeting ended, I was told that Taiwan's electric power system has distribution losses of 17%. Fixing this problem is a major issue. The reason why no progress is being made is that, because of its monopoly position, Taipower has no incentive to do anything about it.

Because Taiwan is not a member of the United Nations, the terms of the Kyoto Protocol do not apply to it. Hence, even if it reduces its CO2 emissions this will not receive any international recognition. This dilemma reflects the international context in which Taiwan is placed. Nevertheless, the head of the Taiwan Environmental Protection Administration said that it was highly significant that CO2 emissions reduction was included as an important issue on the agenda of an economically sustainable development conference last year.

Hideyuki Ban (Co-Director)

Major Incidents at Nuclear Facilities April 2006- March 2007			
Date	**Company Facility**	**Incident Description and Comments**	**Rank 1>2>3**
5 April 06	Tsuruga 1	During periodic inspection of 13 hafniium plate type control rods, cracks found in two places on the top of the sheath of one rod. Cracks also found in 4 other rods. Stress corrosion cracking of sheath (SUS316L) as a result of neutron irradiation.	1
13 May 06	K-K-3	Alarm indicating "control rod drift" when all 185 control rods inserted in preparation for periodic inspection. Discovered that one rod (54-23) had slipped a notch. Apparently the collet finger of the control rod drive mechanism failed to catch in the index tube notch.	3
19 May 06	Onagawa-2	During periodic inspection of 13 hafniium plate type control rods, cracks found in the sheaths of 5 rods. Stress corrosion cracking of sheath (SUS316L) as a result of neutron irradiation.	1
21 May 06	Fuku I-4	Elevated reading by the off-gas monitor in the gaseous waste treatment system. Power reduced to 45% to deal with leaking fuel assembly. On 27 May, 5 control rods inserted around leaking assembly. Continued to operate reactor.	1
28 May 06	Hamaoka-5	Alarm indicating minor damage to control rod monitoring system. Discovered that 8 control rods could not be inserted using regular method. Problem with electricity supply to one of two devices for identifying position of rods.	3
5 June 06	Ikata-1	Reactor shut down manually due to irregular sound in moisture separator heater 1B. 49cm crack found in steam straightening vane and 37cm crack found in weld of another internal plate. Caused by fatigue due to vibration in poorly welded section.	1*
5 June 06	Fuku II-1	During periodic inspection, flow rate could not be confirmed during operation of flow control valve in residual heat removal system A. Discovered that valve stem was broken and valve had fallen. Initial crack in valve stem caused by mechanical fatigue.	1*
15 June 06	Hamaoka-5	Turbine triipped and reactor shut down automatically due to excessiveturbine vibration. Vanes in low pressure turbine B had broken off. Forks or roots of 663 of 840 vanes in stage 12 of low pressure turbines A, B, C, were cracked or broken. Caused by fatigue due to random vibration during low or no load and flashback phenomenon during load cut-off testing.	1*
21 June 06	K-K-3&4	Durng ultra sound tests of welds in recirculation system pipes, cracks found in 1 place in reactor 3 and 5 places in a single weld in reactor 4. Previous inspection judged the crack in reactor 3 to be a back wave weld.	1
18 July 06	K-K-7	Elevated reading by the off-gas monitor in the gaseous waste treatment system. 4 control rods inserted around leaking assembly. Continued to operate reactor until 23 August when periodic inspection began. Leak confirmed in 1 assembly.	1
18 July 06	Shika-2	When inspecting low pressure turbine, forks or roots of 258 of 840 vanes in stage 12 of low pressure turbines A, B, C found to be cracked or broken. Caused by fatigue due to random vibration during low or no load and flashback phenomenon during load cut-off testing.	1
3 Aug 06	Onagawa-2	During periodic inspection, a worker found leaked liquid in 3 puddles on torus room floor in 3rd basement of reactor building. Finally found 7 puddles totaling 7 liters with radioactivity estimated at 6 million becquerels. Check of reactor water cleanup system revealed loss of boundary due to consecutive errors in valve operation.	1*
7 Aug 06	Hamaoka-3	During periodic inspection, 13 hafnium plate type control rods loaded in reactor core were checked. Cracks found in sheaths and tie rods of 5 of them. Stress corrosion cracking of sheath (SUS316L) as a result of neutron irradiation.	1*
11 Aug 06	Fuku I-4	47 billion becquerels of tritium released to atmosphere as steam from auxiliary boiler, because tritium containing water from condensate storage tank flowed into pure water make-up water system. Caused by incorrect operation of valves during valve decontamination work.	1*
18 Aug 06	Takahama-3	When reducing power for periodic inspection, reactor shut down automatically in response to alarm indicating abnormally low water level in steam generator B. Pilot valve of the positioner of the main feedwter bypass control valve was stuck due to accumulation of ammonium sulphate adhesives.	1*
27 Sep 06	Shika-2	When inspecting high pressure turbine, 900 (approx. 80 gm) metal fragments (2-3 mm) found. Marks left where fragments collided with turbine vanes. Shotblast used in manufacture of main steam shutoff valve had remained in valve and was released during operation. During checks of other equipment a further 2,136 fragments (156 gm) collected.	2

4 Oct 06	Tsuruga-2	From 29 August reduced water level noticed in surge tank of componenet cooling system. Leak to sea side discovered in tubes of heat exchanger A of componenet cooling system. When reactor stopped on 4 October, 7 tubes found to be leaking. Thinning rate of over 40% for 1,514 tubes in heat exchanger A and 2 tubes in heat exchanger D. Erosion & corrosion of tubes progressed because of peeling of protective film during high pressure water cleaning and failure to form film due to inadequate injection of ferrous sulphate dissolution. 2,055 tubes in componenet cooling systems A,B,C,D replaced.	1*
11 Oct 06	Ikata-2	When reducing power for periodic inspection, elevated iodine level discovered in primary coolant. Leak discovered in 1 fuel assembly.	1
13 Oct 06	Shimane-1	During periodic inspection, thickness of water level meter piping in condensate storage tank found to have corroded to below minimum permitted 9.9mm. Previously only external inspections had been conducted. Heat insulation material had not been removed.	1*
1 Nov 06	Genkai-2	Elevated iodine level, apparently due to leak in 1 fuel assembly, discovered in primary coolant. When reactor shut down manually on 14 November, cesium found to be leaking from 1 assembly.	1
9 Nov 06	Shimane-1	During periodic inspection, discovered that thickness reduced to below permitted level (6.37mm) in outlet header piping of condensate filter (outlet piping connections to condensate filters of B tank (5.9mm) and C taank (5.8mm)). Caused by erosion/corrosion of carbon steel pipes.	1*
22 Nov 06	Tokai-2	Cracks or breaks discovered around meter tubes and metal supports for 6 jet pumps when checking them in preparation for water jet peening test. Caused by vibration from water flow. Strengthened with couplings.	2
28 Nov 06	Mihama-1	1 broken tube and 1 with a hole discovered when carrying out ECT check on heating tube of moisture separator heater A. Break caused by fatigue. Hole caused by thinning due to steam released from broken tube.	3
16 Dec 06	Ikata-2	When carrying out reactor physics check during periodic inspection, discovered that 1 control rod was 20 steps (of total 228 steps) below others. Reactor shut down manually. Possible that crud from primary coolant accumulated in control rod drive mechanism.	3
17 Jan 07	Fuku I-2	Short circuit during reactor startup. Occurred near automatic depressurization system control circuit in containment vessel. Reactor shut down manually. Electrical cable inside flexible metal tube squashed between supports for main steam system pipe and air compression system pipe. Cable was part of safety release valve.	1*
17 Jan 07	K-K-5	Crack discovered in weld during ultra sound test of recirculation system pipe during periodic inspection.	1
24 Jan 07	Genkai-2	2 cracks (90mm and 20mm long by 8.1mm deep) discovered inside bent portion of excessive extraction piping. Pipe located between prmary coolant pump and steam generator in primary coolant system B. Remaining thickness just 1.5 mm. Caused by heat fatigue from cavity flow in bent portion. Change dimensions and replace bent portion and downstream portion.	1*
4 Feb 07	K-K-6	When testing insertion and extraction of control rods, 1 rod (58-19) failed to move.	3
10 Feb 07	Fuku I-4	During shutdown, when isolating reactor after disconnecting generator, electric feedwater pump stopped due to operator error. This caused drop in core water level. Restarted feedwater pump to raise water level, but generator stopped automatically in response to core water level signal. Originally power output was 10%, but during this period it flucutated between 6% and 23%. Reactor shut down manually. Problem caused by incorrect operation of feedwater pump electricity circuit breaker.	1*
18 Feb 07	Fuku II-4	Reactor shutdown automatically during startup, due to signal indicating elevated radiation in main steam pipe and signal indicating inability to adjust radiation level. Caused by electrical noise in main feedwater pipe radiation monitor.	1*
20 Feb 07	Fuku I-5	On 18 February, when conducting routine test of pump A in core spray system, minimum flow bypass valve failed to fully close. Reactor shut down manually on 20 February. Valve failed to operate because lower part had fallen away.	1*
22 Mar 07	Mihama-1	During periodic inspection, worker on patrol discovered leaks in 5 places in containment vessel. Leaks from concrete wall on reactor cavity side. Loading of fuel postponed. Leak checks of reactor cavity and welds on inside of water channel confirmed leaks in 4 places.	2

*Reporting required by law.
K-K = Kashiwazaki-Kariwa; Fuku = Fukushima

Anti-Nuke Who's Who

Toshiko Takeda: Representative of the committee preparing the lawsuit against the Ohma nuclear power plant

by Yasuko Nomura*

A bleached statue of the poet Takuboku Ishikawa[1] sits in a small park in the city of Hakodate, which he loved so much. From this park, you can see the town of Ohma on the opposite coast across the Tsugaru Strait. Since last autumn, Toshiko Takeda has been going to this park to stand on the beach and shout out to sea her opposition to the planned Ohma nuclear power plant. Or else she writes in the sand, "We don't need the Ohma nuclear power plant". Toshiko is a key figure in the "Donan[2] Stop the Ohma Nuclear Power Plant Committee". These days she is busy every day distributing leaflets in the street, or giving speeches as the representative of the plaintiffs in a planned lawsuit. The license for the Ohma nuclear power plant is expected to be granted this year. If it is granted, opponents plan to launch a suit demanding the annulment of the license approval.

Toshiko was born in 1949 in Asahikawa. At the age of 20 she was baptized as a Christian. She joined the YWCA when she was a student in Kyoto and became involved in the peace/anti-war and human rights movements. She says that through this she became aware of the individual's responsibility to society. Ever since she married and moved to Hakodate she has been involved in peace and human rights issues. In 1982 she helped establish a growers' and consumers' collective for the purchase of organic vegetables. With her friends she got involved in all sorts of activities to enable them to enjoy safe food in this naturally abundant land. Visiting farms to discuss what they should grow and weeding at farms where herbicides were not used gave her a deep personal experience of environmental issues. She says that behind all this is the interest she has had since her university days in Minamata disease.

In April 1986, the Chernobyl accident shocked her so greatly that all other environmental issues seemed to pale in comparison. Recognizing the horror of never-ending radioactivity, scattered in an instant and contaminating on a global scale, she became even more strongly opposed to nuclear power. At the same time as opposing the nuclear facilities at Rokkasho, she became a key figure in the opposition to the nuclear power plant, which was to be constructed in the small village of Ohma just 18 kilometers away from Hakodate. For the past few years, as deputy director of the "Natural Energy Project", which was established to promote a nuclear phase out, she has been promoting wind energy and the "candle night campaign". The latter encourages people to turn off their electric lights and introduce candles into their daily lives.

"The Chernobyl nuclear accident spread contamination over the whole world, while the radiation released on a daily basis from the Windscale reprocessing plant in England threatens the health and lives of the residents. I will not let them build facilities which we know in advance will release this dangerous stuff." With quiet determination she communicates this message.

1. Two "tanka" poems by Takuboku Ishikawa
頬につたふなみだのごはず一握の砂を示しし人を忘れず
An unwiped tear rolls down my cheek. Not forgotten the one who showed me a handful of sand.

砂山の砂に腹這ひ初恋のいたみを遠くおもひ出づる日
Lying on the dune sand, this day I recall, remotely, the anguish of my first love.

2. The Donan region, where Hakodate is located, is in the south of the island of Hokkaido. Ohma is in the far north of Honshu, the largest island in Japan.

**Yasuko Nomura is a journalist for a local free newspaper in Hakodate. She is also involved in the growers' and consumers' collective and in anti-nuclear activities with Toshiko Takeda.*

NEWS WATCH

First application of the "clearance" system

The so-called "clearance" system, under which some radioactive waste is not treated as such, has begun to be implemented. On June 6, four tons of carbon steel from Japan Nuclear Power Company's (JAPCO) Tokai-1 Nuclear Power Plant (GCR, 166 MW, July 1966 - March 1998) was transported to a foundry in Tokai Village, Ibaraki Prefecture. It was immediately melted in a high frequency furnace, poured into molds and turned into radiation screens for use in nuclear facilities. It is planned that by November a total of 20 tons will be taken to this foundry and turned into radiation screens, reception tables, benches, blocks, and so on.

In addition to these 20 tons, the radioactivity of a further approximately 87 tons has been confirmed to be within the regulatory limit. This will be used to make steel for reinforced concrete for construction within nuclear facilities. For the time being, all "cleared" material is destined for reuse by JAPCO, or at other nuclear power facilities. However, once the system has been established, there will be no such restriction.

It is estimated that around 4,900 tons of waste metal and 35,400 tons of waste concrete generated from the dismantling Tokai-1 will be "cleared". A further approximately 128,700 tons will not be considered as radioactive waste in the first place and, therefore, will not be subject to the "clearance" system. JAPCO estimates that in the end around 23,500 will actually be treated as low-level radioactive waste.

Toyo Town and Uken Village enact ordinances rejecting nuclear waste dumps

As reported in NIT 118, the new mayor of Toyo Town (Kochi Prefecture) cancelled the application submitted by the previous mayor for a study into the suitability of Toyo Town as a high-level waste dump site. Soon after, on May 20, the town council passed an ordinance rejecting radioactive waste and studies for a radioactive waste dump site. One month later, on June 20, the council of Uken Village in Kagoshima Prefecture passed a similar resolution.

Three HLW laws passed

Amendments to three laws related to the disposal of high-level waste were passed by the House of Councillors on June 6. The biggest problem with the legislation is that it allows waste containing long-lived trans-uranic elements (TRU), carbon-14, and iodine-129, which can readily be transported by ground water, to be disposed of at the same site as high-level waste. (All these wastes are generated at reprocessing and MOX fuel fabrication plants.) It is claimed that the two waste types will be kept separate, to prevent them having any effect on each other, but there is no guarantee that this will be sufficient.

MOX fuel fabrication plant passes first assessment

The Nuclear Industrial and Safety Agency's assessment of the MOX fuel fabrication plant, which Japan Nuclear Fuel Ltd. (JNFL) plans to construct in Rokkasho Village, Aomori Prefecture, was completed on July 4th. The assessment concluded that there were no problems in regard to the accounting basis, safety and restriction to peaceful use. After double-checks by the Atomic Energy Commission and the Nuclear Safety Commission, the Minister for Economy Trade and Industry will give the final approval. JNFL hopes that approval will be given in time to commence construction in October. It plans to commence operations in October 2012, but this schedule will definitely not be met. The plant's maximum capacity will be 130 tHM/year.

Approval of pluthermal for Hamaoka-4

On July 4, the Minister for Economy Trade and Industry approved implementation of pluthermal* at Chubu Electric Power Company's Hamaoka-4 nuclear power plant (BWR 1137 MW). Chubu

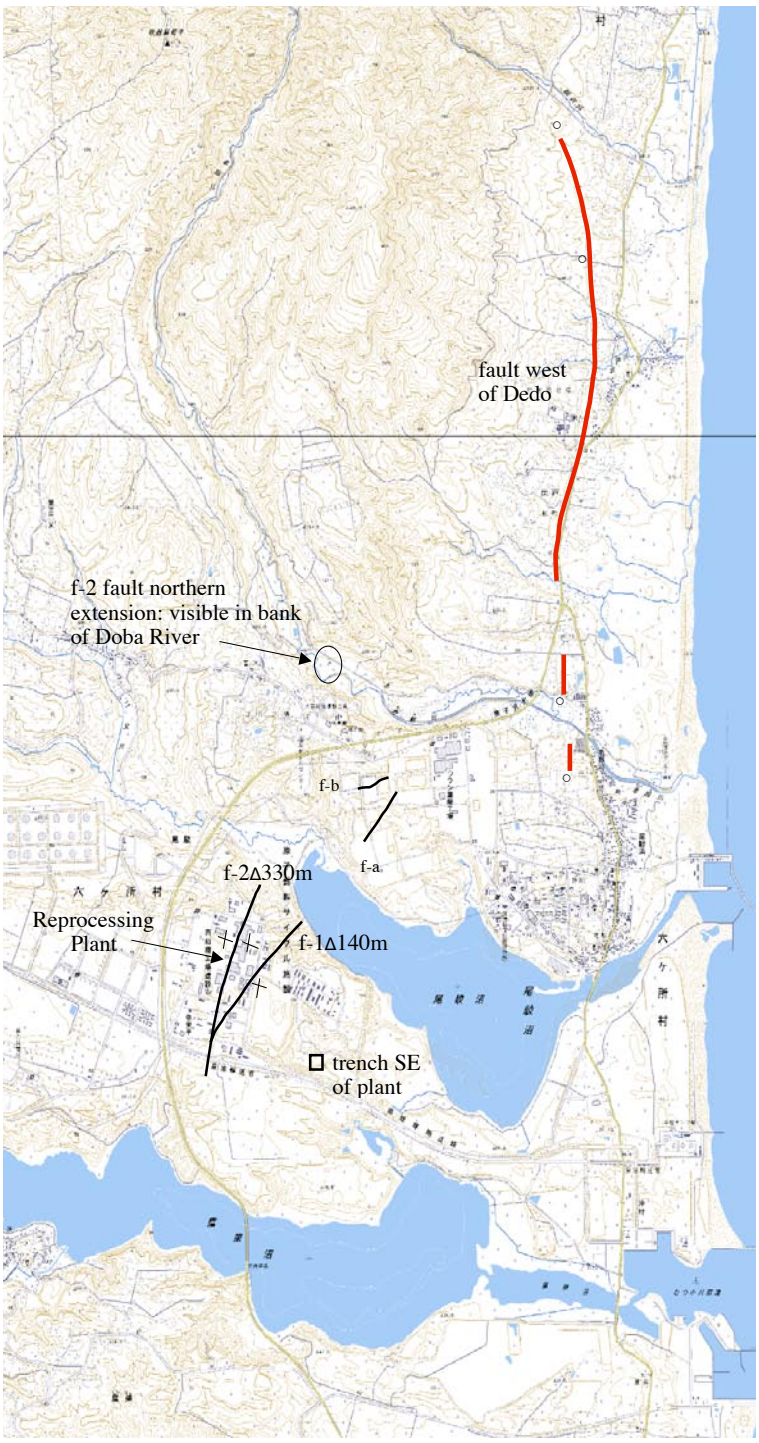
Electric submitted its application on 3 March 2006 and on 13 March 2006 it signed a contract with Global Nuclear Fuel - Japan Co., Ltd. (GNF-J) for supply of MOX fuel. GNF-J subcontracted the fuel fabrication to AREVA's MELOX plant in southern France.

*The term 'pluthermal' refers to the use of plutonium in thermal reactors - i.e. the use of MOX fuel in normal light water reactors as opposed to fast breeder reactors.

Mitsubishi Heavy Industries GNEP proposal

On June 22 Mitsubishi Heavy Industries (MHI) announced that it had submitted a joint technical proposal with AREVA for the US government's Global Nuclear Energy Partnership (GNEP). MHI's contribution to the proposal relates to an Advanced Burner Reactor, while AREVA's contribution relates to another GNEP facility, a Consolidated Fuel Treatment Center. MHI says that its submission is in accord with the wishes of the Japanese government.

Map of faults around Rokkasho reprocessing plant



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