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Akebonobashi Co-op 2F-B, 8-5 Sumiyoshi-cho, Shinjuku-ku,
Tokyo 162-0065, JAPAN Phone: +81 3 3357 3800 Fax: +81 3 3357 3801
URL: <http://cnic.jp/english/> e-mail : cnic@nifty.com

Treading on Thin Ice: Kashiwazaki-Kariwa Unit 7 Restarted

Cartoon by Shoji Takagi



On May 9, Tokyo Electric Power Company (TEPCO) began start-up testing of Unit 7 (ABWR, 1,356 MW) of its Kashiwazaki-Kariwa Nuclear Power Plant. It is the first reactor at the plant to be restarted since 16 July 2007, when the plant was struck by the Chuetsu-oki Earthquake. The governor of Niigata and the mayors of Kashiwazaki City and Kariwa Village officially approved restart of KK-7 the previous day.

CNIC issued a statement of protest on May 8, immediately after the mayors and the governor gave their approval to restart the plant. The statement pointed out that there is no scientific basis for approving the restart of KK-7. We are concerned that important issues remain unresolved (see NIT 129). In fact, Niigata Prefecture's subcommittee looking into equipment integrity and earthquake resistance and safety has not even completed its deliberations.

On April 7, Seiji Shiroya, chairman of Niigata Prefecture's technical committee on safety control of nuclear power plants (the parent committee of the two subcommittees which were

set up by Niigata Prefecture after the Chuetsu-oki Earthquake), delivered a report to Governor Hirohiko Izumida. Disregarding the cautious debate within the subcommittees, the report concluded that it was safe to restart KK-7. However, on April 11 a fire occurred at the plant, the ninth since the earthquake. In response the governor commissioned external experts to check TEPCO's fire prevention plan. On May 7, after receiving the experts' report, Governor Izumida explained to a full sitting of the Prefectural Assembly that he intended to give his permission to restart the *Continued on page 10*

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Seismic Design of the Kashiwazaki-Kariwa Nuclear Power Plant: a Historical Perspective

Why Kashiwazaki-Kariwa?

Prior to establishment of the Kashiwazaki-Kariwa Nuclear Power Plant there were oil fields in the region. Studies related to these oil fields showed that the ground was unstable, so informed locals knew very well that it was an unsuitable place to construct a nuclear power plant. Why then was such a site chosen for a nuclear power plant? The answer is simple: Kakuei Tanaka of Lockheed bribery scandal fame. Kakuei Tanaka, either as Prime Minister, or as the man pulling the strings behind the scenes, was Japan's political strong man. He was from Nishiyama Town, which is now part of Kashiwazaki City. He had a sizable shareholding in real estate company Muromachi Sangyo and in practice controlled the company.¹ The site of the Kashiwazaki-Kariwa Nuclear Power Plant (KK) was bought up by Muromachi Sangyo and later sold to Tokyo Electric Power Company (TEPCO). Money changed hands several times in the process and it is said that Tanaka's profit from the land sale was 400 million yen (\$11 million at the time).² Under these circumstances, it is not hard to imagine that concerns about seismic safety were never going to stand in the way of construction of the plant.

Seismic Design of KK

Japan's first seismic safety guidelines for nuclear power plants (Regulatory Guide for Reviewing Seismic Design of Nuclear Power Reactor Facilities, hereafter referred to as the Old Guidelines) came into force on 20 July 1981. There were no seismic safety guidelines when KK Unit 1 was approved in 1977, so the government established an expert committee specifically to establish a seismic design standard for the proposed nuclear power plant. The committee concluded that the plant should be built to withstand a magnitude 6.9 earthquake (Mj6.9 on the Japanese seismic scale) arising from the Kihinomiya Fault 20 kilometers from the site.

The committee assessed the Kihinomiya Fault to be 17.5 kilometers long, even though one member of the panel disputed this finding. There are other faults running very close to the Kihinomiya Fault and Tokyo University seismologist Tokihiko Matsuda was concerned that they might form a single fault zone.³ If so,

he believed a M8 earthquake could conceivably occur. When his views were ignored, he resigned in protest. Matsuda was vindicated in October 2004 when the Headquarters of Earthquake Research Promotion (HERP) officially recognized the Kihinomiya Fault and faults to the north thereof as a single 91-kilometer Nagaoka Plain western boundary fault zone. HERP judged that this fault zone could give rise to a M8 earthquake.

Despite Matsuda's warning, KK Unit 1 was only designed to withstand a M6.9 earthquake arising from the Kihinomiya Fault. The remaining six KK units were approved under the Old Guidelines, but they too were designed to withstand the same earthquake as Unit 1.

As a basis for seismic resistance design, a so-called S_1 ground motion⁴ of 300 Gal was chosen. Under the Old Guidelines, S_1 ("maximum design earthquake") was considered to be an earthquake ground motion that could actually occur. In addition, a so-called S_2 ground motion of 450 Gal was chosen. S_2 ("extreme design earthquake") was considered to be an almost inconceivable hypothetical earthquake ground motion. The Old Guidelines required that nuclear power plants be designed so that the most important equipment for safety purposes, such as the reactor and the spent fuel pool, must be able to retain their safety functions under S_2 conditions. In the case of KK, the S_2 earthquake was assumed to be a M6.5 earthquake centered directly beneath the plant. This was the default standard required under the Old Guidelines for cases where no fault had been identified that would give rise to a greater ground motion.

Review of Seismic Guidelines

After the Southern Hyogo Prefecture Earthquake, which struck Kobe City on 17 January 1995 and killed around 6,500 people, the nuclear establishment could no longer ignore the defects of the Old Guidelines, so a comprehensive review was commenced in 3 February 1995. It took over eleven years to revise the guidelines and New Guidelines finally come into force on 19 September 2006.

Under the New Guidelines, back checks are being carried out at all nuclear power plants to determine (1) what earthquake and what ground

motion the plants should be designed to withstand and (2) whether the plants are able to withstand such an earthquake. All electric power companies have submitted interim or final reports to the Nuclear and Industrial Safety Agency (NISA). They have all increased the size of the earthquake and the ground motion their nuclear power plants need to be able to withstand. They have all also indicated that their plants were designed with sufficient leeway to withstand such an earthquake, but they are reinforcing their plants anyway.

Niigata Chuetsu-Oki Earthquake

While these back checks were being carried out, the Niigata Chuetsu-Oki Earthquake struck KK. Although the earthquake was only M6.8 (Mj6.8 Japanese seismic scale, moment magnitude Mw6.6), the ground motion was many times greater than the plant was designed to withstand. When Unit 1 was originally designed, the calculations indicated that a M6.9 earthquake arising from the Kihinomiya Fault would only cause a ground motion of 222 Gal (S_1), while a M6.5 earthquake directly beneath the plant would only cause a ground motion of 274 Gal (S_2). However, to be on the safe side, design basis ground motion S_1 was set at 300 Gal, while design basis ground motion S_2 was set at 450 Gal. In the event, these figures turned out to be gross under-estimates. During the Chuetsu-Oki Earthquake the ground motion at the "free surface of the base stratum" for KK Unit 1 was calculated to be 1,699 Gal.⁵

It is not fully understood why the earthquake shook the plant so much more violently than predicted, but it appears that the seismic waves were amplified in some way as they were transmitted through the ground. A similar phenomenon was observed in the Southern Hyogo Prefecture Earthquake, suggesting a tendency for seismic waves arising from strong earthquakes to be amplified in soft ground. Perhaps the soft and folded ground beneath KK focused the seismic waves like a lens. Whatever the physical cause of the violent shaking of the plant, the local people knew from the start that there were problems with the ground on which KK was built. It is hard to believe that TEPCO was unaware of the problems.

TEPCO only took into account land faults when designing KK. However, it is now known that there are important submarine active faults in the area. Experts disagree about the nature of the fault that caused the Chuetsu-Oki Earthquake, but they agree that it was a submarine active fault.

During the debate about KK Unit 1, Tokihiko Matsuda and Geological Survey of Japan's Toshihiro Kakimi pointed out that a survey should be carried out to look for submarine active faults.⁶ TEPCO did not follow their advice, even though a precedent already existed for such a survey. Before deliberations about KK even began, Shikoku Electric Power Company had already carried out two offshore surveys and found a large submarine active fault near its proposed Ikata nuclear power plant. Matsuda and Kakimi were well aware of this precedent, because Shikoku Electric carried out the surveys at their suggestion. By the time TEPCO constructed KK Units 6 & 7, it certainly knew there were submarine active faults in the area, but it chose to conceal this information.

Post-Mortems and the Rush to Restart

Since the earthquake, several committees have been established to investigate three key issues: (1) the nature of the earthquake; (2) the impact of the earthquake on KK; and (3) whether it is safe to operate KK (or some KK units) in future. So far, the central government's committees have concluded that (1) the nature of the earthquake is now understood; (2) KK was not seriously damaged; and (3) that it is safe to operate KK Unit 7. Having restarted KK-7, TEPCO will presumably apply for permission to restart other units in due course.

Niigata Prefecture established two subcommittees of its own, one dealing with the earthquake itself and the condition of the ground and another dealing with the impact of the earthquake on the plant. Unlike the central government's committees, these two subcommittees include members who take a critical perspective. Neither subcommittee has reached a unanimous conclusion. The main points of contention relate to the following issues:

1) The magnitude of the design-basis earthquake: NISA and the Nuclear Safety Commission (NSC) approved restart of KK Unit 7 on the basis that it could withstand a M7.0 earthquake. However, some scientists insist it should be designed to withstand a M7.5 earthquake.

2) Movement of the ground beneath the buildings: The ground level has been measured on three occasions since the earthquake, but each time the direction and size of the inclination of the buildings was different. Boring carried out by a research team including Dr Masaaki Tateishi of Niigata University contradicts TEPCO's assessment.

3) Concerns that during an earthquake in excess of M7 the casing within which the recirculation pump motors are contained could buckle and break: KK-6&7 are Advanced Boiling Water Reactors (ABWR). This type of reactor has internal recirculation pumps. Even for a M7 earthquake, the casing of the recirculation pumps is near the limit of the seismic design standard.⁷

Nevertheless, on April 7 the chairman of the parent committee of Niigata Prefecture's two subcommittees, Seiji Shiroya, handed the governor a biased summary of proceedings, in which he expressed the view that it was safe to operate KK-7. Members of the subcommittees responded by severely challenged his conclusion and the inappropriateness of drawing any conclusions at this stage in the subcommittees' proceedings.

New Research Shakes the Ground Beneath Japan's Seismic Standards

Some serious defects in the seismic assessments of nuclear power plants have become very clear over the last few years. New active faults have been discovered. Active faults have been found to be longer than the electric power companies had claimed. In many cases, faults which power companies claimed were separate and unrelated are now believed to be connected. Estimates of the potential size of earthquakes are connected to the length of active faults, so reassessing the length presents serious challenges for seismic design.

In recent years HERP has reassessed the status of Japan's active faults. In many cases it has reached different conclusions from those of the power companies, but the power companies and the governments' nuclear safety agencies do not necessarily follow HERP's findings. In addition, independent researchers have made many discoveries that contradict the claims of the nuclear industry. In particular geomorphologists, Takashi Nakata, Mitsuhisa Watanabe and Yasuhiro Suzuki have found new faults and shown that shorter faults are linked together. For many years electric power companies ignored the work of geomorphologists. Recently they have found it harder to dismiss their claims, but they still refuse to accept elementary geomorphological evidence of active faults.

Conclusion

Proponents of nuclear power in other earthquake-prone countries point to Japan as a role model. However, the history of the seismic assessment and design of Japan's nuclear power

plants suggests that it is more by luck than good management that Japan has managed to escape a nuclear earthquake catastrophe. Politics has been prioritized over safety in the siting and design of plants and politics was prioritized again in approving the restart of KK-7. Over and again, the government and TEPCO have shown that they are only too willing to sacrifice sound science for the sake of national policy.

Earthquakes are an unknown quantity at the best of times. The Japanese experience shows that when politics and vested interests are involved, even the limited knowledge that we have is distorted and perverted. Under these circumstances, it is impossible to be sure that nuclear power plants are constructed to withstand earthquakes that might occur. If the top priority is safety, wisdom suggests that it is inappropriate to construct something as technologically complex and dangerous as a nuclear power plant in an earthquake zone.

Philip White (NIT Editor) and Yukio Yamaguchi (CNIC Co-Director)

Notes and References

1. Tokyo High Court, quote in The Japan Times on February 27, 1997.
<http://search.japantimes.co.jp/cgi-bin/nn19970227a3.html>
2. Stephen Hunziker and Ikuro Kamimura, Kakuei Tanaka: a political biography of modern Japan, Chapter 4.
<http://www.rcrinc.com/tanaka/index.html>
3. Niigata Nippo (Newspaper) Special Investigation Team, Nuclear Power Plants and Earthquakes: Warning from Kashiwa-Kariwa "seismic intensity 7", Kodansha, 2009, p. 80~83
(Niigata Nipposha Tokubetsu Shuzaihan, Genpatsu to Jishin: Kashiwazaki-Kariwa "Shindo 7" no Keikoku)
4. Ground motion at the "free surface of the base stratum". Tertiary layers, or earlier bedrock that has not been eroded are generally referred to as "ground". Hypothesizing that above this ground there are no layers or structures, the surface spreading out horizontally is called the "free surface of the base stratum".
5. This figure was derived from a peak east-west ground motion of 680 Gal recorded by a monitor in the fifth floor basement of Unit 1.
6. Niigata Nippo, 2009 op. cit., p. 88~90.
7. See past issues of NIT, especially NIT 129 for detailed comments.

Rokkasho Reprocessing Plant: A never ending series of accidents

This article provides an update on a report in Nuke Info Tokyo No.129 about a leak of high-level liquid waste (HLW) at the Rokkasho Reprocessing Plant.

The leak occurred in the HLW Vitrification Facility. HLW is transferred by an "airlift" system from a feed tank through feed pipes to the vitrification furnace, where it is mixed with molten glass. The vitrification furnace was not in operation at the time of the accident, but for some reason the air pressure rose, forcing HLW up the pipes. Due to a worker error, flanges were not properly closed and about 150 liters of HLW leaked from the pipes (see diagram).

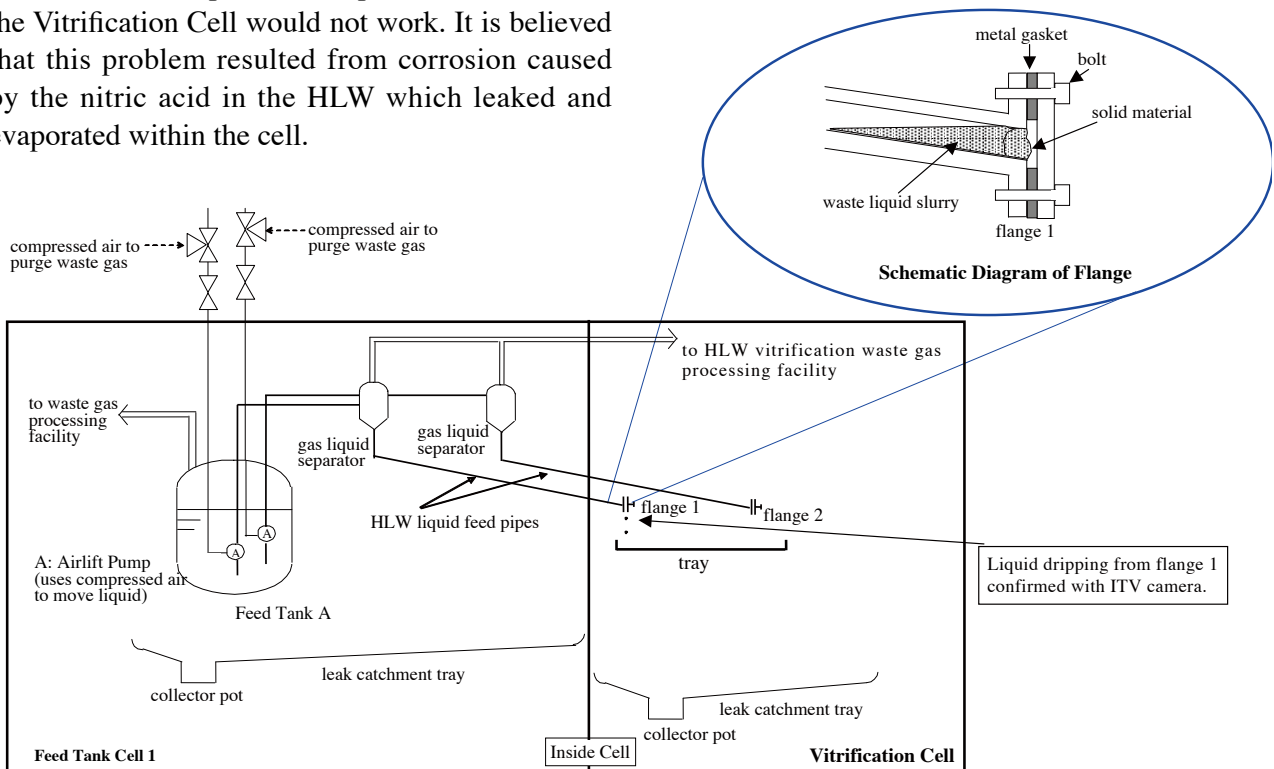
Japan Nuclear Fuel Ltd. (JNFL) delivered a report about the incident on April 10, 2009. In the report it admitted that more problems arose when it tried to clean out the contaminated cell. The leak occurred in the Vitrification Cell, but high-pressure cleaning liquid, contaminated with HLW, found its way through a gap where the feed pipe passes through the wall from the neighboring cell (Feed Tank Cell 1). As a result, elevated radioactivity was recorded in Feed Tank Cell 1 (0.7 Sv/h compared to the control target of 0.5 Sv/h). Furthermore, the power manipulator and crane in the Vitrification Cell would not work. It is believed that this problem resulted from corrosion caused by the nitric acid in the HLW which leaked and evaporated within the cell.

In response to these failures, the regulatory body, Nuclear and Industrial Safety Agency (NISA), deemed that JNFL was in breach of the Reactor Regulation Law on five counts. The breaches identified by NISA included a slow response to alarms indicating a leak, and a failure to produce an operational plan, in according with safety regulations, about the method of detaching the feed pipes. It demanded that JNFL investigate the cause of the problems and introduce measures to prevent a recurrence. It also demanded that JNFL rectify organizational problems.

JNFL's April 30 report, submitted in response to NISA's demands, identified problems that call into question JNFL's qualifications as a nuclear enterprise.

Problems identified in relation to the leak itself:

- 1) Preparedness to identify and manage leaks was inadequate.
- 2) Capacity for calm consideration of safety assurance was weakened by pressure caused by repeated extensions to the schedule for completion.
- 3) Insufficient staff were allocated, even though the work-load grew as a result of the frequent problems.



Schematic Diagram of Repeated Dripping HLW Liquid

4) Inadequate attention was given to communication between senior and middle management and to seeking the opinions of on-site workers.

Problems identified in relation to the slow response:

5) An attitude of always considering the worst case was lacking, so even when liquid was noticed, it was not suspected to be radioactive waste.

6) Even though a worker noticed that the level in the Feed Tank had fallen, this was overlooked due to a lack of communication.

7) Some of the procedures necessary for detecting leaks were not specified.

Reading this report, one cannot help thinking of the huge leak discovered in May 2005 at the THORP reprocessing plant in the UK. BNFL, the owner of THORP, admitted that the leak continued for nine months without being discovered. Apparently the workers were prey to the false belief that such problems could not occur in a new plant. Perhaps the same could be said of the workers at

the Rokkasho Reprocessing Plant. At Rokkasho too, JNFL's workers made no preparations for the possibility of a leak.

On April 30, JNFL President, Isami Kojima, sent an email to all employees entitled "President's Safety First Statement". In it he appealed to them to "promise the public that you will never allow safety to deteriorate." JNFL's method of assuring safety seems to be to reinforce its employees' faith in absolute safety. Incredibly, JNFL seems to be asking its workers to believe in the safety myth even more strongly than BNFL's workers.

On January 30 this year the official date for completing active tests of the Rokkasho Reprocessing Plant (the final stage before the plant commences commercial operations) was postponed to August 2009. It was the sixteenth time the schedule had been postponed.

Masako Sawai (CNIC)

Nagao vs. TEPCO: Tokyo High Court Upholds Unjust Verdict

On April 28, the Tokyo High Court handed down its verdict on the late Mitsuaki Nagao's claim for damages against Tokyo Electric Power Company (TEPCO). Nagao's family had appealed a May 23, 2008 decision by the Tokyo District Court (see NIT 125 and NIT 127).

Tokyo High Court Judge Kaoru Aoyagi took less than a minute to dismiss the appeal, saying only, "The case is dismissed. Court costs are awarded against the plaintiff." The three judges then stood up and walked out, as if they were fleeing the scene of a crime. The plaintiff's supporters were left to read the written text to discover the reasons for the verdict.

The High Court accepted the diagnosis that Nagao suffered from multiple myeloma. In so doing, it overturned an appalling judgment by District Court Judge Hidetaka Matsui and totally refuted the claims of TEPCO and its multiple myeloma expert, Dr Kazuyuki Shimizu. On four occasions Shimizu presented written opinions

which distorted international diagnostic standards in order to avoid the multiple myeloma diagnosis.

However, the High Court jumped to the conclusion that there was not a high probability that Nagao's condition was caused by his exposure to radiation while working in nuclear power plants. It accepted that there was epidemiological evidence in Nagao's favor, but said that there were views both for and against this evidence and that the causes of multiple myeloma are unclear. It also said that in Nagao's case it was possible that the cause of his condition was old age.

Nagao's family has decided to fight on. They appealed to the Supreme Court on May 7. CNIC hopes to keep NIT readers informed of developments.

Mikiko Watanabe (CNIC)

MOX Ships Arrive in Japan Amidst Citizen Protest

On May 18, 2009, two British-flagged vessels, the *Pacific Pintail* and *Pacific Heron* arrived in Japan from France carrying 1.7 metric tons of weapons-usable plutonium contained in 65 assemblies of MOX (mixed plutonium and uranium oxide) fuel. The ships were met with citizen protest at the Omaezaki port, Shizuoka Prefecture, 180 km from Tokyo. The electric utilities and government hope that this fuel will start Japan's beleaguered pluthermal program.

The vessels had left France on March 6th and had travelled the some 30,000 km, south of the Cape of Good Hope, Africa, across the southern Indian Ocean, through the Tasman Sea, and past South Pacific islands states, north to Japan. Although the route was originally to be kept secret until after the ship's arrival in Japan, due no doubt to en route countries' concern, the route was announced jointly by Japanese electric utilities, Areva NC, and the UK shipper two days after the ships departed Cherbourg, France.

The 28 MOX fuel assemblies for Chubu Electric's Hamaoka Unit 4 plant which arrived at Omaezaki port, travelled the 10km on public prefectural roads to the plant site. The *Pacific Pintail* and *Pacific Heron* then continued on to the Genkai Unit 3 plant in Saga Prefecture (May 23rd), meeting with citizen protest, and unloading the 16 assemblies for the nuclear power plant at its port. The remaining 21 assemblies are destined for Shikoku Electric's Ikata nuclear power plant Unit 3 in Ehime Prefecture. More shipments from France to Japanese nuclear power plants are scheduled to follow.

Earlier, on May 10th, Saga citizens held a rally protesting Kyushu Electric's MOX fuel program. Saga citizens now aim to gather 400,000 signatures from prefectural citizens (Saga's total population: 850,000) by the end of August. The petition is directed to governor Yasushi Furukawa and seeks an end to the MOX fuel program.

On May 18th, the day the ships arrived in Japan, Citizens' Nuclear Information Center, Green Action, and Greenpeace Japan called on countries potentially on the route of future MOX fuel shipments to join in demanding the termination of these dangerous shipments.

MOX fuel shipments are unsafe and trample on the right of en route countries to protect their citizens and environment

On March 18th, shortly after the MOX fuel shipment left Cherbourg, Eni F.H. Faleomavaega (member of the US Congress, House of Representatives from the Territory of American



Demonstration in Saga, May 10

Samoa), in a statement made on the U.S. House floor, protested this MOX shipment stating, "As usual, plans for this latest shipment, the largest so far, was covered in shrouds of secrecy without prior consultation or notification of en-route states. Yet, any accident involving the ships or their cargo could have catastrophic consequences on the environment and the population of en-route states. Moreover, with the increasing threat of piracy, the transported plutonium MOX fuel could easily fall in the hands of terrorists..."

Faleomavaega continued, "This unnecessary and unjustifiable shipment provides another example of the unacceptable risks and adverse impact the use of nuclear power and nuclear materials have on the environment and the lives of those involved. It demonstrates once again the imperialistic behavior of some major countries at the expense of others.... Europe, Japan and all nuclear states, should keep their nuclear materials and waste in their own backyard, and not endanger the lives of others."

MOX Fuel Ships Have Serious Design Flaws

In April 2009, a report commissioned by 70 nuclear free local authorities in the UK found that the *Pacific Pintail* and *Pacific Heron* have serious design flaws.¹ The *Pacific Pintail* (built in 1987) is still operating despite having been built to the same design and construction standards as predecessor vessels decommissioned or scrapped following discovery of "run away" corrosion. The *Pacific Heron* (built in 2008) has only small modifications from the original design of the earlier ships. Available details of these modifications do not describe measures to prevent "run away" corrosion.

Although the shippers proclaim that the ships are double-hulled, where in fact 40% of the vessels are only single-skinned hull. The study also found that claims that the ships are unsinkable "lack scientific and technical credibility." Moreover, the report found that

emergency plans for coping with accidents are non-existent.

No One In Charge? Regulations Not Met?

Masato Mori, the government official at the Ministry of Transport, Land, and Infrastructure (MLIT) in charge of the safety of the MOX fuel transport stated on February 13th, shortly before the ships' departure, "[MLIT] is not the party which is fully in charge of this transport. The primary party responsible is the [Japanese] electric utilities. We've told them time and time again that they should put more effort into the safety of sea transports, just like they put into the safety of their nuclear power plants." MLIT concludes that the effort by Japanese electric utilities is not sufficient.

In order to assure that the MOX fuel will not have an uncontrolled chain reaction (go critical) under accident conditions, MLIT regulations require that utilities undertake a drop test of the transport casks with "an object equivalent to the material of the shipment." The utilities, however, did not meet this requirement. Instead, they undertook the test with a lead-based alloy at normal temperatures. (The actual MOX fuel is hot due to the emission of alpha rays. Electric utility documents state that the heat weakens the MOX fuel material.)

On the afternoon of February 26th, concerned that the Japanese government was about to give its approval for a MOX fuel shipment which did not meet Japanese government regulations, twenty Japanese national Diet members, including prominent members of the leading opposition party, the Democratic Party, signed a letter addressed to MLIT stating that the shipment should not go forward until government regulations were met. The letter stated:

"It is essential that the same level of safety precaution be applied to the shipment of nuclear fuel as is applied to nuclear reactors in Japan. ...More specifically, it is essential that the safety of both the MOX fuel assembly and its casks be assured under all circumstances during shipment. Most importantly, as MOX fuel is fissionable material, and there is a possibility of accidents occurring en route, MLIT has a legal obligation to demand assurances that an uncontrolled nuclear chain reaction cannot occur, and to ensure that tests have been conducted to assure that these regulations have been met."

The Diet member letter quotes Section 4 Number 3 of the MLIT regulations and states that the test conducted by the electric utilities did not meet the heat and material requirement of the regulation, saying, "This can hardly be said to be "an object equivalent to the material of this shipment", and surely amounts to a failure to fulfil the legal requirements of the testing." The letter concluded, "For this reason, it

cannot be claimed that the safety of the MOX fuel shipment has been assured. Doubts concerning safety are undoubtedly shared not only by those in Japan but also by citizens of the nations along the shipment route. This shipment, which will be carried out without testing that fulfils Japan's legal requirements, should not take place.

Disregarding the Diet members' letter and its own concerns, MLIT rushed through the approval the same night (February 26th), paving the way for the shipment to leave France.

Where Goes Japan's Plutothermal Program?

This MOX fuel shipment is part of Japan's failed plutonium program. The country has built up tons of surplus plutonium (now 38 tons in Europe and around 9 tons in Japan), and MOX fuel utilization in Japanese commercial reactors is Japan's attempt to consume some of that surplus plutonium, originally intended for the fast breeder reactor program.

Japan's MOX fuel utilization program was to start in 1999. However, a quality control data falsification scandal, local citizen referendum, falsification of nuclear power plant inspection data, and a nuclear accident have delayed the program.

It is worthy to note that virtually none of the plutonium shipped from Europe to Japan, either in the form of plutonium dioxide or MOX fuel, has ever been actually used. Between 1984 and 2001, a total of slightly over 2.5 tons had been shipped (between 1984 and 2001), of which only about 30kg has been used (in Monju in 1995 before the prototype reactor had a sodium lead and fire accident).

On May 18th, a total of 420 citizen, consumer, peace, and professional organizations from every prefecture in Japan submitted a petition to the Japanese government stating the plutothermal program forces MOX spent fuel waste onto the prefectures. (Currently, there is no destination for spent MOX fuel.)

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Aileen Mioko Smith, Executive Director, Green Action (Kyoto)

1. Nuclear Free Local Authorities Briefing No. 66, 31 March 2009.

Stop Press: It was reported on May 19th that the Pacific Heron had developed problems in one of its engines during the voyage but was able to continue using another independent engine. No further details are known at the time of this writing.

2009 Fiscal Year Electric Supply Plan and Nuclear Industry Developments

On April 3, the Ministry of Economy Trade and Industry's Agency for Natural Resources and Energy released the 2009 Fiscal Year (FY09) Electric Supply Plan Outline. The Plan brings together the plans of all the electric power companies (EPCO). Although it is referred to as a "Plan", as usual it has little relation to reality. A look at the plan for construction of new nuclear reactors reveals that the dates have been pushed back year after year. Some have been postponed for over 10 years.

Tohoku Electric's Namie Odaka is the most glaring example. While 1,380MW ABWRs (Advanced Boiling Water Reactors) are the norm these days, the Namie Odaka plan is for an 825MW BWR. It was included in the plan over 40 years ago, but the construction commencement date has been pushed back year after year. Even if a decision is eventually made to construct the reactor, plant makers and parts manufacturers might not still maintain this out-of-date technology.

Predicted Demand Revised Downwards

Nevertheless, we can recognize some reality in the plan. The prediction for electric power demand was revised down in response to declining production, resulting from such factors as the international financial crisis.

The Plan predicts that the average rate of growth over the next 10 years will be around 0.8% for electric power demand (kilowatt hours) and

around 0.6% for peak demand (kilowatts). Both figures are 0.1% less than last year's prediction. Since the predicted growth of peak power demand was reduced 0.2% last year, this year's figure is 0.3% less than the prediction in the FY07 Plan.

The Plan reverts to unreality in its prediction for the medium and long term, stating, "A gradual rise in the level of production is predicted in the medium to long term, in response to recovery in internal and external demand."

EPCOs already have adequate reserve power supply, even with several nuclear power plants out of operation. Hamaoka 1 and 2 were shut down permanently in January (see NIT 128) and all seven Kashiwazaki-Kariwa reactors have been shut down for nearly two years (see article on page 1). Furthermore, they plan to bring on line more thermal power plants. From their point of view, delaying new nuclear construction plans is a good thing. If the plans proceeded according to schedule, they would be lumbered with huge excess capacity.

Some EPCOs predicted lower supply capacity in their FY09 plan than in their FY08 plan, giving the impression that they are reducing their reserve capacity. This was particularly pronounced in Tokyo Electric Power Company's plan. Even as new supply sources are increasing, TEPCO reduced its prediction for total capacity in its plans for each of the last two years. It certainly seems that TEPCO does not need to restart KK.

Table 1: Nuclear Power Development Plan (1)

Power Company	Location	Power (MW)	Commence(d) Construction	Commence Operations	Status
Hokkaido Electric	Tomari-3	912	Nov. 2003	Dec. 2009	Under Construction
Tohoku Electric	Namie Odaka Higashidoori-2	825 1,385	FY 2015 FY 2015 or after	FY 2020 FY 2020 or after	
Tokyo Electric	Fukushima I-7 Fukushima I-8 Higashidoori-1 Higashidoori-2	1,380 1,380 1,385 1,385	April 2011 April 2011 Nov. 2010 FY 2013 or after	Oct. 2015 Oct. 2016 Dec. 2017 FY 2019 or after	Safety Assessment
Chubu Electric	Hamaoka-6	around 1,400	FY2015	FY 2019 or after	
Chugoku Electric	Shimane-3 Kaminoseki-1 Kaminoseki-2	1,373 1,373 1,373	Dec. 2005 FY 2010 FY 2015	Dec. 2011 FY 2015 FY 2020	Under Construction
Kyushu Electric	Sendai-3	1,590	FY2013	FY2019	
J-Power	Ohma	1,383	May 2008	Nov. 2014	Under Construction
Japan Atomic Power Company	Tsuruga-3 Tsuruga-4	1,538 1,538	Oct. 2010 Oct. 2010	Mar. 2016 Mar. 2017	Safety Assessment Safety Assessment
Total	15 Reactors	20,220			

1. Table made by CNIC based on 2009 Electric Power Supply Plan

Planned Reactors

EPCOs decide to construct power stations in response to increased peak demand, so as long as peak demand is not rising, they want to postpone construction of new nuclear power plants. Furthermore, as mentioned above, new nuclear power plants are larger than in the past. Since they are either operated at full power or not at all, their large capacity is very inconvenient. Consequently, construction commencement dates for 8 of the 13 existing reactor plans were postponed by one or two years.

This financial year Kyushu Electric added Sendai-3 and Chubu Electric added Hamaoka-6 to their supply plans. Both are very large reactors, so no doubt they too will be postponed year after year.

More Transparency Needed

Rather than seeking to provide cover for manifestly unrealistic government policy, EPCOs should disclose their real electric power supply plans in a transparent fashion. They should also reconsider their plans to introduce new thermal plants. It would help greatly if they got serious about renewable energy, instead of always putting obstacles in the way of the introduction of non-fossil, non-nuclear energy sources.

Nuclear Industry Developments in FY 2007

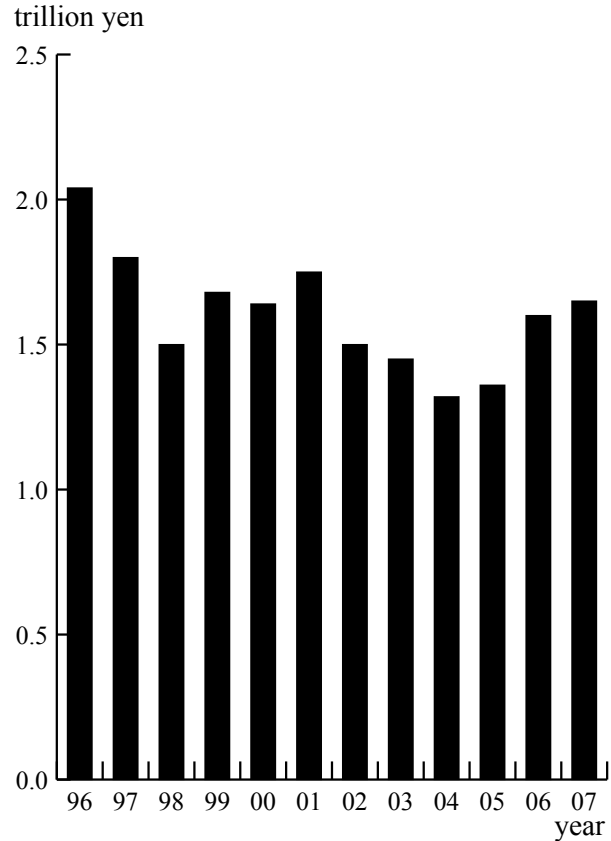
In February, the Japan Atomic Industrial Forum (JAIF) published the results of its nuclear industry survey. The results come from responses to a questionnaire by 11 EPCOs, 263 minerals and manufacturing companies and 23 trading companies.

According to this survey, total sales of minerals and manufacturing companies were 1.65 trillion yen in FY07. Sales are now on an upward trend after a low of 1.3 trillion yen in FY04. However, the increase in FY06 and FY07 was not in nuclear power plant construction. It was in other business, such as maintenance. Meanwhile, nuclear reactor machinery continued its downward trend.

The decline in orders was reversed and at the end of FY07 (31 March 2008) orders were 2.3 trillion yen. As explained in the above discussion of the Electric Power Supply Plan, EPCOs are not enthusiastic about new construction, so whether or not increased orders can be expected in future depends on the prospects of exports by the major manufacturers. Those prospects are far from clear.

Baku Nishio (CNIC Co-Director)

Nuclear Industry Sales



Based on survey by Japan Atomic Industry Forum

Continued from page 1

plant.

TEPCO began withdrawing the control rods at 1:53pm on May 9 and started up the reactor. Problems first arose that night at 11:15pm in a valve in the main steam system. More problems occurred on May 11. TEPCO's press release described the May 11 problems, which occurred at 6:43am and 6:53am, as follows:

"[W]hile performing an activation test of the reactor core isolation cooling system (RCIC), water level of the suppression pool went beyond the normal level...[T]he RCIC could not be shut down by normal procedure and had to be shut down manually at the site."

The problems led to a departure from the "Limiting Condition for Operation" stipulated in the Technical Specification. TEPCO had intended to start the turbines and begin sending electricity to Tokyo on May 15, but as a result of these problems it was not able to do so until May 19.

We believe they are treading on thin ice restarting the plant.

Yukio Yamaguchi (CNIC Co-Director)

Anti-Nuke Who's Who

Kamanaka Hitomi: making films that inspire people to take action

by Philip White*

Kamanaka Hitomi was a late comer to nuclear issues, but in a short time she has had a huge impact on the grass-roots movement in Japan. Her film *Rokkasho Rhapsody* has drawn in thousands of people who had never previously been involved in the movement, including lots of young people. It is one of the key factors in the last few years that have vitalized the campaign to stop the Rokkasho Reprocessing Plant.

Rokkasho Rhapsody shows ordinary people in the region around the Rokkasho Reprocessing Plant, living out their daily lives and working through the dilemmas that the existence of the plant raises for them. It also looks further afield to places such as Sellafield in the UK, the site of another reprocessing plant with which the Japanese nuclear industry has a long and troubled relationship, to understand the issues raised by the Rokkasho plant.

It is a film that asks us to do something. Thousands of people in Japan and beyond have taken up the challenge. The film has now been translated into Korean, Chinese, France and English and it has been screened over 550 times since it debuted in 2006.

Hitomi started making films in Japan, then went to Canada to study further, supported by a governmental arts grant. She returned to Japan in 1995 and gradually moved into TV, eventually spending ten years making documentaries for NHK, Japan's national broadcaster. After the insecurity of life as a media activist "using media to criticize media", she thought it was great not to have to worry about money any more. It was also great to be able to make lots of documentaries that were seen by millions of people. But at some stage she realized that there was a down side. She found that tailoring her documentaries to suit NHK was killing her artistic creativity.

Nevertheless, it was a program that she made for NHK that drew her into nuclear issues. In 1998 she made a program about the effects of depleted uranium (DU) left over from the first Iraq war. NHK wasn't happy with the contents, but she managed to come up with a compromise and the film was shown on TV. It was the first time the DU issue had been raised on TV in Japan. But although

* Philip White is the editor of Nuke Info Tokyo.



the film dealt with the problems of radiation, it was not until much later that Hitomi realized that this DU was a waste product from the nuclear energy industry.

Eventually she broke away from making TV programs. She had become very interested in the problems of radiation, so she decided to make a film about Hibakusha. The film won awards and the topic was relatively easy to sell in Japan, so she was able to form a network of people who screened the film in their communities. This was the basis of the network which took up her next film, *Rokkasho Rhapsody*.

There was something about *Rokkasho Rhapsody* that was different from many of her previous films. It inspired people to take action in their own lives. People sensed a connection between the issues raised in the film and their daily lives. They realized that the radioactivity that contaminates the sea and air around Rokkasho (and that will contaminate a much wider area if there is a major accident) is connected to our use of electricity. The same connection exists with the DU that contaminates the battlefields of Iraq, but Hitomi was not aware of that connection when she made the earlier film. Her focus was on the plight of the victims, rather than the origin of the DU. Had she drawn the connection, perhaps it would have been even more difficult to persuade NHK to show the

film.

It would be a mistake to think that the network that Hitomi has created is sustained simply by the inspiration from the film itself. Hitomi's outgoing personality and her enthusiasm are key ingredients of her success. People are drawn to her light. But there are also other factors. One is her method of releasing "video letters" between films. It takes a long time to make a full-length film, so by the time the film is ready some of the material is quite old. These video letters are a way of getting material out faster. They also provide continuity to the network, which might lose some of its impetus if it had to wait for the final film to be completed.

Currently Hitomi is working on a new film with the tentative title *The Hum of the Honey Bee and the Rotation of the Earth*. The first in a new series of video letters, using footage taken for this film, was released in February this year. It was a wonderful testimony to the spirit of the people of Iwaishima Island, almost all of whom are opposed to the planned Kaminoseki Nuclear Power Plant. The plant is to be constructed on the shores of the Seto Inland Sea, just 4 kilometers across the water from Iwaishima. The highlight of the video letter was a stunning ritual dance by Takashi Yamato (see Who's Who in NIT 125) on the prow of a fishing boat, as part of the island's traditional festival.

The latest video letter also showed alternative approaches to energy being introduced in Europe, with a particular focus on Sweden. Hitomi wants to show broader connections between nuclear energy and the environment. There is still a perception in Japan that nuclear issues are separate from



would like to contribute to breaking down that perception. By enabling her to connect powerfully and personally with her audience, her approach to making and promulgating her films is ideally suited to the purpose.

Some of Kamanaka Hitomi's films

Rokkasho Rhapsody, produced by Group Gendai Co., 2006

Recommendation:

"A story happening around the world. A story universal to human history." - Sakamoto Ryuichi (composer and musician)

Hibakusha at the End of the World (shorter American version called *Radiation: a Slow Death*), produced by Group Gendai Co., 2003

Both films can be obtained from the following address:

Group Gendai Films Co., Ltd.

1-11-13 Shinjuku, Shinjuku-ku, Tokyo 160-0022, Japan

Phone: +81-3-3341-2863

Fax: +81-3-3341-2874

email: front@g-gendai.co.jp

<http://www.g-gendai.co.jp/company/english.html>



The Rokkasho Reprocessing Plant

NEWS WATCH

Subcommittee releases draft international strategy

On April 22, a committee looking into international strategy submitted a draft report to the Nuclear Energy Subcommittee of the Advisory Committee for Natural Resources and Energy. Public comments have been invited and a final decision is expected in May. The report's main points are as follows:

- * Establishment of the nuclear fuel cycle - international expansion and links with overseas businesses through early introduction and expansion of enrichment equipment, early consideration of a second reprocessing plant to follow the Rokkasho Reprocessing Plant, active support of capital involvement by power companies and plant makers in uranium fuel business;
- * Industry structure - promotion of links between power companies and plant makers, links between industry bureaucracy and academia;
- * Nuclear energy diplomacy - conclusion of flexible nuclear cooperation agreements;
- * Response to business risk - establishment of a conducive environment in the areas of human resources, finance, and systems;
- * Response to international competition - support for technological development of materials and component makers, strengthening of government and civilian cooperation in development of next generation light water reactors, active involvement by power companies in self-reliant development of FBR.

The desire to bind power companies to enrichment, reprocessing and FBR comes across very strongly, but since power companies would prefer to get out of these fields, it is hard to imagine things going according to plan.

Institutional preparations for international cooperation

The past few months have seen the following new initiatives.

On April 1, the Nuclear Energy Policy Planning Division of the Agency for Natural Resources and

Energy established an office for the promotion of international cooperation. The intention is to support the expansion of Japan's nuclear industry overseas by establishing a system for building inter-government frameworks, including bi-lateral nuclear cooperation agreements.

On March 18 the Japan Atomic Industrial Forum (JAIF) established the JAIF - International Cooperation Center, which opened an office on April 1. In cooperation with the Federation of Atomic Power Companies and the Japan Electric Manufacturers' Association, they are trying to accelerate the international expansion of Japan's nuclear industry by conducting an all-Japan effort to support the introduction of nuclear power into countries such as Vietnam and Thailand.

It is planned that a joint public-private council for international nuclear cooperation will be established in May or shortly thereafter.

On April 1 Fukui University established the Research Institute of Nuclear Engineering. The Institute has the following four fields of activity: nuclear engineering basics, nuclear engineering research and development, nuclear disaster prevention engineering, medical physics and chemistry research and development. It intends to invite overseas students, in particular from Asia.

Memorandum of Cooperation with Jordan

In Tokyo on April 14, Toru Ishida, Director-General of Japan's Agency for Natural Resources and Energy (ANRE), and Suhair Al-Ali, Jordan's Minister of Planning and International Cooperation, signed a "Memorandum of Cooperation" concerning cooperation in the development of Jordan's nuclear power program. Jordan is aiming to begin operating its first nuclear power plant in 2017. Besides cooperation in preparation, planning and promotion of nuclear power development in Jordan, Japan agreed to cooperate with Jordan on training, human resources and infrastructure development, nuclear safety and security, and identification of uranium and other nuclear related materials. The initial term of the agreement is five

years, but it may be extended thereafter by mutual consent.

Work begins on China's first AP1000

On April 19, work began on China's Sanmen No. 1 reactor (PWR, 1,100 MW). It is being supplied by Westinghouse and the Shaw Group and will be the first ever AP1000 reactor to be built. Westinghouse and the Shaw Group also have contracts for a second AP1000 at Sanmen, as well as two more at Haiyang.

Kharasan uranium mine opened

Kazakhstan's Kharasan mine has two uranium deposits. Kharasan-1 began mining on a trial basis in September 2008 and on April 24, 2009 it held an opening ceremony for the commencement of full operations. Japanese companies that have invested in the mine attended the ceremony, including four electric power companies, Tohoku Electric, Tokyo Electric, Chubu Electric and Kyushu Electric, along with Marubeni, Toshiba, the Japan Bank of International Cooperation, Nippon Export Insurance and Mizuho Corporate Bank.

Kharasan-2 began trial operations in March. At peak production the two deposits are expected to yield about 5,000 tons of uranium per year. Of this, 2,000 tons will be taken by Japan.

Hitachi falsified data about heat treatment of pipe welds

On April 13, Hitachi and Hitachi-GE Nuclear Energy revealed that data relating to heat treatment of welds in moisture separation heating devices was falsified during construction of the Hamaoka-5 (ABWR, 1,380 MW) and Shimane-3 (ABWR 1,373 MW) reactors. In both cases, the data was falsified by the same employee of Japan Industrial Testing Co.. Due to an error in operation of the electric heater, the temperature fell suddenly giving rise to data that deviated from the permitted standard. The worker erased the non-compliant data with bleach. An employee of Chugoku Electric Power Company discovered the error in relation to Shimane-3 in March and confirmed the matter with Hitachi.

A similar case of data falsification by a Hitachi subcontractor was discovered in 1997.

Procedures to prevent a repetition should have been implemented, but evidently they were not effective.

Nuclear compensation law amended

An amendment to the Law on Compensation for Nuclear Damage was passed by the House of Councillors on April 10. The law, which is valid for a limited period, was extended by ten years. It doubled the amount of insurance that operators of nuclear facilities must take out to cover damages. For example, in the case of nuclear power plants and reprocessing plants the amount was doubled to 120 billion yen.

A supplementary resolution requires a multi-dimensional study concerning joining the international nuclear compensation framework. Japan is not currently a party to any international nuclear liability regime.

Delay to construction of MOX fuel fabrication plant

On April 16, Japan Nuclear Fuel Ltd (JNFL) announced a delay in the commencement of construction of the MOX fuel fabrication plant (130 ton/year MOX fuel). JNFL plans to build the plant in Rokkasho Village, Aomori Prefecture. Commencement of construction was set back two years and one month to November 2009, while the completion date was set back two years and eight months to June 2015. The estimated cost of construction was increased 60 billion yen from approximately 130 billion yen to approximately 190 billion yen.

Frequent fires at nuclear power plants

The frequency of fires at nuclear power plants has increased. On April 23 the Nuclear and Industrial Safety Agency (NISA) announced that of the 105 fires that have occurred since 1967, 49 occurred since 2000. There have been 21 fires since 2007, 11 of which occurred at the Kashiwazaki-Kariwa Nuclear Power Plant. NISA said that it will establish a panel of experts to analyze the reasons why there have been so many fires at Kashiwazaki-Kariwa and to find if there is a common cause.

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/>

Please write to us if you would like to receive email notices when new editions are published.

Translator and Editor: Philip White

Proof Readers: Yukio Yamaguchi, Baku Nishio, Tony Moore