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Reorganization of Japanese Nuclear Industry



Cartoon by
Shoji Takagi

While the international nuclear industry was busily reorganizing itself into a more oligarchical structure, Japan alone managed to retain three nuclear power plant makers, Mitsubishi Heavy Industries (MHI), Toshiba Corp and Hitachi Ltd.. But extraordinary things happened within Japan's nuclear industry in 2006. The drama began with Toshiba's take-over of Westinghouse (WH). On 26 January 2006, Toshiba was chosen by British Nuclear Fuels Ltd (BNFL) as the preferred bidder. Agreement was reached between Toshiba and BNFL on February 6th and the take-over was completed on October 17th. Marubeni, one of the original partners in the deal, later withdrew, leaving Toshiba to make up the difference. In the end, Toshiba paid the astronomical sum of \$4.2 billion for its 77% stake in WH. The US-based Shaw Group and Ishikawajima-Harima Heavy Industries (IHI) were the other partners, paying \$1.08 billion (20%) and \$162 million (3%) respectively. The total purchase price of \$5.4 billion compares with \$1.2-billion paid by BNFL for Westinghouse in

1999.

Since Toshiba completed its purchase of WH, events have unfolded at a dizzying pace. On October 19th MHI and France's Areva, both PWR makers, announced a strategic partnership. MHI also began negotiations with GE. Then, on November 13th, remaining BWR makers Hitachi and GE announced a partnership which effectively merges their nuclear businesses. One could be forgiven for thinking that the waves from the reorganization overseas had finally reached Japan. However, that would not necessarily be an accurate interpretation of the changes that have taken place. The reorganization of the international nuclear industry was originally a move away from nuclear energy, a contraction of the industry. By contrast, the reorganization of the Japanese nuclear industry comes in the context of predictions of expansion, of a so-called "nuclear renaissance". This might sound like good news for the nuclear industry. However, as the Toshiba take-over of WH starkly shows, if these predictions turn out to be wrong, the losses will be huge. The current reorganization could actually prove to be very dangerous for the Japanese nuclear industry.

State of the industry

The shrinking market in Europe and the US meant that WH and GE were unable to win enough contracts to maintain their technological skills and they lost their ability to independently manufacture nuclear power plants. However, the situation in Japan is slightly different. In its 8 August 2006 report, *New National Energy Strategy: Nuclear*

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Energy Nation Building (hereafter referred to as *Nuclear Nation Building*), the Nuclear Energy Subcommittee of the Advisory Committee for Natural Resources and Energy explains the situation as follows:

Because construction of new [nuclear power plants], albeit few in number, has continued, Japan's manufacturers have an overwhelming advantage in technology for design, manufacture and construction and there is a strong industry base capable of supplying the supporting core components. (p.24)

The report continues:

However, in regard to domestic and international market strategy, because hitherto the focus was on the domestic market, the response to the international market has been slow, and the reality is that international recognition of reactors developed by Japan is not high.

Consequently, Japanese makers seeking to expand internationally team up in various ways with foreign companies that already have brand recognition. Having taken over WH, Toshiba still hopes to continue its cooperation with GE in order to win US orders for ABWRs (Advanced Boiling Water Reactor), which it developed jointly with Hitachi, GE and BWR users such as Tokyo Electric Power Company. MHI's partnership with Areva includes joint development of medium-size reactors and in October it also began discussions regarding cooperation with GE, including a joint tender to uprate the power output of the Laguna Verde BWR in Mexico. According to *Denki Shimbun* (15 November 2006), it is also keen to gain GE's cooperation in obtaining license approval in the US. Apparently the idea is for MHI to manufacture major components for contracts won by Areva, while GE takes responsibility for license negotiations. Meanwhile, it is expected that a contract effectively merging the nuclear businesses of Hitachi and GE will be formally concluded around June 2007. Hitachi and GE will jointly invest in new companies in Japan and the US. The American company (GE 60%, Hitachi 40%) will aim to win contracts in the US, while the Japanese company (Hitachi 80%, GE 20%) will fabricate the major components.

This all sounds very positive, but the prospects are not necessarily as bright as they seem. The first problem is that breaking into the international market inevitably entails the risks associated with developing new reactor types. Japanese companies independently developed the US-APWR (MHI)

and the AB1600 (Toshiba), because they wanted to avoid the license problems associated with joint development with GE and WH, but there is no guarantee that these designs will ever be taken up. In regard to development of a next generation light water reactor, while the Ministry of Economy, Trade and Industry (METI) acts as number one cheer leader, the nuclear power companies are unable to provide the leadership that they did in the past. Instead, as METI admits, "Plant makers will play the leading role." (*Nuclear Nation Building*, p. 92)

In fact, integration of the industry was one of the original objectives of development of a Japanese third generation reactor. There were questions about the need for three Japanese plant makers. Efforts to integrate the three companies' nuclear businesses have waxed and waned over the years. In February 2002, with a view to fielding an all-Japan team to export nuclear reactors to Vietnam, MHI, Toshiba and Hitachi formed a joint consultative committee on Japan-Vietnam cooperation within the Japan Atomic Industrial Forum. Also in February 2002, MHI and Hitachi agreed to cooperate on basic technology common to BWRs and PWRs. The final area where integration was contemplated was development of a third generation reactor, but the reorganization of the nuclear industry has thrown all this into confusion. The upshot will be that next-generation versions of both PWR and BWR will have to be developed. This will place an additional burden on each of the companies.

Component manufacturers, which according to *Nuclear Nation Building* form "a strong industry base capable of supplying the supporting core components", are also facing difficulties. Many have already gone bankrupt and others have withdrawn from nuclear manufacturing, complaining of low returns and the specialized nature of the orders (*Nihon Keizai Shimbun*, 14 January 2005). This trend is likely to continue if increased competition between plant makers leads to further demands for cost reductions. And mass retirements, which are expected in the near future, will shake the foundations of both plant and component manufacturers alike. So on closer inspection, before getting too carried away by the juicy offerings from the international nuclear power market, a strong dose of caution is in order.

International and domestic demand

(a) Europe

The 28 December 2006 edition of *Denki Shimbun* carried the following headline: "ABWR a

candidate for new nuclear construction in Britain / business opportunity for Japanese companies". The article continued, "Some British nuclear industry leaders have high hopes of Japanese companies. One such leader said that he hopes Japanese nuclear plant makers will bring components manufacturers with them and build factories in Britain. If this happens, Japanese plant makers will be able not only to sell nuclear power plants in Britain. They will also be able to use their British factories as a base from which to enter the European market." While it is true that the UK government is favorably disposed towards nuclear power, it is not the government that will pay for new plants. That will be left to the nuclear power companies. But where is this demand for Japanese nuclear plant makers which will bring parts manufacturers with them and build factories in Britain coming from? Demand in Europe is virtually non-existent, so these comments should be seen for what they are: a classic case of counting your chickens before they hatch.

(b) Russia

The top page of the 1 January 2007 edition of the Yomiuri Shimbun said that Russian state-run company Atomprom is seeking to link up with Toshiba and IHI to develop the nuclear power industry in Russia. If a tie-up is agreed, the Japanese companies will manufacture and supply steam turbines and generators to Russia. The scenario being considered is very similar to the UK example, only in this case Russia would become a base from which to expand into countries of the former Soviet Union. A more realistic assessment is that this was a typical New Year's day article, with lots of congratulations, but not much substance.

(c) China

On 16 December 2006 China selected WH as preferred tenderer for four AP1000 reactors. That will be pleasing news for Toshiba, but the lack of resolution of nuclear safeguards issues between China and Japan might force WH to look elsewhere for component fabrication. Originally WH intended to source components from MHI, but according to Platts Nucleonics Week (14 December 2006) MHI might be replaced by South Korea's Doosan Heavy Industries & Construction Co. Ltd.. WH's deal with China came after demands for major cost reductions and technology transfer. Even if WH produces the first four reactors, China will build subsequent reactors itself. Moreover, in the words of Denki Shimbun, "Depending on the technology transferred by WH, it is possible that Chinese companies,

having mastered AP1000 technology, will flood into the newly created world market." (19 December 2006) These conditions appear to have frightened off Areva, WH's main competitor in the bidding.

(d) US

That leaves the US as almost the only possible foreign market. The nuclear power companies there appear to be dancing to the tune of the Bush administration's nuclear-first policy. However, after the Democrats' win in the mid-term elections, banks began to squeeze credit for new nuclear construction. In fact, Wall Street didn't wait to see the outcome of the elections. It was skeptical about nuclear power well before that. In its 10 July 2006 edition Business Week pointed out that informed investors knew that the incentives on offer for new nuclear construction were insufficient. Nuclear power companies are asking the states for additional incentives, but this just puts these states in an embarrassing position.

(e) Japan

It would seem then that the reorganization of the Japanese nuclear industry, premised as it was on an expanding international market, is on shaky ground. But there are also other problems. Hitachi is now facing compensation claims associated with damaged turbines at the Hamaoka-5 and Shika-2 ABWRs (see NIT 113 & 115). On December 26th Chubu Electric and Hokuriku Electric sought consultations with Hitachi regarding the cost of repairs and loss of income incurred because of the need to make up lost capacity using thermal and other power plants. This case illustrates the point that the relationship between power companies and makers has changed. The days of ever-increasing electricity demand are over and liberalization of the electricity market has made power companies more cost conscious. When old reactors are retired, replacements will not necessarily be nuclear and there is no guarantee that power companies will buy any new-generation reactors that might be developed.

Conclusion

Future generations will probably conclude that the industry should have contracted gracefully when it had the chance.

Nishio Baku (CNIC Co-Director)

Japanese Nuclear Industry Eyes New Nuclear Power Plants in Asia

Proponents of nuclear energy claim that the world is on the verge of a nuclear renaissance. The Japanese nuclear industry is pinning its hopes on Asia. Six Asian countries already possess nuclear power plants: Japan, South Korea, China, Taiwan, India and Pakistan. All of those countries have new plants under construction and all except Taiwan have plans for more plants. Indonesia and Vietnam do not yet have nuclear power plants, but they are believed to be very close to making a decision to introduce nuclear power. Table 1 shows the current situation for Asia as a whole. The numbers for planned and proposed plants are rather vague in some cases and the term "under construction" can be defined in various ways, so this list should not be taken to be precise.

There is fierce competition for contracts to construct new nuclear power plants in Asia. New construction contracts for China have been delayed, but on 16 December 2006 a memorandum of understanding was signed with Westinghouse for four AP1000s. Toshiba, which bought Westinghouse last year, is rejoicing, but the position of Mitsubishi Heavy Industries (MHI), which was a partner in the original bid, is unclear. There have been reports that South Korea's Doosan Heavy Industries & Construction Co. Ltd.

may replace MHI as the component fabricator¹. Although Vietnam and Indonesia have not yet made final decisions to introduce nuclear power, foreign governments and companies are going to great lengths to help them put the necessary systems in place. The following comment comes from a special on Vietnam in the October 2006 edition of the Japanese journal *Energy Review*:

"It is believed that the country which carries out the feasibility study (FS) will be in a very favorable position and lively competition has already begun. So far seven countries have expressed interest: France, South Korea, Russia, India, China, Canada and Japan." (p.22)

Vietnam is proceeding cautiously. It is taking a long time to finalize the plan and one gets the impression that those hoping to sell reactors are feeling frustrated. Indonesia is just the opposite. Despite the fact that no formal decision has been made to introduce nuclear power, statements keep popping up that suggest that they are in a rush to get started. For example, the schedule currently being proposed would involve calling tenders in 2008 and finalizing a contract by 2010. However, it will not be possible to meet this schedule unless legal, safety and safeguards systems, as well as the necessary skilled labor force are in place. Table 2

Table 1: Asian Nuclear Power Plant Plans

Country	Operable	Under Construction	Planned or Proposed	Comment
Japan	55 (49.6 GW)	2 (2.3 GW)	11 planned (14.9 GW)	
South Korea	20 (17.7 GW)	1 (1 GW)	7 planned 27 GW by 2017	
China	10 (8 GW)	4 (4 GW)	40 GW by 2020	
Taiwan	6 (5.1 GW)	2 (2.7 GW)		Current government does not promote nuclear energy.
India	16 (3.9 GW)	6 (2.9 GW)	40 GW by 2030	Has not signed NPT.
Pakistan	2 (0.5 GW)	1 (0.3 GW)		Has not signed NPT. Negotiating with China for more reactors.
North Korea				Withdrew from NPT. Construction of 2 x 2 GW reactors halted with dissolution of KEDO.
Indonesia			4 proposed (4 GW)	Refer table 2.
Vietnam			2-4 proposed (2-4 GW)	Refer table 2.
Malaysia				Conducting comparative energy study, including nuclear. Considered nuclear energy in the past also.
Thailand				Plans which emerged in 1970s and 1990s did not proceed. Nuclear is included in Energy Department's draft plan.
Philippines				Construction of 620MW reactor in Bataan was completed in 1984, but it has never operated.

shows the history and future plans for the nuclear programs of Vietnam and Indonesia. As with Table 1, the future plans should not be taken to be precise.

Before the 1997 Asian financial crisis there was a plan to build a nuclear power plant on the Muria Peninsula of Central Java (see map). This plan has resurfaced. Also the Korea Atomic Energy Research Institute is proposing to build a small-scale "Smart" reactor for desalination on the island of Madura off the north-east coast of Java, although Indonesia does not appear to be particularly enthusiastic. Besides these proposals, in October 2006 a proposal suddenly emerged for Russian electricity trading company Raoues to develop a floating nuclear power plant off the coast of Gorontalo Province on Sulawesi Island. It is claimed that the 70MW plant could be built

in just 20 months. Fortunately, the Indonesian government has not yet approved the plan.

The Japanese government and nuclear industry have great expectations of participating in the construction of new nuclear power plants in Asia. Shin'ichi Mizumoto of the Agency for Natural Resources and Energy made the following comment:

"Until around 2030, when the predicted period of large-scale construction begins in Japan, the number of nuclear power plants built in Japan will decrease. International development of Japan's nuclear industry is an effective way to maintain the depth of the industry's nuclear technology and skilled labor."²

Hopes are particularly high for Vietnam and Indonesia. When the Prime Ministers of Vietnam and Indonesia visited Japan in October and November 2006 respectively, joint prime ministerial

statements were issued agreeing to promote cooperation in nuclear power development.

In order for Vietnam and Indonesia to introduce nuclear energy, it will be necessary for them to prepare their non-proliferation, regulatory and indemnity systems and to develop their labor force. The Japanese government takes the view that "clearly demonstrating a positive attitude towards providing support, from the stage when the various systems are being put in place, will promote the involvement of Japan's nuclear industry in those countries."³

The government therefore decided to send experts to both countries. The Japan External Trade Organization (JETRO) was commissioned to carry out the project. JETRO is now carrying out a comprehensive survey of the current situation in regard to each country's plan to introduce nuclear power.

Raising finance will be difficult for countries which do not yet have nuclear

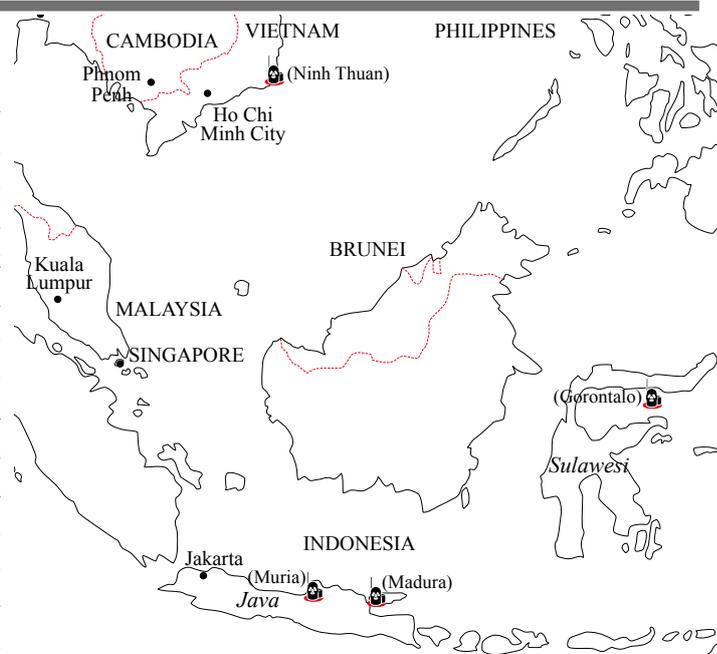
Table 2: Nuclear Power Plans for Indonesia and Vietnam

	Indonesia	Vietnam
History to December 2006	1964: first research reactor goes critical (currently 3 operating) 1965: National Nuclear Energy Agency of Indonesia founded 1991-96: FS (by KEPCO subsidiary NEWJEC) 1997 (April): Nuclear Energy Law established 1997: Muria (Jepara) nuclear plan suspended due to Asian financial crisis 2004: National Energy Policy includes nuclear as an important future energy source	1963: research reactor goes critical (built with US assistance, restarted with Soviet assistance after north-south united) 1976 (April): Vietnam Atomic Energy Commission founded 1992: visit by Japan Atomic Industrial Forum delegation 1994 (July): Vietnam Agency for Radiation and Nuclear Safety and Control founded 1996: joins FNCA 1997-99: feasibility research (Ministry of Industry et al) 2002 (Aug.): began pre-FS (with support from Japan Consulting Institute and Japan Atomic Industrial Forum) 2003 (Nov.): pre-FS completed (submitted to Prime Minister in August 2005) 2006 (Jan.): Prime Minister endorses nuclear long-term plan
Future Projections*	The following dates relate to the Muria nuclear power plant plan?: Cabinet decision 2008~10: tender and contract process 2010~12: commence construction 2016~17: commence operation By 2025: 4 GW	2007: submit pre-FS to parliament 2015: commence construction By 2020: begin operation of first plant (1GW) By 2020: 2~4 GW (5-9% of total capacity)
Candidate Sites	Muria (4x1GW), Madura (100MW), Gorontalo (70MW)	Ninh Thuan (4x1GW)

FNCA: Forum for Nuclear Cooperation in Asia (led by Japan)
FS: Feasibility Study

*The data in this table is based on various sources including those listed below. Future projections vary depending on the source.
Indonesia: Fabby Tumiwa, "Reemergence of Indonesia's Nuclear Power Plans", *Indonesia Alternative Information*, April 2006, Network for Indonesian Democracy, Japan (dates adjusted based on communication with the author)
Vietnam: *Energy Review*, December 2006

power plants, such as Vietnam and Indonesia. The policy of the Japanese government is to help these countries solve this problem. "There is a high likelihood that raising finance will become a bottleneck...so Japan should continue to provide positive support...in the form of export finance through Nippon Export and Investment Insurance (NEXI) and Japan Bank for International Cooperation (JBIC)."⁴ JBIC has provided finance in the past for nuclear-related projects. Table 3 shows the projects for which it has provided support since 1990.⁵ (Of course, there have been cases of Japanese nuclear-related exports which did not receive finance from JBIC.) Since April 2002, when JBIC's *Guidelines for Confirmation of Environmental and Social Considerations* were introduced, the nuclear-related projects for which financial support has been provided have all been assessed as "likely to have minimal or no adverse environmental impact" and classified accordingly as "Category C". Whereas JBIC's *Guidelines* make no mention of nuclear power, the OECD's *Recommendation on Common Approaches on Environment and Officially Supported Export Credits* classifies most nuclear power projects as Category A, on the grounds that they have "the potential to have significant adverse environmental impacts". *Common Approaches* is not binding on



OECD countries, so in order to ensure that Japan gives due consideration to the environmental and social impacts of nuclear facilities, JBIC should amend its *Guidelines* to make specific reference to nuclear power.

As the number of nuclear power plants being built in Japan decreases, it will be difficult for Japan to "maintain the depth of the industry's nuclear technology and skilled labor" from contracts for nuclear power plants in Asia alone. The roles played by Toshiba, Hitachi and

Table 3: Export Credit Awarded by Japan Bank for International Cooperation Since 1990

Year Approved	Country	Loan Recipient	Details	Value	Category*
1991	China	Mitsubishi Corporation	Guangdong (Transformer)	300 million yen	—
1993	Indonesia	NEWJEC Inc.	Muria F/S	700 million yen	—
1997	China	Mizuho Corporate Bank and Tokyo Mitsubishi Bank	Qinshan III	\$89 million	—
1997	China	China State Development Bank	Qinshan III	\$134 million	—
1997	Mexico	Comision Federal de Electricidad (CFE)	Laguna Verde (exchange parts for turbine generator)	30 million yen	—
1997	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	20 million yen	—
1999	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	80 million yen	—
2000	KEDO	Korean Peninsula Energy Development Organization	Light Water Reactor	116.5 billion yen	—
2000	China	Mitsubishi Heavy Industries	Qinshan II (primary coolant pumps)	1.3 billion yen	—
2000	China	Mitsubishi Corporation	Qinshan II (gas insulating switches)	2 billion yen	—
2000	China	Mitsubishi Corporation	Qinshan III (gas insulating switches)	2.2 billion yen	—
2000	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	80 million yen	—
2001	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	30 million yen	—
2001	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	50 million yen	—
2002	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	20 million yen	—
2002	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	20 million yen	—
2003	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	20 million yen	—
2004	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	50 million yen	C
2005	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	40 million yen	C
2006	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	20 million yen	C
2006	Mexico	CFE	Laguna Verde (exchange parts for turbine generator)	20 million yen	C

* Since October 2002, when *Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations* came into effect.

MHI during 2006 in the reorganization of the international nuclear industry show that they have their eyes on the world market. However, in view of the considerable influence Japan has in Asia, particular attention should be given to Japan's involvement in the Asian market. It is important to keep track of the support provided by the Japanese government and nuclear industry to Asian countries seeking to develop nuclear energy. In particular, projects in which JETRO, JBIC and NEXI are involved should be watched closely. It is also important to provide information on the problems of and alternatives to nuclear power.

Nuclear energy in Asia is a big topic and it will be quite difficult to exert influence on the actors involved, but it is a topic that anyone who is interested in Asia's energy structure cannot ignore. Rather than worry about the magnitude of the topic, it is probably better to grasp the opportunity to strengthen and expand the anti-nuclear network.

Philip White (NIT editor)

References

1. *Nucleonics Week*, Vol. 47, No. 50, December 14, 2006
2. *Energy Review*, October 2006, p.10
3. *Program to Support the Introduction of Nuclear Power in the Asian Region* (part of the explanatory documents for the Ministry of Economy, Trade and Industry's 2006 Budget Proposal). 5.5 million yen allocated for the 2006 Fiscal Year. Program runs for 5 years from 2006-2010.
4. *New National Energy Strategy: Nuclear Energy National Building*, Report of the Nuclear Energy Subcommittee of the Advisory Committee for Natural Resources and Energy, 8 August 2006, p.111
5. Data released by JBIC on 28 November 2006 in response to a request by the office of House of Councillors Member, Mizuho Fukushima.

Haiku for the season

*Young grass sprout
Coming out of the chilly earth
Under the fallen leaves*

by Toshishige Aoki

Continued from page 12 lowered, while at others the intake temperature was raised, indicating that the data was falsified independently at each plant and that data falsification was routine practice.

In addition, it was discovered that all of the power companies owned hydro-electric power stations at which repairs had been carried out without the necessary approvals and data on alterations to dams, thickness of feedwater pipes, etc. had been falsified.

Mihama-3 restarts

On January 10th, Kansai Electric Power Company (KEPCO) restarted its Mihama-3 reactor (PWR, 826 MW). Operations had been suspended since 9 August 2004, when steam from a ruptured pipe killed 5 workers and injured six others (NIT 102, 103, 106). According to media reports, police intend to lay charges against several KEPCO employees for professional negligence.

Japan and US announce nuclear cooperation plan

Japan's Minister of Economy, Trade and Industry, Akira Amari, and US Secretary of Energy, Samuel Bodman, have announced a plan for cooperation on energy security. In a statement released on January 9th, DoE described the nuclear component of the plan (which it said would be completed by April 2007) as follows:

"The United States and Japan will jointly develop a civil nuclear energy action plan that will provide a framework for collaboration. The plan will place focus on: (a) research and development activities under the Global Nuclear Energy Partnership initiative that will build upon the significant civilian nuclear energy technical cooperation already underway; (b) collaboration on policies and programs that support the construction of new nuclear power plants; and (c) regulatory and nonproliferation-related exchanges."

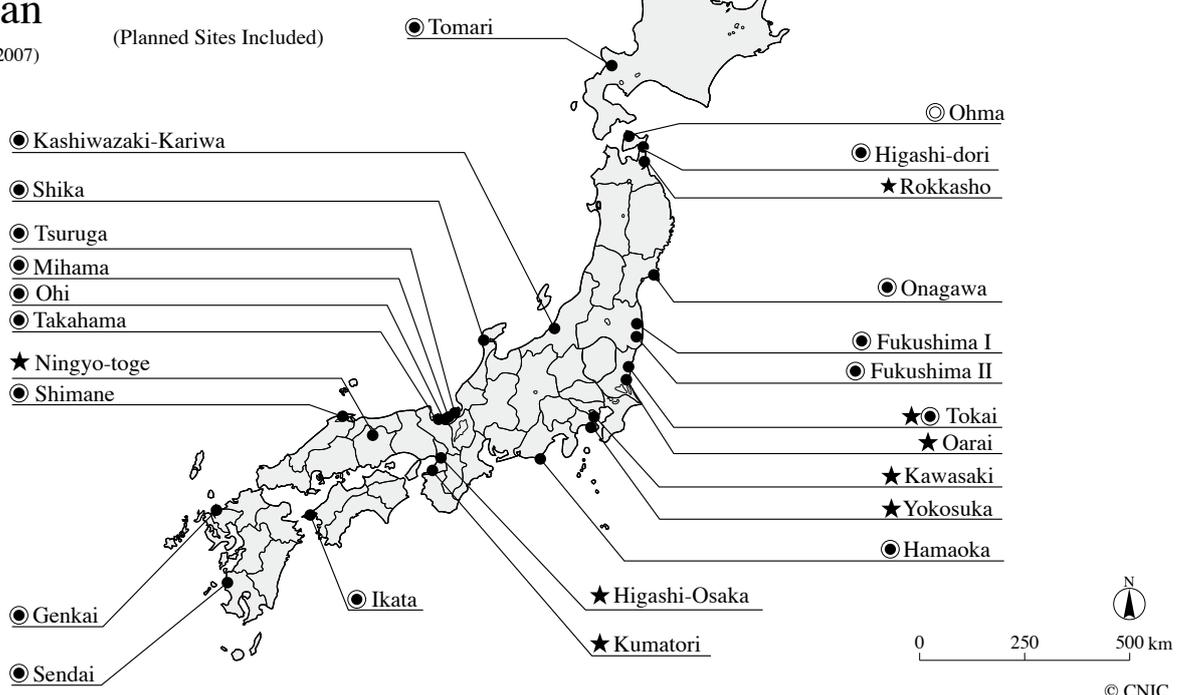
Though not mentioned in DoE's press release, media reports claim the deal will allow Japan to offer trade insurance to Japanese companies investing in the construction of nuclear power plants in the United States.

Nuclear Plants and Facilities in Japan

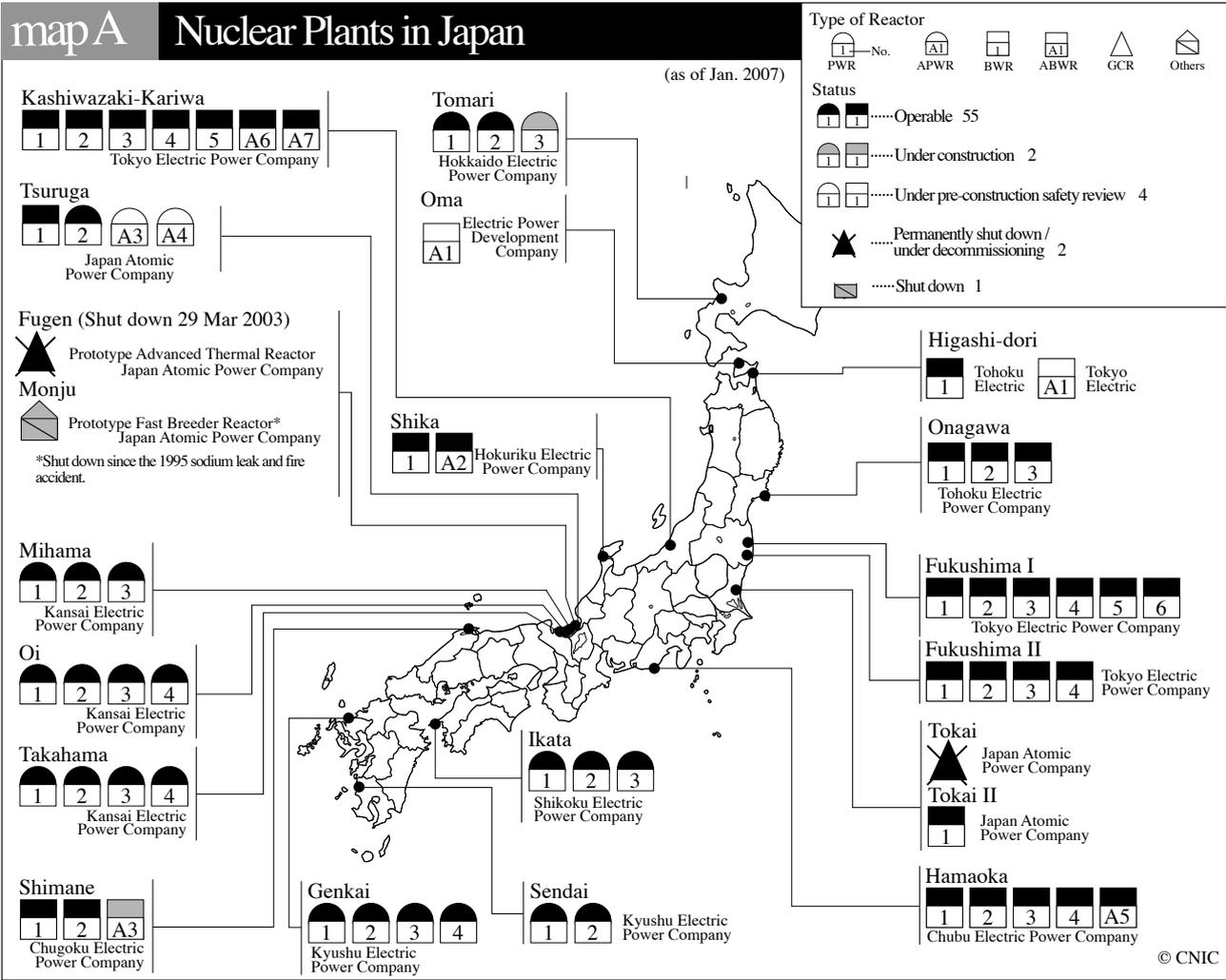
(as of Jan. 2007)

(Planned Sites Included)

● Nuclear Plants map A
 ★ Nuclear Facilities map B

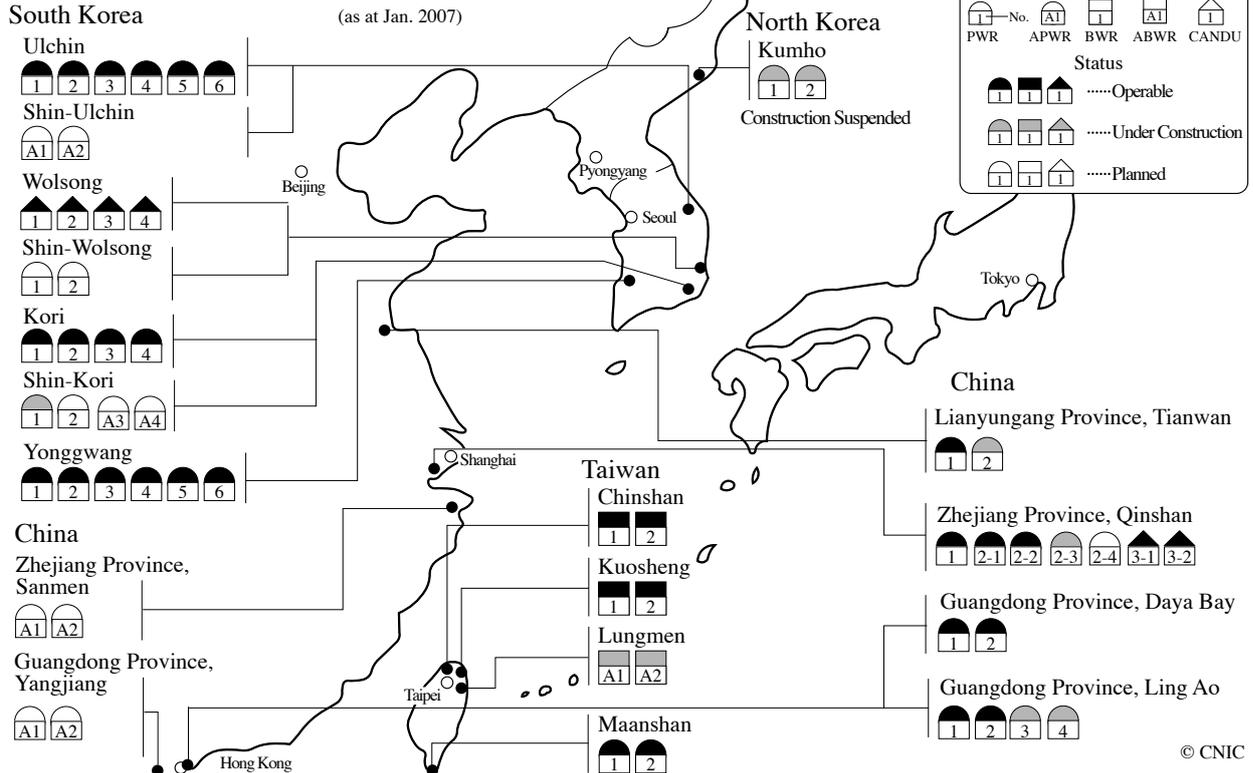


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Nuclear Plants in East Asia

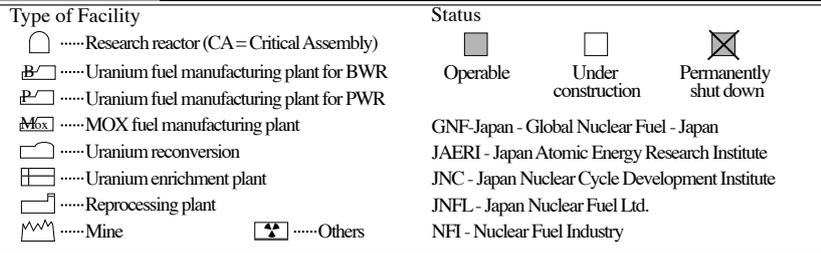
(as at Jan. 2007)



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map B Commercial and Research Nuclear Facilities in Japan

(as of Jan. 2007)



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

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

- Tono, Gifu Prefecture**
 Uranium Mine (JAEA)

- Kawasaki City, Kanagawa Prefecture**
 NCA (Toshiba)

- Yokosuka City, Kanagawa Prefecture**
 B GNF-Japan

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

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

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

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

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Group Introduction:

KO-OK Productions: radiation is not OK

by Shigeki Kobayashi and Yuko Oki

Our company, KO-OK Productions, is a film production company run by the two of us: Shigeki Kobayashi and Yuko Oki. KO-OK is short for Kobayashi-Oki.

We became involved with the anti-nuclear movement two years after Chernobyl when we were working with a group of friends to bring the 1987 German documentary "Spaltprozesse" to Japan. Produced by Denkmal-Film, "Spaltprozesse" means "nuclear fission process," and the documentary depicts the protest of residents against the Wackersdorf nuclear reprocessing plant. During a two-year period, the documentary was screened at over two hundred places throughout Japan. Since then, whenever we can squeeze time in between our regular work, we make documentaries and film footage focusing on nuclear issues, such as the problem of nuclear waste. We have made a number of short films which have been shown to the public. Not only have we shot in Rokkasho Village, Aomori Prefecture, where plans for Japan's nuclear fuel reprocessing plant continue unabated, we have also shot in Tokyo, the center of government and the place where national nuclear policy is ultimately determined.

Since 1997, we have attended public hearings in Tokyo held by the (former) Science and Technology Agency, the Ministry of Economy, Trade and Industry (METI), and the Japan Atomic Energy Commission. Whenever possible, we have filmed the proceedings. We were able to film the meetings in which discussions leading up to the "Framework for Nuclear Energy Policy" (Japan Atomic Energy Commission) took place. Our main purpose was to observe and witness what was discussed and how it was discussed, and to make this information public. During our filming, it was clear to us that the Commission members, including the academic specialists, displayed no sensitivity to the critical problem of radiation.

With each passing minute, more and more radiation is being emitted into our natural environment, where it continues to accumulate. Sources of this radiation are multiple: from Rokkashomura, from the waste produced at nuclear power plants across the country, and even from medical institutions such as hospitals and



laboratories. The question is, what are we going to do about this? Who will take responsibility for the long-term problems which are being created? These questions are for both the supporters of nuclear power, who have caused these conditions, and for members of the general public, who must live with the consequences. To question the issues of nuclear power and radiation is to consider the hidden oppressive nature of our society and to question the manner in which our present civilization has developed. We believe such questions call for a re-thinking of education, for it is education which connects this generation to the next.

Our everyday work consists of making public relations videos for companies and films concerning children's issues for schools. In 2003 we produced a documentary film set in a nursery school entitled "Eat, Grow, Raise, Cultivate." We are currently working on a sequel which will further explore issues of food and agriculture. The theme will be "an environment where children can grow, and people can live." Cut off from the earth, people cannot survive, life cannot be sustained. Needless to say, the theme of our film is connected to the problems posed by radiation.

"Living creatures do not know [how to handle] radiation. In the billion-year long history of life on our planet, living creatures have not developed the ability to identify and expel radiation from their bodies." It is from this perspective that we are committed to continue making films that examine the threat of nuclear power and radiation.

NEWS WATCH

HLW dump developments

Over four years have passed since the Nuclear Waste Management Organization (NUMO) called applications for candidate sites for a high-level radioactive waste dump. There is still no official candidate, although on several occasions municipalities have shown signs of applying, only to be forced to back down in the face of local opposition.

Following this pattern, on 6 December 2006 the mayor of Yogo Town in Shiga Prefecture announced that he had given up the idea of submitting an application. The reason was that a petition opposing the dump signed by over half of the residents had been lodged with the local council the day before. In fact, the mayor never intended to accept a HLW dump. He stated publicly that his intention was simply to allow a study to be carried out, so that Yogo Town could be listed as a candidate and receive a subsidy from the government. Whether or not they say so publicly, this is the intention of many of the mayors who consider submitting applications.

The HLW dump saga took another extraordinary turn when, on 15 January, it was revealed that the Mayor of Toyo Town (Kochi Prefecture) had actually submitted an application to NUMO on 20 March 2006. However, NUMO refused to accept it as an official application, because he had not first sought endorsement from the local council.

In other developments, a few members of the Tsushima City Council in Nagasaki Prefecture have set up study groups and it is reported that the mayor of Higashi-doori Village in Aomori Village is interested in submitting an application.

Opposition to impact assessment for HLW dump

On 30 November 2006 the governor of Iwate Prefecture and the mayor of Tono City expressed their opposition to the Japan Atomic Energy Agency's (JAEA) plan to conduct boring to a depth of approximately 400 meters from the middle of

December as part of an impact assessment for geological disposal of HLW. The assessment was commissioned by the Nuclear and Industrial Safety Agency and the purpose is to collect data to help establish standards for the government's safety regulations. JAEA explained that the purpose was not to select a HLW dump site and once again sought the cooperation of Tono City, where the boring was to be carried out. The mayor responded by submitting a written request for boring to be cancelled. On the same day the local council passed a resolution demanding that the boring be cancelled immediately.

Another line stops at Rokkasho uranium enrichment plant

On 30 November 2006 another line of the Rokkasho uranium enrichment plant stopped operating, bringing the number of lines which have stopped to five. The plant has seven lines, each with a capacity of 150 tSWU, but only two are still operating. The first line commenced operations in 1992. The intention was that by 2004 ten lines would be operating with a total capacity of 1,500 tSWU. However, centrifuges broke down one after the other and the first line was forced to stop operating in 2000. Since then more lines have stopped operating before completing their 10-year design life.

Japan Nuclear Fuel Ltd. (JNFL) is developing a new type of centrifuge and plans to introduce it in 2010. Until then JNFL intends to continue operating with just two lines, but it continues to stick to its original intention of eventually operating at a capacity of 1,500 tSWU. On November 24th JNFL announced that it plans to test a cascade of the new type of centrifuges in 2007.

ITER related facilities to be built in Rokkasho

On 21 November 2006 Japan, USA, Russia, China, South Korea, India and the EU signed an agreement for the implementation of the International Thermonuclear Experimental Reactor (ITER) project. The following day Japan and

the EU provisionally signed a draft agreement titled "Broad Approach". The previous week, on November 16th, the first step was taken towards construction of the Aomori International Fusion Energy Research Center when a site (Iyasakatai in Rokkasho Village) was selected just across the road from the Rokkasho reprocessing plant. It is expected that the Japan Atomic Energy Agency (JAEA) will be chosen to manage the center. "Broad Approach" is a joint project between Japan and the EU and the cost for the first ten years (estimated at 92 billion yen) will be divided equally between them.

Toshiba runs course on nuclear power in Vietnam

An intensive course on nuclear power, subsidized by Toshiba, was held for the first time from October to November 2006 at the Hanoi University of Technology (HUT). Classes were held two days each week for six weeks for a total of 28 hours. Participants included nineteen students and researchers from HUT, seven staff members and researchers from the Vietnam Atomic Energy Commission, and five people from the Vietnam Agency for Radiation and Nuclear Safety and Control. The course covered a wide range of issues including the following: the international situation in regard to nuclear power; the basic physics of nuclear power; an outline of the nuclear fuel cycle; and construction, operation, maintenance and regulation of nuclear power plants.

Toshiba boasted that it has also established a permanent classroom in HUT's Institute of Engineering Physics, furnished with 26 computers, a projector and reference materials, in order to provide a good study environment.

FNCA pushes nuclear power in Asia

On 27 November 2006 the Forum for Nuclear Cooperation in Asia (FNCA), which is led by the

Japanese government, held a ministerial meeting in Kuantan Malaysia. All countries agreed to a Japanese proposal that a new panel be established to discuss cooperation in the area of nuclear power in Asia. Japan undertook to provide the secretariat for the panel. The panel will consider the following topics: securing safety, assuring nuclear security, developing human resources, carrying out PA activities, implementing financial planning, evaluating economic efficiency, and developing the foundation for nonproliferation.

Participants also agreed that nuclear power should be discussed as part of the Clean Development Mechanism of the Kyoto Protocol at conferences held among signatory nations to the Framework Convention on Climate Change.

While previously FNCA's focus was solely on radiation applications, in 2004 a panel was established on the "Role of Nuclear Energy for Sustainable Development in Asia" to carry out basic discussions about nuclear power generation.

FNCA is made up of ten countries: Japan, Australia, Bangladesh, China, Indonesia, Malaysia, the Philippines, South Korea, Thailand and Vietnam. This time Bangladesh participated for the first time as an official FNCA member.

Pattern of data falsification

On 15 November 2006 it was revealed that a computer program used by a Chugoku Electric thermal power plant had been altered to reduce the temperature difference shown between intake and outflow water. Subsequent checks of all nuclear and thermal power plants revealed similar alterations at seven reactors at the following nuclear power plants: Kashiwazaki-Kariwa (Tokyo Electric), Fukushima I (Tokyo Electric), Onagawa (Tohoku Electric), Tsuruga (Japan Atomic Power Company), Ohi (Kansai Electric). At some the outflow temperature was *Continued on page 7*

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