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# Decommissioning of Tokai Plant to Begin

JAPC's Tokai Plant in Tokai Village, Ibaraki Prefecture. It was the first commercial plant to operate in Japan and will become the first commercial one to be dismantled. (Photo by Satoshi Fujino)

On 31 March 1998, Japan's first commercial nuclear power plant, Tokai Plant (GCR, 165MW), was shut down after being operated for 32 years. Then on 4 Oct. 2001, a "Reactor Decommissioning Application" was submitted to the Ministry of Economy, Trade and Industry (METI) by the plant's owner, the Japan Atomic Power Company (JAPC), and the plan was approved on 1 Nov. 2001.

After the reactor was shut down, the spent fuel was taken out of the reactor over a period of three years, and was sent to the reprocessing plant in Sellafield, U.K. by way of a number of international shipments through the Panama Canal. Now that the reactor is empty, JAPC is to begin the dismantling of the plant starting 4 Dec. 2001.

The company contains that it will dismantle and remove all facilities except for parts that were built underground, and that the plan is to "return the site to a state in which it can

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once again be used for electricity generation." However, there are no plans for building a new nuclear plant there.

## The dismantling and removal process

JAPC's plan is to complete the decommissioning within about 17 years. The schedule consists of three stages (Table 1). The first and second stages are termed the "safety storage period" since the reactor itself will be left untouched. The disposal sites for the radioactive waste resulting from the first and second stages are to be decided by the beginning of the third stage. The initiation of the third stage will be put on hold if a conclusion is not reached on sites for the disposal of the waste.

## The short "safety storage period"

The reactor core, heavily contaminated with radioactivity, will finally be dismantled about 13 years after its shut down. However, this 13 year period is extremely short compared to the decommissioning plans of other countries which have gas-cooled reactors (GCR).

One of the typical radioactive nuclides which are the cause of workers' exposure is the beta radiation-emitting Cobalt-60. Its half-life is about five years, and thus the amount of this nuclide decreases to 1/100 after 35 years and 1/1000 after 50 years. (The total amount of radioactivity decreases close to 1/100 after 50 years because there are other beta emitting nuclides with longer half-lives.) Thus in countries like Italy and Spain, plans are to leave reactor cores untouched for 35~40 years after their shut-down. Plans in France involve a waiting period of 50 years, and in the U.K., plans are to leave a reactor core untouched for over 100 years. Though short cooling periods are of a cause of real concern, it is also true that the structural integrity of the plants naturally deteriorates with time, and new worries about safety arise. Moreover, as time passes and the political and corporate landscape changes, the question of who should be responsible for decommissioning is likely to become obscure and contentious.

| Schedule | Period | Area |
|---|---|---|
| First Stage | FY 2001 to FY 2005 | Removal of equipment in turbine building, reactor service building, fuel exchanger building. Draining and decontamination of spent fuel cooling pool. etc. |
| Second Stage | FY 2006 to FY 2010 | Dismantling of heat exchangers etc. |
| Third Stage | FY 2011 to FY 2017 | Dismantling of reactor core and biological shielding. Removal of all buildings except for the equipment and facility parts built underground. |

Note: Ex. FY2001 = April 2001 to March 2002

Table 1 JAPC's Decommissioning Schedule

Dashing ahead of other GCRs around the world that had been shut down much earlier, the Tokai Plant looks like it is going to become the first one of its type to be dismantled.

Workers' exposure is of great concern because the core is to be dismantled when the level of radioactivity is still very high. According to an explanation given by JAPC at a seminar held by the Japan Nuclear Information Center on 29 Sep. 2000, the exposure dose will be reduced by half after the reactor has cooled for nine years, which means that the dose will be close to the average dose received by workers when the plant was generating electricity. Thus, according to JAPC, there was nothing to worry about. There can be no words to describe the disparity between the views of the operator and those of concerned citizens.

## The future of the radioactive waste

There are yet more concerns about the 177,000 tons or so of waste that are expected to be produced by the decommissioning process. JAPC considers that 90% of this waste does not need to be treated as radioactive materials (see Table 2). There is a possibility that such scrap metal will be recycled into pots and pans, and other household metal products, while dismantled concrete gets recycled into cement and walls of households and buildings. Similar plans have been introduced in other countries, and large-scale campaigns were initiated in E.U. countries and in the U.S. against the recycling of low-level radioactive waste under "clearance level."

However, there is great uncertainty about the amount of waste that is likely to be produced. For example, when the Japan Atomic Energy Research Institute (JAERI)'s Japan Power Demon-

| Radioactive material concentration level | | First stage | Second stage | Third stage | TOTAL |
|---|---|---|---|---|---|
| Low-level rad-waste (LLW) | LLW with relatively high concentration of radioactive materials [Level I] | 0 | 0 | 1,550 | About 1,600 |
| | LLW with relatively low concentration of radioactive materials [Level II] | 10 | 560 | 7,840 | About 8,500 |
| | LLW with extremely low concentration of radioactive materials [Level III] | 10 | 60 | 8,010 | About 8,100 |
| | Total of LLW | | | | About 18,100 |
| Waste which does not have to be treated as radioactive waste* (The criteria set by the government is called the "clearance level") | | 2,070 | 4,090 | 39,190 | About 45,400 |
| Non-radioactive waste | | 8,510 | 2,980 | 102,390 | About 113,900 |
| TOTAL | | About 10,600 | About 7,700 | About 159,000 | About 177,300 |

*Materials which meet the criteria shown in a report produced by the Nuclear Safety Commission. Until regulations and management frameworks are finalized, this waste will be managed in the same way that level III waste would be managed.
Source: The Japan Atomic Power Company

Table 2 Estimate of radioactive materials to be produced from the decommissioning of Tokai Plant (Unit: Ton)

stration Reactor (JPDR) was decommissioned, the amount of generated waste far exceeded the original estimation. Accordingly, the amount of waste treated as radioactive material exceeded the estimate.

## Who will pay for the decommissioning?

It is assumed that the total cost of the decommissioning process will be about 93 billion yen, with the cost for treating the waste at about 58 billion yen. As mentioned earlier, if the amount of waste increases, the cost will further increase. This estimate does not include the cost for the final disposal of the waste. The construction cost of the Tokai Plant was 46.52 billion yen. Even if we make allowance for inflation since the initiation of construction in 1960, and the start of the plant's operation in 1966, the cost of decommissioning is clearly out of balance.

The JAPC has said that the cost of about 6.7 billion yen for the first period will be paid "from [their] own assets (including the reserve fund)" but it is unclear where the money is going to come from for the second and third decommissioning periods. Who can be charged for the costs exceeding JAPC's reserve fund? Despite the significance of the project, the decommissioning of Tokai Plant has received relatively little domestic attention because it is the country's only GCR. Experience gained from this plant cannot be applied to the decommissioning of other commercial plants currently operating in the country, as they are all light water reactors. However, citizens must monitor this process in order to assure that the best available methods will be adopted for the decommissioning and treatment of waste.

By Baku Nishio

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# Nuclear Plants Unfit to Withstand Impact of Aircraft Crashes

Since the events of September 11, we can no longer ignore the big question: Would nuclear facilities be able to withstand the impact of a large, fully fueled aircraft?

There are two matters to be addressed here: kinetic energy and chemical energy. First, by assessing the kinetic energy involved in a collision, the extent of damage caused by a large object crashing into a nuclear plant can be appraised. The other matter to be considered is to evaluate the extent of damage that can be done to facilities depending on the various forms that the chemical energy produced by aircraft fuel can take. It is relatively easy to make assumptions on the first issue on the basis of assessments or studies that have already been made. The second issue is not as straightforward because one key factor is extremely uncertain, complicating all hypothetical calculations: We cannot know beforehand which type of reaction — combustion, deflagration, explosion, or detonation — will be the main cause of damage. Reality can be very far removed from the results of laboratory experiments, with all their uncertain assumptions. The actual conditions in a real-life incident can produce diverse and unpredictable complications.

In what follows, I will discuss the minimum assumptions which should be taken into account in considering the likely impact of kinetic and chemical energy from an aircraft crash.

(1) Estimating kinetic energy

The kinetic energy Ek (in joules) of a mass (m) kilograms travelling with speed (v) meters per second is given by the formula:

$$Ek\ (J) = 1/2\ mv^2$$

In the court case fought over the legitimacy of the government's grounds for licensing the Uranium Enrichment Facility located at Rokkasho Village, Aomori Prefecture, one of the matters at issue was the safety of the facility in the event of an aircraft crash or a hit by missiles from the nearby U.S. Misawa army base and firing range. The ruling in this case will be handed down in March 2002. The two parties argued over whether or not damage would be caused if the engine of a phantom jet fighter (m = 20t, v = 150m/s) crashed into the facility's reinforced concrete walls.

The defendant's argument only evaluates the impact of a military fighter crash, but if a Boeing 747-400 (m = 375t) traveling at a speed of 916 km/h (= 254m/s) crashed into the facility, the kinetic energy produced would be about 54 times that of a phantom jet fighter:

$$(375/20) \times (254/150)^2 \approx 54$$

In court cases involving nuclear plants, the government has referred to an experiment conducted by the U.S. Sandia National Laboratories in which detailed data was collected on the impact of a F-4 Phantom (m = 12.7 t) traveling at a speed of 215m/s crashing into a 3.66m thick, $7m^2$ concrete block (1993). The government cites this experiment to support its argument that the walls of the nuclear reactor vessels can withstand aircraft crashes. The government also cites an experiment conducted in the former West Germany, in which a steel column (m = 1t) traveling at a speed of 222m/s was crashed into a reinforced concrete wall. The conclusion of this experiment was that if a wall is thicker than 70cm, it would withstand such a collision. Though accurate comparison cannot be drawn from these experiments, which were conducted under certain assumed conditions, if a Boeing 747-400 (m = 375t, v = 254m/s) crashed into, for example, the reactor building of Oi 3 (PWR, 1180MW), it can readily be assumed that the 110cm thick ceiling would be damaged.

(2) Evaluation of chemical energy

The chemical energy of aircraft fuel is;

$$4.2 \times 10^4 kJ \text{ per 1kg}$$

This is 10 times the chemical energy of high-quality TNT.

If it is assumed that the Boeing 747-400 is loaded with a full tank of 145t (= $145 \times 10^3$kg) fuel, the chemical energy of the fuel equals;

$$145 \times 10^3 \times 4.2 \times 10^4 \approx 6 \times 10^9 \text{kJ}$$

This is about five hundred times that of the aircraft's kinetic energy:

$$1/2 \times 375 \times 10^3 \times (2.54 \times 10^2)^2 \times 10^{-3} \text{kJ} \ (\text{J} = 10^{-3}\text{kJ})$$

$$\approx 1.2 \times 10^7 \text{kJ}$$

Indeed, compared with the kinetic energy of the Phantom cited by the government in the Aomori court case, the chemical energy of the above-mentioned fuel is about 25,000 times greater:

$$54 \ (\text{comparison of Ek}) \times 500 \approx 25{,}000$$

The assertion that the uranium facility could withstand a large-scale aircraft crash is shown by these calculations to be completely without support.

How much potential does chemical energy have to cause damage? Fuel can partially gasify and mix with liquid fuel to cause detonation. Ordinary combustion takes place with a combustion speed of between a few mm/s and a few cm/s; but detonation can far surpass the speed of sound (≈ 340m/s), traveling at an extremely high speed of a few km/s, and transmitting in an instant with a high-pressure and high-temperature shock wave. Most objects would be destroyed and melt from the high-temperature.

Steel embrittlement must also be taken into account. There are various types of special steel which can withstand high temperature and are used in the manufacture of boilers. When elements like Chromium (Cr), Molybdenum (Mo), Titanium (Ti), and Niobium (Nb) are added to steel, the permissible stress is improved by 100~150℃. However, it is not possible to prevent rapid decreases in permissible stress at temperatures of around 500~600 ℃ (see Fig. 1).

When all these factors are taken into account, it is clear that reinforced concrete cannot be assumed to be heatproof against detonation. There is an immeasurable difference between the destructive force of chemical energy produced by the most common process, combustion, and that released by a detonation process. Considering that, although about 6,000 people are assumed to be missing, fewer than 300 bodies have been

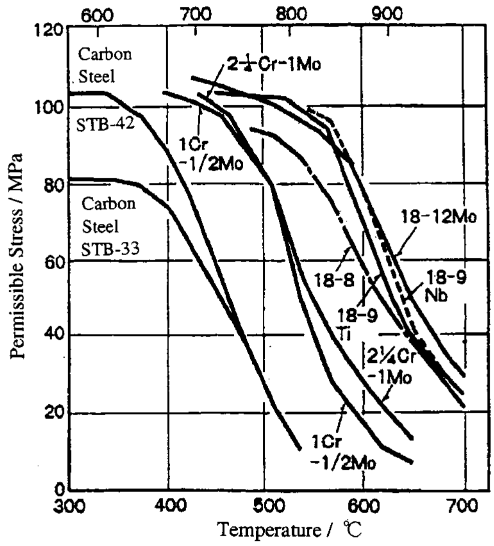



Fig. 1 Permissible stress of steel pipes for boilers*

recovered from the wreckage of the World Trade Center towers in New York, I cannot help suspecting that detonation took place. The buildings were made additionally vulnerable by the fact that they were constructed with a double tube structure similar to a bird cage, in which units of three stories were joined together with bolts.

In the Aomori court case, the defendant assessed the damage that could be caused to the nuclear facility if a jet fighter lost its thrust and crashed to the ground at a speed of 150m/s, and if the 4m$^3$ of fuel in the plane's reserve tank leaked into the uranium storage building, flowing down a floor that has a 1/100 slope, and catching fire. The defendant's conclusion was that because the fuel would burn up in about 2~3 minutes, 6 minutes at the most, the effects on uranium, stored in the facility in the form of uranium hexafluoride ($UF_6$), could be safely ignored. It is clear from the arguments presented in this paper that this is a wholly unconvincing conclusion.

Nuclear energy, which can only be obtained by the use of massive amounts of steel and uranium, is, to borrow A. Lovins' term, one of the "hard energy paths." September 11 incident demonstrated all too vividly that this form of energy production has a defenseless Achilles' heel. Surely it is time to develop our reliance on the "soft energy paths."**

By Yukio Yamaguchi

*Source: Iron and Steel Material, Japan Metal Society edit., Japan Metal Society, 1985, p.200
**Soft Energy Paths — Towards a Durable Peace, A.B. Lovins, Friends of the Earth, Inc. 1977

# Conference in Taiwan to Stop International Waste Shipments

From 2~4 Nov. 2001, an international conference on the export of high-level radioactive wastes, including spent fuel (SF) from nuclear plants, to Russia was held in Taiwan by Green Party Taiwan, whose members include University of Taiwan professors Kao Cheng-yen and Shih Hsin-min, as well as other people who have been calling for a nuclear phase-out for more than 20 years. The conference was held because, in July 2001, Russia's President Putin signed legislation amending a law to allow Russia to accept SF from abroad. In addition, the Russian Federation's Ministry of Atomic Power (Minatom) is applying great pressure on the government to accept SF from abroad, and Minatom says it has made arrangements to sign contracts with several countries by May 2002, with Taiwan seen to be the most likely of Russia's customers.

Conference participants included the Moscow-based environmental organization ECODEFENSE!, which considers radioactive wastes to be an important issue, Greenpeace International, the Korean Federation for Environmental Movement (KFEM), the Green Party Taiwan, and, from Japan, Green Action and CNIC. Participants from the US were also scheduled, but could not make it due to the September 11 attacks. These countries are all variously involved in the international storage of radioactive wastes.

Taiwan has a serious SF problem, and until now has dealt with it by considerably increasing storage capacity by "re-racking" (rearranging of storage racks. Apparently volume was doubled, but detailed data is lacking). Currently, a dry storage facility is under construction in the proximity of the 2nd nuclear plant (Kuosheng). The facility size is unknown, but the technology is American, meaning that there is no building; instead, dry casks are encased in concrete and stored outdoors. Taiwan's policy on final disposal states that a site will be chosen by 2016, and that it will begin operating in 2032. At that time overseas disposal will be one option.

In July 2000, the bill submitted by Minatom was adopted by the Russian government to allow acceptance of foreign SF. This bill "amends" art. 50 of Russia's Environmental Protection Law which prohibited the entry of foreign rad-wastes. This was made possible under the assumption that SF does not have to be considered as radwaste if it is imported with the assumption that it will be reprocessed to extract plutonium, a "fuel source." This was despite the fact that, according to a Russian polling organization, more than 90% of Russians are opposed to the amendment.

Minatom's current plan calls for the acceptance of 20,000 tons of SF from other countries, with a view to reprocessing it in 20 to 30 years. This would net Russia about $20 bil. in foreign currency. Domestic SF storage capacity must be increased in order to carry out this plan. The most likely site is said to be Krasnoyarsk-26. There is a plan to increase the storage capacity of this site, but even then the site will not be able to provide adequate storage space for Minatom's plan, and an additional facility must be built.

Minatom asserts that by next May it will sign contracts with a number of countries. Some of the income generated will go in the form of taxes to the local governments of the region that accepts the wastes, while some will pay for the decontamination of areas polluted in past nuclear accidents, and for the repair of neglected storage facilities for domestic SF. However, there are suspicions that funds may be diverted to projects more likely to provide financial benefits, such as building large storage pools, remodeling the Mayak Reprocessing Plant so it can process non-Russian model fuel, or building new plants.

America also has a possible role to play in regards to overseas storage of SF. In particular, attention should be paid to the actions that have been taken by a private organization called the Non-Proliferation Trust (NPT). This organization proposes to store SF temporarily until permanent storage becomes possible, and not to reprocess it. NPT is the customer and the contractor for this proposed scheme. It would manage the entire plan — including the transportation of SF and the construction of the storage facility. The aim is to strengthen the control of nuclear materials for non-proliferation purposes.

As Russia considers plutonium a resource, and plans to use it for the development of fast breeder reactors and as material for mixed plutonium-uranium oxide (MOX) fuel, the aims of NPT and Minatom are in conflict. But it has been pointed out that the Russian ministry, keen to gain foreign currency, will most likely take advantage of NPT's plan. Minatom could lawfully take on NPT's plan by extending the storage period of SF with the avowed purpose of future reprocessing even if it did not actually reprocess the fuel.

It is rather difficult to predict what future actions will be taken by Minatom and Taiwan Power Co. (Tai Power), which is solely responsible for the storage and disposal of rad-waste in Taiwan. The uncertainty is due to the fact that these organizations will most likely try to do business behind doors to avoid the predictable strong international protest that will be set off once contracts are signed and the transportation of rad-waste begins. According to reports in Taiwan, the head of the Ministry of Economic Affairs, Lin Hsin-yi, stated at a Congress session in April that the government was "negotiating with the U.S." over overseas storage of rad-waste. Taiwan imports all of its fuel from America and thus based on the U.S.-Taiwan nuclear agreement*, America's permission is needed for any kind of international transportation of Taiwanese SF. Scientists from America's Lawrence Livermore National Laboratory, high ranking officials of the country's Department of Energy, and representatives of the private organization NPT have been visiting Taiwan and South Korea since last year, and are actively promoting the storage of SF owned by those countries in Russia. At home they lobby the U.S. government to embrace this plan. Yet Taiwan's Atomic Energy Council explains that U.S. technicians regularly visit Taiwan, and did not come for any specific negotiations. Tai Power also admitted that they had received an offer from Minatom, but stressed that they are not involved in any negotiations with the ministry.

Tai Power has in the past signed a contract with North Korea to have the company's low-level rad-waste stored overseas (the company has already paid a portion of the cost to construct a disposal facility). The company also has an agreement with a Russian nuclear research institute, the Kurchatov Institute, but there are no concrete plans because Russia does not allow the import of rad-waste for the sole purpose of disposal. There is strong opposition to these plans in Korea as they would most likely involve the transportation of rad-waste through the East Sea (the Japan Sea). At this point the Taiwanese government is promoting the establishment of a domestic disposal facility, and it looks like it will not permit the export of rad-waste. Hsiao-Chio Island, under the jurisdiction of Kinmen Hsian, has been selected as a candidate for a disposal site and currently an environmental impact assessment is being conducted. However, the above mentioned contract with North Korea and agreement with the Kurchatov Institute remain valid, and overseas storage remains a highly likely option. Considering that Tai Power is actively trying to have its low-level rad-waste stored overseas, there is a strong possibility that Tai Power will become the first customer of Minatom for SF trade.

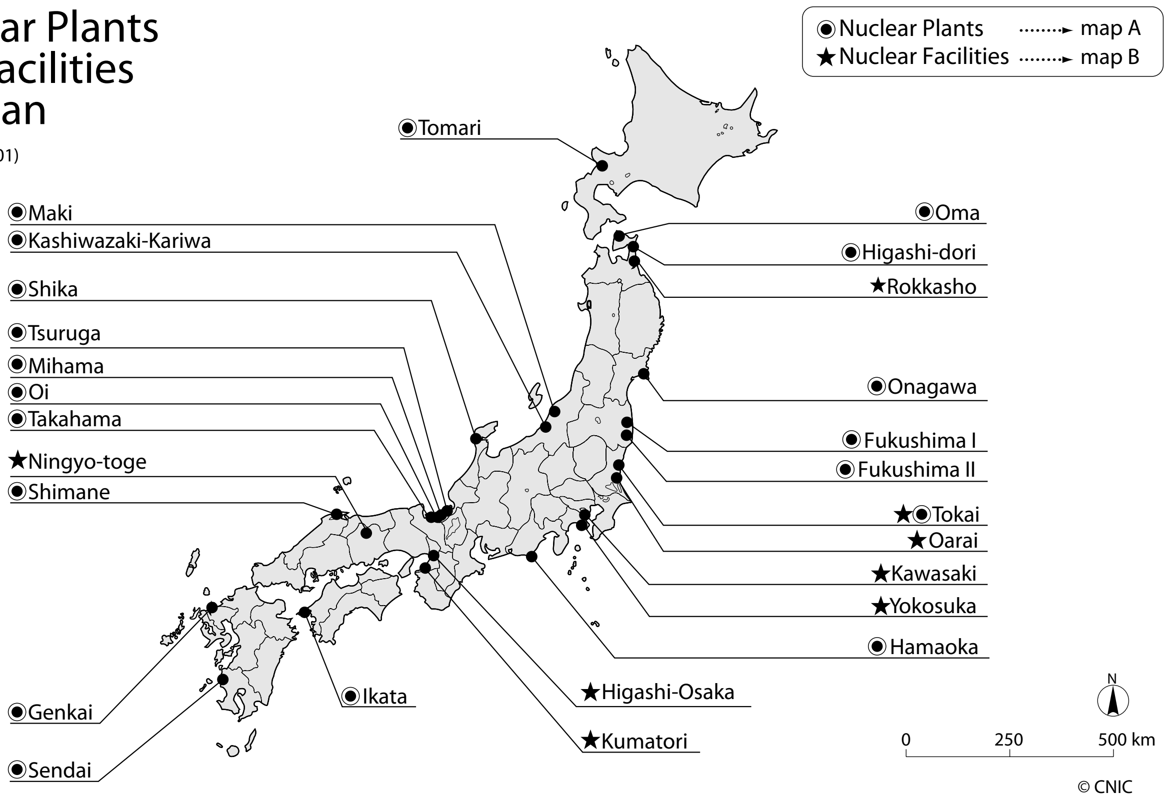
Japan's policy is to reprocess SF. It coincides with the Russian view, which considers plutonium as a fuel source. The storage capacity of the Rokkasho Reprocessing Plant currently under construction is not sufficient to accommodate the SF annually produced by Japan's nuclear plants. Thus the plan is to construct an off-site interim storage facility by 2010. In addition, there are powerful individuals in Japan who agree with NPT's plans. The possibility of Japan signing contracts with Russia and having SF reprocessed or stored cannot be ruled out.

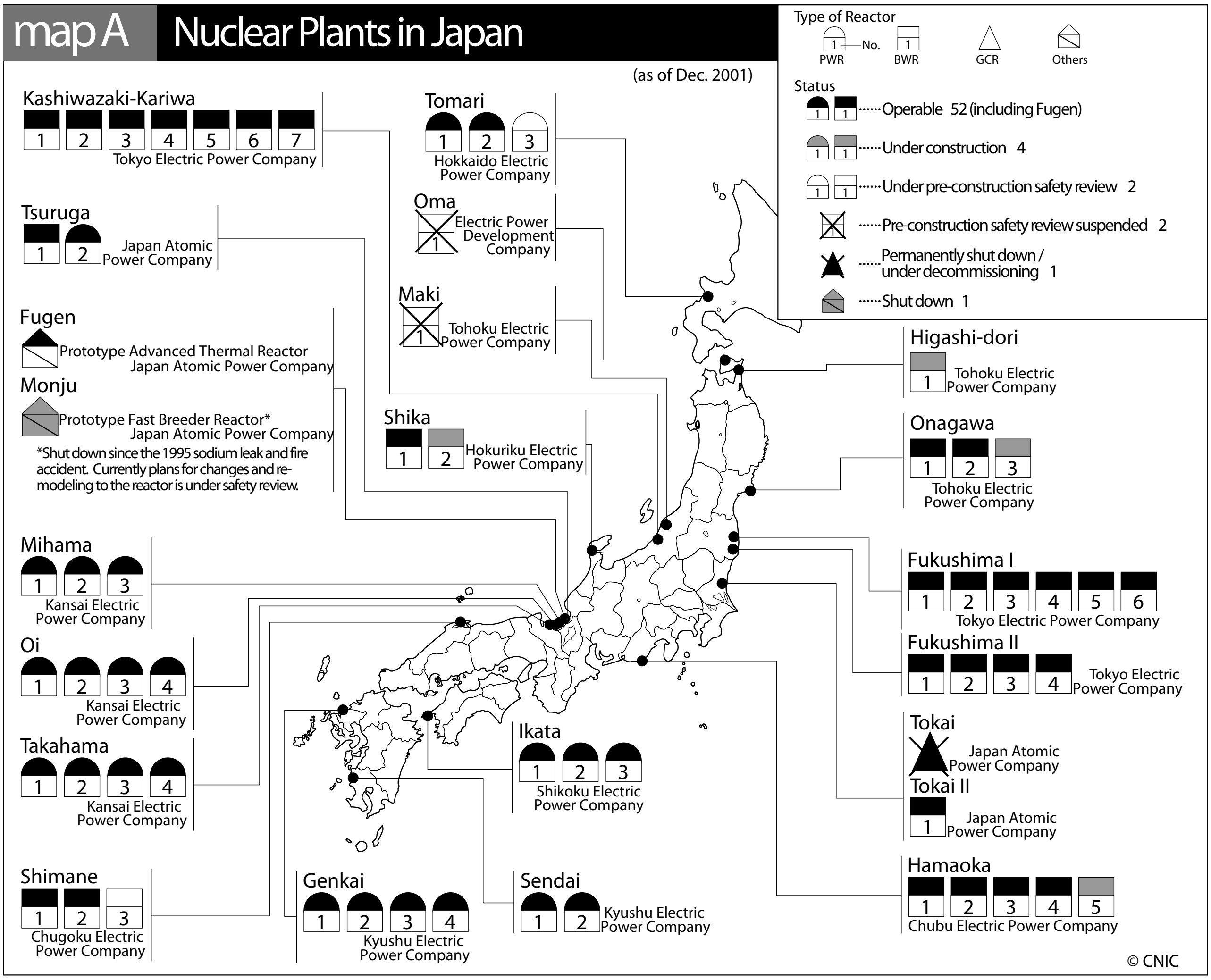
By Hideyuki Ban

*Full title is Agreement for Cooperation Between the Government of the Republic of China and the Government of the United States of America Concerning Civil Uses of Atomic Energy.

# Nuclear Plants and Facilities in Japan

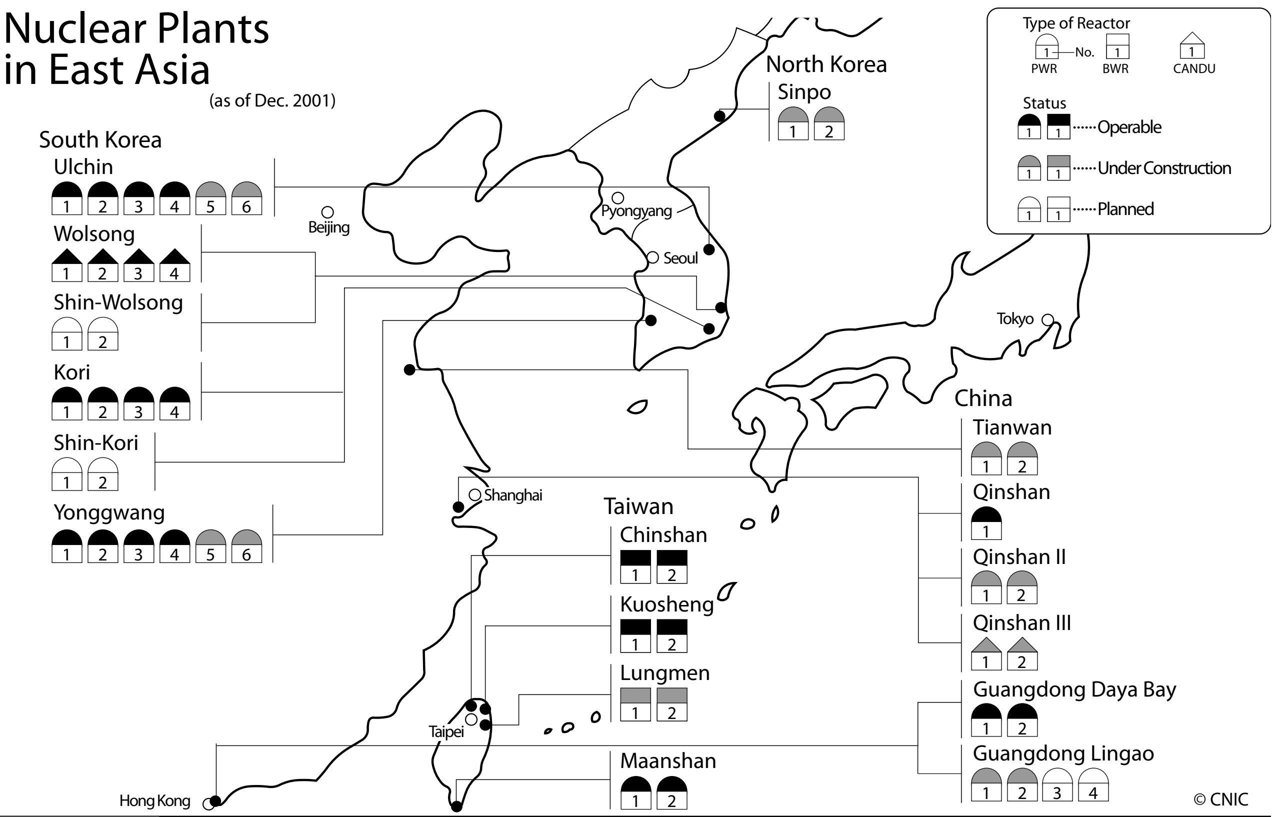
(as of Dec. 2001)



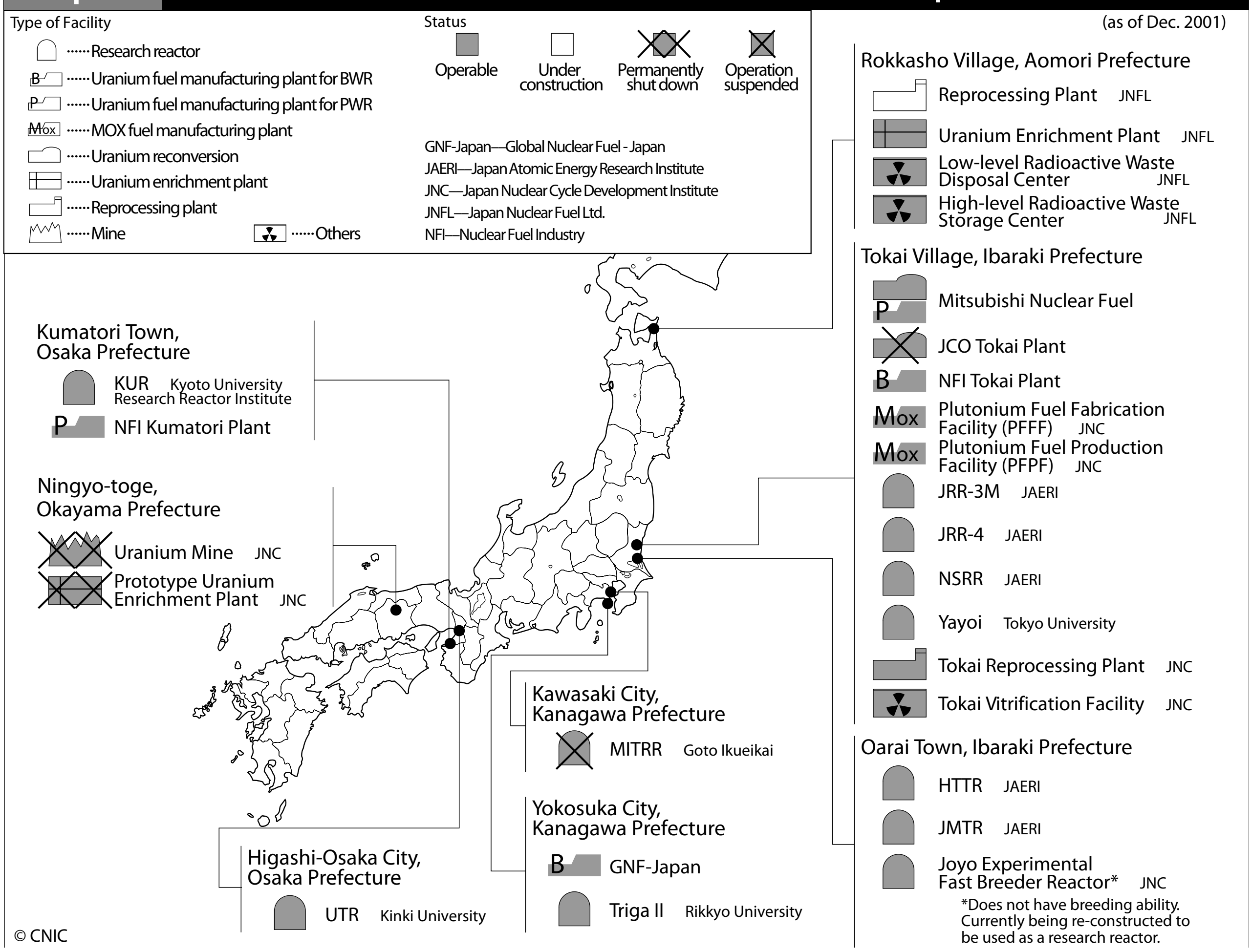
## Nuclear Plants in East Asia

(as of Dec. 2001)




## map B Commercial and Research Nuclear Facilities in Japan

(as of Dec. 2001)



## Anti Nuke Who's Who

# Yuko Yatabe

## An activist with mother's eyes

I first met Yatabe in Aug. 2000 at a lecture sponsored by the Japanese Chernobyl Foundation. She spoke from the perspective of a local resident and a mother, regretting that she couldn't protect her daughter from getting soaked in the rain when she returned home from school on the day of the JCO criticality accident. She stressed that the newly developed nuclear disaster response programs do not alleviate her regrets and concerns — the source of her activism. Her sensitive and honest speech appealed directly to the hearts of the audience that day.

Twelve years ago, Yatabe, her husband, and their two young children moved to Naka Town, next to Tokai Village. Her house is situated about 2km from the JCO plant. She recalls that she was indifferent to nuclear energy and never even considered the fact that she was living near Tokai village.

After the JCO accident, desperately wanting to do something, she organized a screening of a movie about the Chernobyl accident, "Village of Naja," directed by Seiichi Motohashi. Arranging this screening was quite a task as everything was new to her, but about 610 people came to the event, and she recalls being moved by a strong power she felt — perhaps the power of peoples' good will. After the screening, Yatabe and nine others who organized the screening formed a group, the "Circle of Naja". Naja, which means hope, was the main character's name in the movie. She enjoys the activities of the group, building friendship with concerned locals, talking with them, and learning from them. The feeling that she is moving forward keeps her going. However, she is also aware that there are many who cannot act as they want, restricted by Japanese traditions governing regional and familial loyalty.

Around Nov. 2000, a plan to have the International Thermonuclear Experimental Reactor (ITER) sited in Naka Town began to be promoted in earnest. Yatabe, who lives 1km away from the ITER candidate site, attended the promoters' explanatory meeting, wishing to learn about the ITER. The explanation there was that "the ITER will contribute to the town's development and to scientific progress in the world. Japan will gain global status by hosting this plant." She became ever more concerned about the project as the promoters only spoke about the positive aspects of the plan at this meeting. So she decided to set up a study group on the ITER.

This study group decided to conduct a survey of residents living within 3km of the ITER candidate site, visiting door-to-door for three days. Surprisingly, the survey revealed that about half of the respondents did not know what ITER was. She and a couple of others submitted the survey results to the town assembly, only to be criticized by the chairman of the assembly that they are disturbing the town's tranquility. When she related this story to other residents, she was criticized for slandering the chairman in public. But she was encouraged by others who said that, though it is not their way to stir up confrontation in a town where regional and blood relations are crucial, they still need to oppose the project. Thus opponents of ITER eventually began to collect signatures in support of their campaign. Within 10 days in early August, they collected over 1,700 signatures — a significant achievement.

Yatabe enthusiastically related to me her future plans to inform people of the dangers of the ITER. If the plan is abandoned, she then hopes to continue her efforts to plant seeds in children's minds to nourish critical thinking about the risks of nuclear energy. (By Hideyuki Ban. Based on an interview with Yatabe on 15 November, 2001)

# NEWS WATCH

## ECCS Pipe Rupture and Water Leak at Hamaoka 1

On 7th Nov. 2001, an emergency core cooling system (ECCS) pipe ruptured at Chubu Electric's Hamaoka 1 (BWR, 540MW). The ruptured pipe was located in the residual heat removal system (RHRS) which is connected to the high pressure coolant injection system (HPCI). The pipe ruptured apparently in an explosive manner, partially turned upwards, and another part of it shot off and broke into five fragments. The pipe had a 15 cm inside diameter and its surface was 11 mm thick.

The rupture occurred during a regular monthly test to confirm the HPCI's performance. The previous test was done on 3 October, when no problem was found. That means that there was no sign of a possible incident. The pipe is covered with insular materials, thus it is difficult to find cracks.

Hamaoka 1 is an aging reactor which began operation in 1976, but the ruptured pipe was put in place as a replacement in 1993. The Agency for Nuclear and Industrial Safety (ANIS) will conduct an emergency inspection of all BWR 4 type reactors that began operation around the same time. (For more details, see SPENA newsletter vol. 3, no.2, pp.13~15, or go to our web-site: http:// www.cnic.or.jp/english/)

## Overwhelming Majority Vote Against Nuke Plant in Miyama

On 18 Nov. 2001, a referendum asking whether to invite a plan to construct a nuclear plant was held at Miyama Town, Mie Prefecture. Voter turn out was 88.6%, and 67.2% of the votes (59.6% of the electorate) were cast against the plan. The referendum bill was proposed by nuclear promoters, and involved a plan that had not yet even been submitted to the Town by the Chubu Electric (see NIT 86, pp.15~16).

No doubt the recent incidents at the company's Hamaoka 1 influenced the residents' concerns over safety, but the overwhelming votes cast against the plan shows that residents had had strong doubts about nuclear energy regardless of what had happened at Hamaoka.

## Sanctions to be Lifted on India, Pakistan

On 26 Oct. 2001, the Japanese government announced that it will lift the economic sanctions which had been imposed on India and Pakistan for conducting nuclear tests in 1998. This move aims at promoting Japan's cooperation with the U.S. and Britain's attack on Afghanistan. The government also announced its plan to consider new relief measures for these countries.

The government says that "there is no change in Japan's nuclear weapons non-proliferation policy" and that Japan requests the two nations "to take absolute measures to prevent nuclear weapons from being passed into the hands of terrorists," but the recent move proves that the government virtually approves of nuclear proliferation.

## Fire at JNC s Joyo Reactor

On 31 Oct. 2001, fire broke out at the maintenance building of Joyo, an experimental fast breeder reactor (FBR) located in Oarai Town, Ibaraki Prefecture, and owned by the Japan Nuclear Cycle Development Institute (JNC). The fire was started in a waste basket used to dispose paper towels. The paper towels that caused the fire had been used to wipe up sodium, and should have been disposed of in a separate designated waste basket. It is very likely that the sodium reacted to water and ignited.

## Rokkasho or Naka? - The Candidate Locations for ITER

On 18 Oct. 2001, an advisory committee of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) compiled its final report on the survey it had conducted concerning possible sites for the International Thermonuclear Experimental Reactor (ITER) which Japan has been considering to have it built in this country. Three municipalities have voiced their willingness to be a site for this project: Tomakomai City in Hokkaido Prefecture, Rokkasho Village in Aomori Prefecture and Naka Town in Ibaraki Prefecture. According to the report, the evaluation of these three municipalities showed that Naka Town got 4.3 points out of 5; Rokkasho Village 4.1 points; and Tomakomai City 3.5 points. Naka Town gained the highest point but only by a narrow margin. Aomori Prefecture has been very aggressive, claiming that it would provide the land free of charge and accept the disposal of radioactive waste to be produced from the ITER. Rokkasho is also putting pressure on the central government, saying that unless it is chosen as a candidate site for the ITER, it will not approve the construction of the planned MOX fuel plant. Therefore, it is hard to predict which site will be chosen.

However, the government has postponed its decision on whether Japan should introduce an ITER into the country. The government has to pay an estimated 700 billion yen or more for this project, and there is considerable caution in ministerial circles about this expensive and complex endeavor.

## Oma Nuclear Plant Plan Temporarily Suspended

On 24 Oct. 2001, the Electric Power Development Co., Ltd. (EPDC) made a request to ANIS to temporarily suspend the pre-construction safety review for the Oma nuclear plant (ABWR, 1383MW, full MOX), which EPDC plans to construct in Oma Town, Aomori Prefecture. ANIS accepted the request. EPDC claims that “it is not a freeze” but a “ temporary suspension” because the owner of a piece of land in the planned site refuses to sell it. However, the landowner openly stated that she would never sell the land.

The green house for strawberries on the piece of land at Oma planned site which the owner refuses to sell. The land is located right where the reactor core is to be built. August 2001. (Photo by Noriko Yanakita)

This is the second case of a temporary suspension of a pre-construction safety review. The safety review for Tohoku Electric’s Maki nuclear plant (BWR, 825MW) has also been “suspended temporarily” for 18 years. That delay is partly due to the result of the referendum held in Maki Town in August 1996, in which the majority voted against the plan. A long-term “temporary suspension” of the Oma nuclear plant also seems inevitable.

## Toshiba and GE Form Equal Partnership

Toshiba has revised the technical cooperation agreement (TCA) that it had concluded with the General Electric Co. in the field of nuclear power, and agreed to form an equal partnership with the American company. The revision can be explained by the fact that there has been no new plant construction for more than 20 years in America, and thus GE, which has hardly any production facilities for heavy machinery in the U.S., has to rely on Toshiba for production technology.

A similar equal partnership was formed in Jan. 2001 between Mitsubishi Heavy Industries, Ltd. and Westinghouse Electric Corp. of America.