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Citizens' Nuclear Information Center

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Three Years Since the Chuetsu-oki Earthquake

"We don't need the Kashiwazaki-Kariwa Nuclear Power Station"

On the afternoon of August 28, 300 people from around Japan gathered at a meeting in Kashiwazaki City hosted by the "Citizens' Group to Protect Life and Home Town from Nuclear Power Plants". Three years since the July 16, 2007 Niigata Chuetsu-oki Earthquake, Units 7, 6 and 1 have been restarted (in that order), but the local residents protest the way in which Niigata Prefecture's technical committee has handled the matter. They point out that it did not properly debate the issue. Instead, throughout the whole process it worked on the assumption that the plants would be restarted. An inspiring march was staged to protest the fact that the nuclear power plants were restarted even though safety was not assured and citizens' anxiety about accidents was not allayed. The march gave expression to the participants' shared belief that we have entered an era of worldwide transition in the energy field.

In the morning, about a hundred people turned up to see a new film (Japanese title: "*Mitsubachi no haoto to chikyu no kaiten*" = "*The sound of the honeybee's wings and the revolution of the earth*") by Kamanaka Hitomi (see NIT 130). The film has two strands, one following the lives of people in Europe pursuing new renewable energy paths and the other showing the struggle of the people of Iwaishima (see NIT 125), whose lifestyles are threatened by the planned construction of the Kaminoseki Nuclear Power Plant (see NIT 133). The audience included not only opponents of nuclear power, but also local people from a study group considering ways to coexist with the Kashiwazaki-Kariwa Nuclear Power Plants.

The keynote speaker at the afternoon meeting was Professor Koichi Hasegawa, an environmental social scientist at Tohoku University Graduate School. His presentation was entitled, "Is nuclear energy the answer to global warming?" He answered this question by saying that a policy which relies on nuclear energy will inevitably lead

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to an increase in CO_2 emissions and that we must promote efficient use of energy and renewables. He gave the example of Kuzumaki Town in Iwate Prefecture, which has been highly successful as a "milk, wine and clean energy town". He also presented the situation of wind power throughout the world and criticized the Japanese government's inadequate policy for promoting renewable energy.

Three people delivered appeals about major problems associated with the Kashiwazaki-Kariwa Nuclear Power Plant. Kazuyuki Takemoto (see NIT 111), representing three local groups opposed to nuclear power, reported on key problems related to ground condition; I explained the situation regarding the integrity of equipment and seismic safety on behalf of the *Group of Concerned Scientists and Engineers Calling for the Closure of the Kashiwazaki-Kariwa Nuclear Power Plant* (see NIT 123); and Chie Takakuwa of *Niigata Women Thinking about Life and Nuclear Energy* (see NIT 135) spoke about the problems of Niigata Prefecture's technical committee.

Ongoing deliberations about Unit 5

When the previous issue of NIT went to press KK-1 had not yet recommenced commercial operations and deliberations had not finished. There were discussions about the operation of valves and the lack of seismic safety leeway for control rods. However, the central government's Nuclear Safety Commission gave the go-sign on July 29 and Tokyo Electric Power Company (TEPCO) resumed commercial operations on August 4, three and a half months after TEPCO submitted its application for permission to Niigata Prefecture, Kashiwazaki City and Kariwa Village. There was no meeting between the governor and the mayors and there was no public meeting to explain the restart to the residents. In the past Niigata Prefecture had held such meetings, but this step was omitted this time. Now three of the seven reactors have resumed commercial operations (Units 1, 6 and 7).

In regard to KK-5, we reported in the previous edition of NIT that eight groups had submitted open questions to members of the subcommittee dealing with equipment integrity and seismic safety regarding cracks in the reinforced concrete walls of the turbine building. They submitted further questions under three headings on August 11, after totally inadequate discussion of their original questions by the subcommittee at its July 7 meeting. These questions can be summarized as follows:

1. What would the shear stress be during a design basis earthquake (606 Gal) and an earthquake which the plant is supposed to be able to withstand after seismic reinforcement (1,000 Gal) on those reinforced concrete parts that exceeded the seismic movement that they were supposed to be able to withstand at the time of the earthquake (442 Gal).
2. Is the estimated shear strain at which cracks will form (0.25×10^{-3}) appropriate?
3. Is TEPCO's crack width assessment standard (1.0 mm) appropriate?

The subcommittee considered these questions on August 30. TEPCO gave an arbitrary response to number three and was requested to provide further information.

It was revealed in photos taken photos three days after the earthquake by the Nuclear and Industrial Safety Agency (NISA) that movement indicators of spring hangers and constant hangers (from which pipes are suspended) in KK-5 exceeded their design range. Subcommittee member Masahiro Koiwa submitted questions in relation to this matter. Debate is continuing between Koiwa and TEPCO about this matter. Koiwa is asking whether the aftereffects of the earthquake remained in the pipes suspended from these hangers and that this resulted in residual strain, which caused the movement indicators to exceed their range. TEPCO refuted Koiwa's suggestion, but its reasoning was vague and further discussion of this issue was rolled over to future meetings.

The process is for the subcommittee to put together a report on the arguments and submit it to its parent committee, the technical committee. The governor makes his judgment about restart based on advice from the technical committee. Already four drafts of the report on Unit 5 have been submitted to the subcommittee for discussion. Subcommittee member Kotaro Kuroda, in particular, has pointed out the defects of these drafts.

With citizens submitting questions, subcommittee members actively taking up the debate and reservations about the draft report, the way forward for KK-5 is shrouded in mist.

Yukio Yamaguchi (CNIC Co-Director)

Accident at Monju

3 ton fuel loading device dropped into reactor

An accident occurred on August 26 at the Monju Prototype Fast Breeder Reactor (280 MWe) in Tsuruga City, Fukui Prefecture. Full details have not yet emerged, but it seems that it was quite serious. As usual, notification to the local authorities was late. On August 27 the Nuclear and Industrial Safety Agency (NISA) demanded a report on the cause of and response to the accident, including "the circumstances of the event, the impact on equipment, and the reasons for the time required for notification".

According to the announcement by Japan Atomic Energy Agency (JAEA), which owns and operates Monju, at 14:48, while removing a relay device used when replacing fuel, the device dropped back into the reactor vessel. No radioactivity was detected, so it is assumed that the fuel was not damaged.

When fuel is replaced in light water reactors the reactor head is removed, but in the case of Monju that is not possible, because the sodium coolant must not come into contact with air. New fuel is first inserted through the reactor head through a relay device into a relay rack beside the fuel assemblies in the reactor core (see diagram). Next, a fuel replacement device moves the new fuel from the relay rack to its allotted place. The process is reversed to remove the spent fuel.

Since Monju resumed test operations on May 6, it has undergone the first stage of testing. These core confirmation tests were completed on July 22. Preparations are now being made for the next stage, which involves increasing power output to 40%. As one of the preparatory tasks, replacement of 33 fuel assemblies was begun on August 11 and completed on August 17.

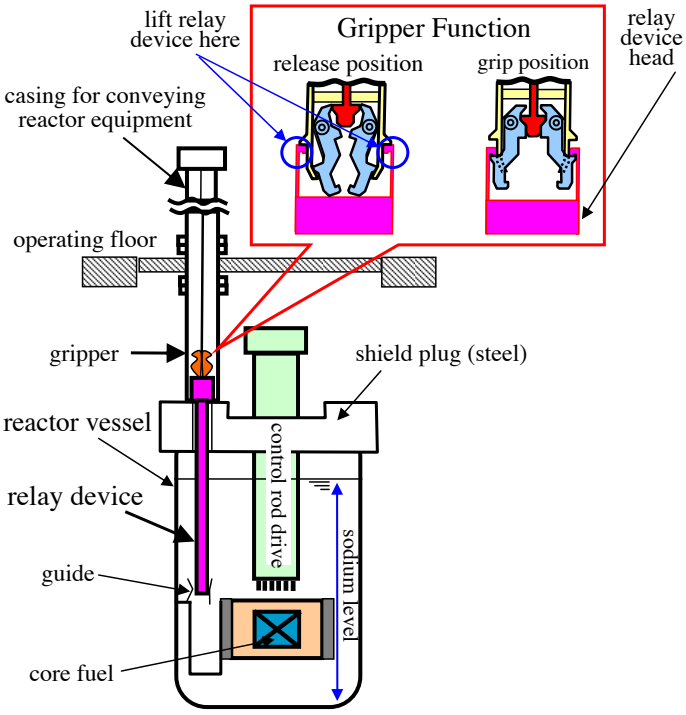
During operation, the abovementioned relay device is usually taken out of the reactor as a precaution in case of earthquakes. The accident occurred when the relay device was being removed after the fuel had been replaced.

According to JAEA's announcement, when the device had been lifted about 2 meters, there was a sudden loss of load and a sound. The relay device is cylindrical in shape, 55 cm in diameter, 12 meters long and weighs 3.3 tons. Investigations using a fiberscope inserted through the reactor head showed that the grippers that hold the relay device came loose due to rotation of their axis. JAEA says this is the reason why the device fell, but no reason has been given why the grippers' axis rotated.

One would imagine that there could be serious problems with the lower part of the relay device as a result of the fall. There is a revolving rack attached to the bottom of the relay device and there is equipment to guide fuel into the relay rack. If these were damaged, one would expect that repairs would take a long time. It is not possible to remove the sodium to check the situation and, since sodium is opaque, there are limits to what can be discovered with video cameras. It is likely to be some time before details emerge, or even before an investigation method is established.

Increasing power output to 40% was supposed to begin around June 2011, but presumably this will be delayed. Besides the abovementioned replacement of fuel, preparations include inspection of disassembled water and steam system equipment and replacement of exhaust ducts in which corrosion and holes were discovered. Only makeshift measures were taken to address the exhaust duct problems before Monju was restarted.

Hideyuki Ban (CNIC Co-Director)



Two year delay for Rokkasho Reprocessing Plant

On September 10 Japan Nuclear Fuel Ltd (JNFL) announced that the commencement of commercial operations of its Rokkasho Reprocessing Plant would be delayed by two years from October this year to October 2012. This is the eighteenth time the start date has been delayed. The reason for the delay is a series of problems and accidents during testing of the process of vitrifying high-level radioactive liquid waste. All the other tests have been completed, but unless the two vitrification furnaces can achieve a production capacity of 1,000 glass canisters per year, the plant cannot begin commercial operations.

JNFL says that the first 18 months of the extension period will be spent on activities including fitting thermometers to the vitrification furnaces and comparing operational data from a mock up facility (KMOC) in Tokai Village which is conducting experiments vitrifying an imitation of the radioactive liquid waste produced at the Rokkasho plant.

So far all the vitrification tests at Rokkasho have used Vitrification Furnace A, but glass and other material have become stuck in the furnace. JNFL now wants to begin testing Vitrification Furnace B and conduct "hot tests" (using real high-level liquid waste) in both furnaces from April 2012.

However, it is completely unclear when it will be possible to resume testing of the Vitrification Facility. No matter how well comparison of the KMOC data goes, since KMOC is not using the strong heat and radiation generating highly radioactive liquid waste produced at the Rokkasho Reprocessing Plant, the problems involved are not the same. JNFL's attempts to gather new data from KMOC since testing of the Rokkasho plant came to a standstill are bound to fail. They only go to show that the development of the vitrification furnaces was a total failure in the first place. JNFL needs to reconsider the fundamental design and development of the vitrification furnaces.

Testing of the vitrification furnaces has been a vicious circle in which one problem has led to another. Due to its lack of technical ability, JNFL has only been able to respond to problems in a haphazard fashion. To deal with the sedimentation of platinum group elements at the bottom of the vitrification furnace it inserted a stirring rod, but the stirring rod bent and in the ensuing confusion a brick was dislodged from the ceiling of the furnace (NIT 128). As attempts were being made to overcome the problem, about 150 liters of highly radioactive liquid waste leaked and evaporated within the cell (NIT 129). No doubt there will be more problems in future and JNFL will end up chasing its tail as it tries to respond to them, while the real tests are pushed further and further into the future.

It is hard to read any technical logic into the two-year period of the delay. Rather, it seems to have more to do with the fact that the spent fuel pools at Japan's nuclear power plants can just manage to get by without sending spent fuel to Rokkasho for a period of two years. Rokkasho's spent fuel storage pools are almost full. As at September, 2,776 tons of spent fuel was already stored in the pools, which have a total capacity of 3,000 tons. (See page 5.)

The two-year delay will have a severe impact on the finances of Rokkasho Village. Rokkasho Village expects to receive about 2 billion yen in fixed assets taxes in the first year the plant begins commercial operations. The figure will gradually decrease thereafter. It is four and a half years since active testing of the Rokkasho Reprocessing Plant began on March 31, 2006 and almost three years have passed since testing of the Vitrification Facility began on November 5, 2007. Now completion of the tests has been pushed back another two years. This small village made all sorts of plans on the assumption that it would receive huge taxation income from the reprocessing plant, but now it is forced to reconsider its finances.

At the same time as announcing the delay, JNFL announced that it was making third-party allocations of new stocks worth a total of 400 billion yen. The thirteen recipients are the nine electric power companies that operate nuclear power plants, plus Japan Atomic Power Company, Hitachi, Toshiba and Mitsubishi Heavy Industries. A September 14 article published on the English web site of *The Denki Shimbun* (*The Electric Daily News*) made the following comment:

> "As of March 31 this year, JNFL's equity ratio was about 7.5%. Its financial position was weak for an enterprise executing the nuclear fuel cycle as a matter of national policy, and

Continued on page 18

Construction of Interim Spent Fuel Storage Facility Begins

On August 31 the Recyclable-Fuel Storage Company (RFS), established jointly in 2005 by Tokyo Electric Power Company (TEPCO - 80%) and Japan Atomic Power Company (JAPCO - 20%), began construction work on its "Recyclable Fuel Storage Centre", a spent fuel interim storage facility located in Mutsu City, Aomori Prefecture. The facility is scheduled to begin operations in July 2012. As electric power companies wrestle with the problem of what to do with their spent nuclear fuel, this will be the first centralized away-from-reactor interim spent fuel storage facility in Japan.

The fuel cycle program promoted by the Japanese Government has been marking time as a result of problems at the Monju Prototype Fast Breeder Reactor (see page 3) and the Rokkasho Reprocessing Plant (see page 4). Even if the Rokkasho Reprocessing Plant operates at full capacity, reprocessing 800 tons of spent fuel a year for 40 years from 2012 as planned, it is clear that of the spent fuel that will be generated at nuclear power plants during that period, Rokkasho will be unable to reprocess over half (30,000 ~ 40,000 tons).

RFS plans to accept spent nuclear fuel generated at nuclear power plants owned by TEPCO (currently 17 plants: 7 at Kashiwazaki-Kariwa, 6 at Fukushima I, 4 at Fukushima II) and JAPCO (currently 2 plants: 1 each at Tsuruga and Tokai). The same casks will be used for shipping and storage and they will be cooled using a natural cooling method.

The facility will eventually have two storage buildings with a total capacity of about 5,000 tons. The first building, which has just begun construction, will have a capacity of about 3,000 tons, or 288 casks. The period for which the spent fuel may be stored at the facility is 50 years for each building, but since the second building will not be built for another 10 to 15 years, the maximum storage period for the facility as a whole will be about 65 years.

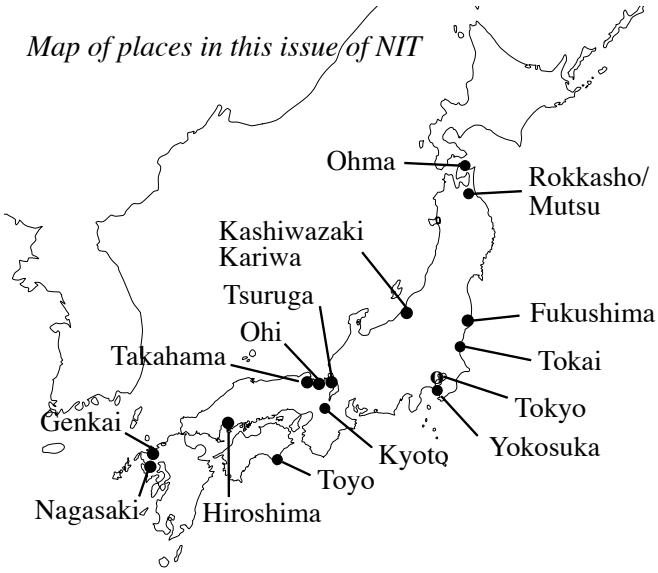
The facility is now scheduled to begin operations before the Rokkasho Reprocessing Plant, after commercial operation of the latter was delayed by 2 years (see page 4). Therefore, even if startup of the reprocessing plant is delayed again, TEPCO and JAPCO should not have a problem storing their spent fuel. Looked at from another perspective, commencement of construction of the interim storage facility made it possible to delay the startup of the reprocessing plant by two years, and TEPCO, the biggest holder of spent nuclear fuel in Japan, for the time being does not need the Rokkasho Reprocessing Plant.

A major reason why the interim storage facility has proceeded relatively smoothly is that Mutsu City had serious financial problems and was willing to accept the facility for the sake of the various subsidies it would receive. From April 1988 to March 2009 it has received over 22 billion yen in subsidies from the central government. This money has been used for the full range of municipal activities, including salaries, roads, rivers and municipal facilities. Besides government subsidies, Mutsu City has also received donations worth 1.5 billion yen from RFS's parent companies TEPCO and JAPCO. It was able to repair the bankrupt shopping center and turn it into a new city office. The interim storage facility was, therefore, welcomed as a "money tree" by local politicians.

Nevertheless, many residents are anxious about the facility. Yoko Nosaka, representative of the "'We don't need an interim nuclear storage facility' Shimokita group", says, "There is no guarantee that [the spent fuel] will be sent to the reprocessing plant. If we accept this facility when a final disposal site has not even been selected, Mutsu will become a nuclear waste dump." Regarding depending on subsidies she says, "There are no signs that the city intends to stand on its own two feet. It's like being addicted to drugs."

Masako Sawai (CNIC)

Map of places in this issue of NIT



Nuclear Power and Nuclear Weapons the Unbreakable Connection

In a dozen years of involvement in the anti-nuclear movement in Japan I have found that there is surprisingly little overlap between nuclear energy related campaigns and nuclear weapons related campaigns. One notable exception was the campaign to prevent the Nuclear Suppliers Group (NSG) from granting an exemption for India from international rules governing nuclear trade. The campaign failed to persuade the Japanese government to block consensus when the NSG granted an exemption for India in September 2008, but protests from hibakusha groups, nuclear disarmament groups and groups opposed to nuclear energy generated sufficient public awareness to force the then Prime Minister, Taro Aso, to refrain from immediately beginning negotiations with India for a bilateral nuclear cooperation agreement.

The new government might have hoped that the movement's momentum would have dissipated when in June this year it decided to begin negotiations with India. If so, it was sadly mistaken. The response was swift and broad-based. Protest statements were issued by hibakusha, the Mayors of Hiroshima and Nagasaki, and a wide range of NGOs. (See CNIC's statement in NIT 137.) The mainstream media was also universally critical.

Another area where campaigns on nuclear energy issues and nuclear weapons issues sometimes overlap is the nuclear fuel cycle. The nuclear proliferation implications of Japan's plutonium program and its uranium enrichment program are of potential concern to groups working on nuclear energy issues, as well as to groups working on nuclear weapons issues. Perhaps it is surprising that the movement does not make more of this connection. There are various reasons for this, but rather than explain this phenomenon, this article focuses on how Japan's long-standing nuclear fuel cycle program and its more recent drive to export nuclear technology are combining to undermine efforts to strengthen the international nuclear non-proliferation regime.

Bilateral Nuclear Cooperation Agreements

India is just one of many countries which the Japanese Government hopes will help rescue Japan's struggling nuclear industry. Persistently depressed domestic demand means that exports are seen as a lifeline.

The first requirement if Japan is to become a leading nuclear supplier is to negotiate bilateral nuclear cooperation agreements. Japan takes the position that, for reasons of non-proliferation, it can only supply nuclear fuel, equipment and technology to countries with which it has such an agreement. Most, but not all states engaged in nuclear trade require bilateral agreements. The terms invariably specify that traded items may not be used in the development of nuclear weapons, although the constraints placed on Non-Nuclear Weapon States (NNWS) are much stricter than those placed on Nuclear Weapon States (NWS). It is certainly preferable to require such agreements as a condition of nuclear trade, but, as shown below, they are imperfect instruments.

At present, Japan has bilateral agreements with China, France, the UK and the US (all NWS), Australia, Canada and Kazakhstan (all NNWS), and with the EU. (The Kazakhstan agreement, which was signed on March 2 this year, has been endorsed by both countries' parliaments and is just awaiting a confirmatory exchange of notes.) An agreement with Russia was signed in May last year, but it has not yet been submitted to the Diet for ratification. The latest agreement was signed on September 10 with Jordan. Negotiations are also under way, or about to begin with India, South Africa, South Korea and the United Arab Emirates (UAE). Preparations are being made to begin negotiations with other countries, including Vietnam. Most of Japan's agreements (certainly the older ones) were written on the assumption that Japan would generally be a receiver rather than a supplier of nuclear goods and services. However, Japan's nuclear industry has grown and internationalized to such an extent that many of the proposed new nuclear power plants around the world presuppose some level of Japanese involvement.

On the cusp (or so we are told) of a new wave of orders for nuclear power plants, what are the conditions that will prevent an outbreak of nuclear weapons proliferation? The *sine qua non* of nuclear non-proliferation is control over the nuclear fuel cycle. This theme was promoted by former Director General of the International Atomic Energy Agency (IAEA) Mohamed ElBaradei and it has also been pushed by successive US Administrations. The Japanese Government promotes its 3S (safety, safeguards and security) slogan, but that alone will not prevent the proliferation of nuclear power plants from leading to the proliferation of nuclear weapons. Without addressing the nuclear fuel cycle, non-

proliferation benefits from 3S will be marginal.

The US recently negotiated a bilateral nuclear cooperation agreement with the UAE in which UAE gave up the right to enrich uranium or recycle spent nuclear fuel itself. This was supposed to be a model for all future US bilateral nuclear agreements. Of course, it is hypocritical for the US to require other countries to forgo the shortest route to nuclear weapons, while holding onto its own nuclear arsenal, but that does not alter the fact that containing the proliferation of nuclear fuel cycle facilities is a prerequisite for preventing the proliferation of nuclear weapons.

It came as a surprise then when authoritative reports emerged saying that the US was no longer demanding that all countries accept the UAE formula as a condition of nuclear cooperation. The US is said to be negotiating an agreement with Vietnam that does not contain these provision. Meanwhile, Jordan's unwillingness to accept the same conditions as the UAE is blocking progress in its negotiations with the US. It is reported that the reason for this apparent contradiction is that the US has decided that the UAE formula is the standard for the Middle East (truly a nuclear proliferation powder keg), but not for East Asia (which just happens to include nuclear proliferator North Korea, recent suspect Myanmar, former suspects Taiwan and South Korea, and, not to be forgotten, Japan).

Japan's Nuclear Fuel Cycle an Obstacle to Non-Proliferation

How is Japan's nuclear power program connected to all this? The principal issue is not that Japan might obtain nuclear weapons in the near future, although in the longer term that is not a concern to be dismissed lightly. The argument is more subtle.

There are a number of reasons why the United States might seek to make a distinction between the Middle East and East Asia. However, underlying them all is the inconvenient fact that Japan, with the blessing of the US, already has reprocessing and enrichment technologies. South Korea views Japan with envy and resentment and is now engaged in a fierce campaign to renegotiate the terms of its nuclear cooperation agreement with the US to allow it too to reprocess spent nuclear fuel. South Korea hopes to use pyroprocessing, which is marginally less proliferation-prone than the "purex" process used by Japan at Tokai and Rokkasho, but by no means proliferation resistant.

It remains to be seen whether South Korea's relentless campaign will be successful, but the reports about the US-Vietnam negotiations suggest that, in East Asia at least, the US has softened its opposition to the spread of nuclear fuel cycle technologies. The Japanese precedent certainly makes it more difficult to tell other countries in the region, including South Korea and Vietnam, that they cannot have these technologies. In this sense the Japanese precedent can been seen as one (though not the only) obstacle to the universalization of the UAE standard for US nuclear cooperation.

The policies of other countries besides the US are also important. Some of the other NWS are disinclined to impose strict conditions for nuclear cooperation. That makes it harder to get universal agreement, but given the international interdependencies in the nuclear energy field, it should not be impossible to achieve a stronger nuclear non-proliferation regime. It is important in this context to remember that the issue is not just about the US imposing its will on the rest of the world. There are a number of high level proposals falling under the general rubric of "internationalization of the nuclear fuel cycle" which will be placed out of reach if norms and rules are not put in place now, before the deluge of proliferating nuclear power programs.

New Agreements Send Mixed Signals

New conditions demanded of NNWS

Japan could seek to use its bilateral nuclear cooperation agreements to strengthen the international nuclear non-proliferation regime, including by increasing control over the nuclear fuel cycle. Officials in the Ministry of Foreign Affairs have thought of this and are supportive in principle. However, it is very difficult for Japan, which enjoys the dubious privilege of access to a full range of nuclear fuel cycle technologies, to demand other countries to forgo these technologies. In this regard, the following quote from a recent article in *The Asahi Shimbun* is very interesting:

> "Japan and South Korea have been negotiating since July 2009 for an agreement on the mutual supply of parts used in nuclear power generation and technology cooperation.
>
> "While the two nations have reached an agreement in principle after the fourth round of talks in July, Japan is insisting that the accord clearly state that South Korea would not introduce a nuclear fuel recycling program involving the removal of plutonium from spent fuel.
>
> "South Korea said no such wording is needed because reprocessing of spent fuel is rejected under a declaration calling for a nuclear-free

Korean Peninsula." (*The Asahi Shimbun* English web site, August 19, 2010)

It is highly unlikely that South Korea would accept such a demand from Japan, which leads me to suspect that the Asahi report might not be completely accurate. Japan's recent agreement with Kazakhstan states, "technology for and equipment for uranium enrichment, spent nuclear fuel reprocessing, conversion of plutonium and production of special non-nuclear material and plutonium shall not be transferred under this Agreement." The agreement with Jordan reproduces this clause, but goes further, adding a clause that is unprecedented in Japanese nuclear cooperation agreements. Article 9 states, "Nuclear material transferred pursuant to this Agreement and nuclear material recovered or produced as a by-product shall not be enriched or reprocessed within the jurisdiction of the Hashemite Kingdom of Jordan."

The *Asahi Shimbun* article suggested that Japan was trying to prevent South Korea from reprocessing altogether. We will not know until the text is made public, but perhaps Japan is demanding the same condition as appears in the Jordan agreement. This does not rule out enrichment and reprocessing completely, but it does prevent enrichment and reprocessing within Jordan of material supplied by Japan. It does not go far as the US-UAE agreement, but it certainly is stronger than anything Japan has demanded before.

Minimalist conditions demanded of India

As for negotiations with India, like Japan India already has a full range of fuel cycle technologies. There are other areas where strong demands from Japan could theoretically leverage meaningful concessions from India - for example on nuclear testing and fissile materials - but, judging from media reports, it seems that the timid, minimalist demands that the Japanese Government has made so far are already more than India is willing to accept. The only concrete demand the Japanese Government has acknowledged publicly is that cooperation would be terminated if India tested a nuclear weapon. However, it is not even clear whether the government regards this as a non-negotiable minimum condition.

Paying lip service to safeguards in Russia

Another bilateral agreement currently under consideration offers a slightly different angle on Japan's drive to become a major nuclear exporting nation. There are serious nuclear proliferation risks associated with the Japan-Russia Nuclear Cooperation Agreement signed on May 12, 2009, while Russian Prime Minister Vladimir Putin was visiting Japan.

The agreement has not been submitted to the Diet for ratification. One likely reason is that no Russian nuclear facilities were subject to IAEA safeguards. Russia submitted some facilities to the IAEA as "eligible" for the application of safeguards, but none had been "selected" by the IAEA when the agreement was signed. The International Uranium Enrichment Center (IUEC) in Angarsk in Siberia was the only facility listed in the Japan-Russia Agreement as an "eligible" facility, but no facilities were listed as "selected". The civilian and military sectors of Russia's nuclear program are not clearly separated and the list of "eligible" facilities is not public. Furthermore, the IAEA has limited resources, so it prioritizes safeguarding facilities in NNWS over facilities in NWS.

The Agreement does not require that Japanese nuclear material, equipment and technology exported to Russia be covered by IAEA safeguards. Instead, it requires that at least one Russian nuclear facility be "selected" by the IAEA, but permits Japanese nuclear exports to be used in other facilities. Indeed, this is the most likely scenario. Hence, there is no way of ensuring that Japanese exports are not used in Russia's nuclear weapons program, or that they are not transferred to potential nuclear proliferators such as Iran.

The July 8, 2010 edition of *The Denki Shimbun* (*The Electric Daily News*) suggested that the Japan-Russia Agreement might soon be submitted to the Diet for ratification. There is a danger that the Japanese government will move to ratify the agreement as soon as the IAEA puts in place safeguards on the Low Enriched Uranium Reserve, established at the IUEC in Angarsk as an international reserve in case countries are unable to obtain enriched uranium through regular commercial channels. According to a June 1 IUEC press release, "IAEA defined the storage facility of the International Uranium Enrichment Center in Angarsk as a facility subject to the IAEA safeguards commencing July 1, 2010". It would be a travesty if this were considered sufficient for ratification, since the LEU Reserve is of no direct relevance to nuclear trade between Japan and Russia.

Profits versus Principles

As reported in NIT 137, on June 18 Cabinet approved the "Basic Energy Plan" and the "New Growth Strategy". Two weeks earlier, on June 3, the Ministry of Economy, Trade and Industry released "Industrial Structure Vision 2010". These policies place nuclear energy alongside water,

fossil fuel power plants, electricity transmission and distribution, railways, recycling, and space industries as priority areas for "infrastructure-related/ system exports". Such exports are to be supported in a coordinated fashion by both government and industry as "all Japan endeavors", backed up with finance and export insurance from the Japan Bank of International Cooperation (JBIC) and Nippon Export and Investment Insurance (NEXI). Both developing and developed countries are targeted.

On August 5, the Ministry of Economy, Trade and Industry set up a panel involving both public and private sectors to study ways to gain infrastructure-related business orders abroad. A month earlier, on July 6, six nuclear companies announced that they were preparing to establish a new company, tentatively named 'International Nuclear Energy Development of Japan', this autumn to help secure nuclear power plant contracts in emerging nuclear countries. The companies involved are Tokyo Electric Power Company, Chubu Electric Power Company, Kansai Electric Power Company, Toshiba, Mitsubishi Heavy Industries, and Hitachi. (See table below of major Japanese nuclear exporters.)

Major Japanese Nuclear Exporters

Company	Brief Summary
Toshiba	Plant maker specializing in boiling water reactors. Majority shareholder of US company Westinghouse, which specializes in pressurized water reactors. Investing in proposed new reactors at the South Texas Project
Mitsubishi Heavy	Plant maker specializing in pressurized water reactors. Teaming with France's Areva on the ATMEA design.
Hitachi	Plant maker specializing in boiling water reactors. Minority shareholder of US company GE-Hitachi, which also specializes in boiling water reactors
Japan Steel Works	Steel forgings and castings. The only company capable of producing the largest forgings used in nuclear power plants. Exporting forgings to nuclear projects including in China.
IHI Corporation	Components maker. Began shipping "bottom heads" on July 25 for containment vessels of reactors to be constructed at the Vogtle Nuclear Power Plant (AP1000). It is the first time IHI has shipped machinery for nuclear power plants in the USA since 1980.
Tokyo Electric Power Company	Electric power utility. Investing in proposed new reactors at the South Texas Project

All this represents a reorientation of the perception of nuclear energy in Japan as predominantly an energy issue to a key trade and economic growth issue. In this context, nuclear disarmament and non-proliferation are treated as peripheral issues.

Conclusion

In its eagerness to win a piece of the global nuclear energy market, the Japanese Government risks sacrificing its reputation as a leading advocate of nuclear disarmament and non-proliferation. By entering into negotiations for a nuclear cooperation agreement with India, Japan reversed its long-standing policy of not engaging in nuclear trade with countries which are not members of the Non-Proliferation Treaty. Japan's determination to continue its reprocessing and uranium enrichment programs is also undermining efforts to strengthen international nuclear non-proliferation standards. There are some signs that Japan is trying to strengthen its nuclear cooperation agreements with NNWS, but when confronted with a choice between principles and profits, the indications are that Japan will choose the latter, that it will prioritize its nuclear industries over non-proliferation.

The technological links between nuclear energy and nuclear weapons are well known. However, it is often overlooked that the industrial links are equally important. As long as the interests of the nuclear energy industry are prioritized, efforts to put in place a robust nuclear non-proliferation system will founder. If any country could be different, it should be Japan, which experienced the horror of the bombing of Hiroshima and Nagasaki. But, as shown in the above discussion, Japan is no better than other countries and in some ways it is worse.

Japanese NGOs have found it difficult to communicate the connections between civil and military uses of nuclear energy. However, at this crucial point in the history of Japan's nuclear industry, the government's decision to begin negotiations on nuclear cooperation with India has handed the movement a unique opportunity. The issue brings the connections into stark relief and there is media interest. It should be possible to communicate the contradictions between Japan's nuclear energy and nuclear disarmament policies to a wider audience than ever before. First, however, the movement itself must recognize the connections. Historically, a large part of the movement is hardwired to ignore these connections. It is, therefore, all the more important for groups like CNIC, which have always understood the connections, to get the message out.

Philip White (NIT Editor)

Note: See pages 10 and 11 for a different angle on problems with Japan's nuclear export policy.

US NGOs Warn Japanese Government of Financial Risks of Investing in US Nuclear Power Plants

The letter below, which was endorsed by 72 US NGOs, was sent to the Japanese Government on August 11, while Kevin Kamps of Beyond Nuclear was visiting Japan. Also, on August 4 Kevin visited the Japan Bank of International Cooperation (JBIC) and Nippon Export and Investment Insurance (NEXI) to explain the risks involved in investing in new nuclear construction projects in the United States.

Philip White (Nuke Info Tokyo Editor)

Prime Minister Naoto Kan
Minister of Finance Yoshihiko Noda
Minister of Economy, Trade and Industry Masayuki Naoshima

August 11, 2010

Dear Prime Minister Naoto Kan, Minister of Finance Yoshihiko Noda, and Minister of Economy, Trade and Industry Masayuki Naoshima.

We are writing to share with you the financial risks involved with new atomic reactor projects proposed in the United States. The environment for nuclear construction in the US is highly uncertain - much more so than in the rest of the world. The US has immense renewable energy resources that are truly unparalleled around the world and a larger potential for efficiency gains than in any other industrialized nation. As a consequence of these fundamental marketplace and technology risks, investment in new reactors in the US will remain extremely risky, even if climate legislation is enacted that raises the price of fossil fuels.

Electricity demand has plummeted in the U.S. due to the two-year economic recession. The large projected increases in electricity demand made just a few years ago - which served as the basis for many new reactor proposals - are now highly unlikely to be reached for another decade or more.

At the same time, the US has a host of lower-cost alternatives to meet the need for electricity, even in a carbon-constrained environment. The U.S. has abundant renewable energy resources that are significantly cheaper than new reactors. Estimated costs for constructing new reactors in the U.S. have quadrupled since 2001, while the cost of renewable technologies continues to decrease. Currently, the estimated cost for electricity from a new reactor is 12 cents to 20 cents per kilowatt-hour, compared to 3 cents per kilowatt-hour for efficiency, while several plentiful renewable resources including wind and biomass fall in the range of 5 to 10 cents. Moreover, there is growing confidence in the availability of alternatives. Recent estimates of the natural gas resources have increased dramatically and the price has tumbled and is expected to remain low. Cogeneration opportunities are abundant in the U.S. industrial sector.

Meanwhile, the US uses far more electricity per capita than other industrialized nations, leaving a lot of potential for efficiency to further dampen electricity demand. Climate policy, which may put a price on carbon emissions, will also likely create a very substantial mandate for efficiency technology and renewable energy that will dramatically shrink the need for new, nonrenewable, large baseload generating capacity. It is not only renewable electricity standards and energy efficiency resource standards that will have this effect, but also building codes, appliance efficiency standards, and increases in funding for weatherization retrofitting of buildings.

In addition to the supply- and demand-side risks in the US, significant problems with new reactor designs have meant that none have received final certification from the U.S. Nuclear Regulatory Commission (NRC). Until their reactor designs are certified, no proposed new reactors can receive an

NRC combined construction and operating license (COL). Design problems are likely to delay licensing and further increase the costs.

Moody's Investor Services have called new reactors a "bet the farm" investment. Credit rating agencies have downgraded some US utilities proposing to build new reactors. In 2003, the Congressional Budget Office (CBO) estimated the likelihood of default for loans made to nuclear reactor developers to be "very high - well above 50 percent." CBO has not developed a more recent estimate, but the necessary conditions for new reactors have only deteriorated further since then.

Due to Japanese corporate involvement in many of the proposed US reactor projects, it might appear that they would make good investments. The reality, however, is that the projects involving Japanese companies have suffered the same delays, design problems and financial difficulties as other proposed nuclear projects. With decreased U.S. electricity demand, an abundant supply of cheaper alternatives and ongoing design problems, investment in new reactors in the U.S. is simply as bad a deal for Japanese investors as it is for American investors.

Just as we have warned American taxpayers and elected officials about these very serious financial risks, we also urge you to very carefully consider these risks before deciding to invest in new atomic reactors in the United States.

If you have any questions, please don't hesitate to contact Kevin Kamps at Beyond Nuclear, (301) 270-2209 extension 1, as well as Michele Boyd at Physicians for Social Responsibility, (202) 667-4260.

Sincerely...

Continued from page 14 human environment.

In the first place, it is highly doubtful whether geological disposal is safe. In fact, in Japan geological disposal was not originally considered to be an option. In a 1962 interim report the Japan Atomic Energy Commission's (JAEA) expert committee on waste disposal said, "It would be difficult to implement in Japan, with its extremely dense population, limited space, complex ground structure and environmental conditions, including frequent earthquakes."

In an October 1976 policy statement JAEC shifted its stance, saying, "For the time being emphasis will be placed on geological disposal." This was in line with a change of opinion in Europe and the United States, but JAEC also said, "We will rapidly proceed with research into a method of disposal that is in keeping with Japan's social and geographical circumstances." However, since then, although there has been no investigation whatsoever, geological disposal has become the only policy.

Geological disposal involves great dangers for future generations. By using geological disposal the present generation will be unable to take full responsibility. Unfortunately, this generation, which has already produced the legacy of high-level radioactive waste, is unable to avoid placing a burden on future generations.

That is why we must make the burden we leave to future generations as light as possible. We must phase out nuclear energy as quickly as possible. While carrying out serious research into the least dangerous method of disposal, we must simultaneously continue to manage the existing waste in such a way that, in response to technological developments, we can shift to more appropriate locations and more appropriate methods of managing the waste. We must continue to manage the waste, which means that we must find somewhere to manage it. This high-level radioactive waste, which no one wants, must be accepted somewhere and handed on to future generations. Recognizing the sheer scale of this problem is the first step towards solving it.

Baku Nishio (CNIC Co-Director)

Japan's Policy on Disposal of Radioactive Waste

1. Classification of Radioactive Waste

Radioactive waste is produced at nuclear power plants and nuclear fuel cycle facilities, and also through research, medical and industrial use of radioisotopes (RIs). The main nuclear fuel cycle facilities operating in Japan include a uranium enrichment plant, nuclear fuel fabrication plants, and spent nuclear fuel reprocessing plants. There is also a research and development-level MOX fuel fabrication facility. Construction of a commercial plant is planned. Radioactive waste generated at nuclear power plants and nuclear fuel cycle facilities is regulated under the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Reactor Regulation Act) and RIs are regulated under the Act Concerning the Prevention of Radiation Hazards.

Gaseous wastes are released into the atmosphere from the exhaust stack and liquid wastes are released into the environment via waste water pipes, so the disposal of radioactive waste relates to solid waste.

In Japan, radioactive waste is classified either as "high-level" or "low-level". The term "medium-level radioactive waste" is not used in Japan. Japan's policy is to reprocess spent nuclear fuel (the failed "closed nuclear fuel cycle" concept), so the only "high-level radioactive waste" (HLW) will be the vitrified canisters that are produced at the reprocessing plant. Everything else is lumped together into the "low-level radioactive waste" (LLW) category.

LLW is further subdivided into "relatively high", "relatively low" and "extremely low" level radioactive waste. Waste that is even less radioactive than so-called "extremely low-level" waste is exempted from radioactive waste regulations under a "clearance" system. In addition, waste which one would not expect to be contaminated with radioactivity, or which has had radioactive contamination removed, is classified as "non-radioactive waste" and exempted from radioactive waste regulations.

Transuranic Waste (TRU) (waste containing elements higher in the periodic table than uranium, along with other isotopes with long half-lives such as Iodine 129) are classified as "low-level radioactive waste", but it is planned that TRU with a relatively high concentration of radioactivity will be buried deep underground in the same way as HLW.

2. Low-Level Radioactive Waste

The bulk of LLW falls in the "relatively low" sub-category. That portion which is generated at nuclear power plants is buried at the LLW Disposal Center at Rokkasho Village in Aomori Prefecture. This facility is owned by Japan Nuclear Fuel Ltd. (Most of JNFL's shares are owned by the electric power companies.) LLW generated at nuclear fuel cycle facilities (170,000 x 200 liter drums at the end of March 2010) and through the use of RIs (about 560,000 drums at the end of March 2009) have not been disposed of yet. The fuel cycle waste is stored at the facilities where it was generated. RI waste that has been moved from the site where it was generated is stored at one of the two treatment and storage facilities (Tokai Village in Ibaraki Prefecture and Takizawa Village in Iwate Prefecture) and nine other interim storage facilities.

By the end of March 2010, about 220,000 drums had been transported from nuclear power plants to JNFL's Rokkasho facility, while about 650,000 drums were still stored at the nuclear power plants. It is planned that eventually 3 million drums will be disposed of at the Rokkasho facility. The Japan Atomic Energy Agency (JAEA) has been designated as the body responsibly for disposing of RI waste, but no progress has been made on selection of a site. In regard to nuclear fuel cycle waste, it has not yet been decided whether or not the owner of each facility will be responsible for disposal. It is fair to say that the policies for disposal of the various categories of waste are totally disparate and lacking in coherence.

"Relatively low level" LLW is stored in drums and disposed of in concrete pits. A concrete pit is built just below ground level. The drums are piled into the pit and filled in with mortar. It is said that control of the site will gradually be relaxed as the level of radioactivity falls over a 300-year period after the drums are buried, but in fact, after 50 years anyone will be able to approach the site, as long as they don't dig up the drums. It is even said that it could be turned into a children's playground or an apple orchard.

The shallow burial policy for LLW has not

always been the preferred option. The original policy was shallow burial, but the policy changed to disposal at sea, before reverting to shallow burial. When the Reactor Regulation Act was established in 1957 it was blithely assumed that shallow burial would be possible, but it became impossible to implement this policy and the word "burial" was deleted from the Act after the International Commission on Radiological Protection (ICRP) recommended in 1959 that there was no threshold below which exposure to radiation was safe.

As a result, storage at each facility has continued for an extended period of time.

In 1980 regulations were prepared to enable experimental disposal in the North Pacific Ocean, but opposition from Pacific island residents stymied these plans. In 1983 dumping at sea was frozen by the Conference of Parties (COP) to the London Convention, so Japan had to abandon this policy. Such dumping was banned completely at COP 1993.

The Reactor Regulation Act was amended in 1986 to once again enable shallow burial. However, for the first 300 years it would be controlled, so for this period, regardless of the actual situation, it would considered to be storage rather than disposal. The first drums of LLW were transported from nuclear power plants to the LLW Disposal Center in Rokkasho at the end of 1992.

"Relatively high-level" LLW from decommissioning of nuclear power plants etc. will be put in drums, or large rectangular containers and buried between 50 and 100 meters underground (so called "disposal at depth"). The control period was set at "a few hundred years". It might seem that this is longer than 300 years, but actually the time has not been specified. It is planned that this waste will also be disposed of in Rokkasho, but as of August 2010 the project had not begun, because local agreement had not yet been obtained.

"Extremely low-level" LLW from decommissioning of nuclear power plants can be disposed of in trenches, simply wrapping it in plastic sheets. The control period is 30 to 50 years. For example, approximately 1,700 tons of concrete from the decommissioning of the Japan Power Demonstration Reactor (JPDR), owned by the former Japan Atomic Energy Research Institute (now Japan Atomic Energy Agency), was put into polyethylene bags and buried in trenches within the grounds of the facility.

3. Clearance

The notion of removing controls on radioactive waste that is below a given level of radioactivity was introduced in a 1986 amendment to the Reactor Regulation Act. The concept applied to waste for which the abovementioned control period had elapsed. The amendment was passed on May 21, less than one month after the Chernobyl accident on April 26, 1986.

However, it took 19 years for specific clearance levels to be established under an amendment passed in 2005. This amendment only applies to waste generated at nuclear power plants. A system for clearance of radioactive waste generated at nuclear fuel cycle facilities is currently being prepared. In regard to RI waste, an amendment to the Act Concerning the Prevention of Radiation Hazards was passed in May this year.

Waste below the clearance level (annual dose benchmark of less than 10 micro-sieverts for each isotope) can be disposed of as industrial waste, or reused. However, in the case of reuse, electric power companies voluntarily agreed not to release the material into the general community until the system is well established.

Reuse of metals from decommissioning of the Tokai Nuclear Power Station (GCR, 166 MW) that were assessed to be below the clearance threshold began in 2007. It has been reused in such things as radiation screens in the Japan Proton Accelerator Research Complex (J-PARC) and the legs of benches and tables used in nuclear power plants and their public relations facilities, as well as in the head offices of electric power companies. It is reasonable to say that these uses are for PR purposes to justify the claim that the "system is well established".

The expression "non-radioactive waste" suddenly appeared in 1993. This is waste that is said to be fundamentally not radioactive and therefore not in need of any clearance. It includes those parts of radioactive waste that could not conceivably have been contaminated with radioactivity, or that have had the radioactivity removed. This notion change represented a shift from the view that all waste generated in the "radiation control area" was radioactive waste.

The reason was that as nuclear power plants got older, large items of equipment, such as steam generators, had to be replaced and, as a result of this, unplanned waste was generated, such as

from cutting open the containment vessel. With the appearance of this "non-radioactive waste" category, huge quantities of waste arising from decommissioning do not need to be treated as radioactive waste, or be assessed to determine whether they fall beneath the clearance level. The aim is to exempt 98-99% of decommissioning waste from treatment as radioactive waste. The majority of this (94-98%) is so called "non-radioactive waste".

4. High-Level Radioactive Waste

HLW and upper range TRU will be buried over 300 meters underground - so-called "geological disposal". In May 2000 the Specified Radioactive Waste Final Disposal Act was established. At the time specified radioactive waste referred to vitrified HLW canisters, but TRU was added to the category in a June 2007 amendment.

At the end of March 2010 a total of 23,000 vitrified HLW canisters for disposal were said to have accumulated. Actually, most of this was still in the form of spent fuel, while some was in the form of liquid waste. There were only limited quantities of waste in the form of vitrified HLW canisters: 247 canisters at JAEA's Tokai Reprocessing Facility (Tokai Village, Ibaraki Prefecture), 107 canisters at JNFL's Rokkasho Reprocessing Plant, 1,310 canisters returned from France and held at JNFL's Vitrified Waste Storage Center in Rokkasho, and 28 canisters returned from the UK and likewise held at JNFL's Vitrified Waste Storage Center in Rokkasho. A further 820 canisters will be returned from the UK. In addition to these, 70 vitrified HLW canisters that have been substituted for TRU will be returned from the UK. These have been substituted on the basis of the same "integrated toxic potential".

The quantity of HLW to be disposed of in the first period is estimated at 40,000 canisters. It is estimated that in the same period about 18,000m^3 of TRU will be disposed of. Most of this will be generated in future at the reprocessing plant and MOX fuel fabrication facility.

Based on the above Act, the Nuclear Waste Management Organization of Japan (NUMO) was established in October 2000 to implement disposal of HLW. It is planned that disposal will begin around 2035. The costs will be covered by electric power companies (in other words by consumers of electricity).

NUMO began seeking candidate sites in December 2002. Due to the amendment adding TRU as a target for geological disposal, three types of offer are being called for: (1) only HLW, (2) only TRU, (3) both HLW and TRU. If there are any candidates, an initial document study will be carried out. These studies will consider such things as whether there is an active earthquake fault, or a volcano nearby. If not, a "summary study" will be carried out. If there are no particular problems after boring has been carried out, the site will proceed to a "detailed study" as a candidate site. During the process of selecting a final site, an underground research facility will be constructed. At each new stage, the views of the governor of the prefecture and the mayor will be sought. It is required that their views be "sufficiently respected".

The process of calling for candidate sites has begun, but although there have been moves to apply for the sake of the subsidies on offer, as soon as such moves came to light there was strong opposition and they were abandoned immediately. In January 2007 the mayor of Toyo Town in Kochi Prefecture submitted an application, but in response there were moves to recall him. He resigned and stood again in the election that followed in April, but a new mayor who opposed the HLW dump was elected and withdrew the application.

Originally the aim was to get five candidate sites for a document study, but there are still no candidates. In an effort to overcome resistance, the government increased the subsidy for a document study from 210,000,000 yen in a single year to 1 trillion yen, with a maximum of 2 trillion yen over two years. In September 2007 the government decided to create an option for it to submit its own applications to local governments and then proceed with document studies if the mayor agreed. Nevertheless, the government still has not submitted any such applications and still no candidates have emerged.

5. Closing Remarks

As the above account shows, it is clear that from HLW to "non-radioactive waste" Japan's radioactive waste policy is totally haphazard. The notion that HLW and TRU can be disposed of together just because in both cases the method is geological disposal is too simplistic. No matter how often it is claimed that they will be kept apart, there is no doubt that collocation will lead to negative interaction between them. It will speed up the rate at which radioactivity will leak out and re-enter the

Continued on page 11

Workers' Radiation Exposure Data for FY2009

On July 29 the Nuclear Industrial and Safety Agency (NISA) released its 2009 Fiscal Year (April 2009 to March 2010) report on radiation exposure incurred by people working at nuclear power facilities. The Japanese report ("Concerning the status of radioactive waste management at nuclear power facilities and radiation dose management of radiation workers") is available on the following link:
http://www.meti.go.jp/press/20100729007/20100729007-2.pdf

Figures 1 and 2 below show the fluctuation in worker exposure at commercial nuclear power plants over the past three decades.

The total collective dose in FY2009 for people working at nuclear power plants was 82.08 person sieverts. According to NISA's report, no one incurred a dose exceeding 20 milli-sieverts. However, according the Radiation Dose Registration Center for Workers (Registration Center) of the Radiation Effects Association, which calculates the total dose received by individuals at all their work places, seven people received doses in the 20-25 milli-sievert range (see table). This compares to just one person in the previous fiscal year. The Registration Center's figures give a realistic picture of the severe conditions of radiation workers. The true situation is obscured in NISA's data.

NISA's data shows a top dose of 19.5 milli-sieverts incurred at the Ohi Nuclear Power Station, while the highest dose for an electric power company employee was 12.9 milli-sieverts at Fukushima I Nuclear Power Station. The highest dose for an electric power company employee in the previous fiscal year was 14.6 milli-sieverts, also at Fukushima I.

For many years CNIC has strongly criticized the lack of legal requirements for the management of radiation workers' radiation doses. From around 2008, as Japan's oldest nuclear power plants approached 40 years of operation, finally moves emerged based on the awareness that the absence of adequate legal provisions is an embarrassment for a leading nuclear nation. In particular, radiation exposure of subcontractor workers accounts for over 96% of the total dose incurred in Japan. One cause of the shoddy management of workers' radiation doses is that in some cases workers do not even receive their radiation control handbook. Management of the radiation doses of subcontractor workers should, therefore, be the top priority.

Mikiko Watanabe (CNIC)

Number of Work Sites and Radiation Doses of Radiation Workers in FY2009

Number of Work Sites	1	2	3	4	5	Over 6	Total
Dose (mSv)							Number of Workers (%)
Less than 5mSv	54666	11028	3386	1039	358	137	70,614 (92.9)
5～10mSv	1366	1119	551	214	89	20	3,359 (4.4)
10～15mSv	459	505	306	129	45	16	1,460 (1.9)
15～20mSv	176	183	102	69	16	2	548 (0.7)
20～25mSv	0	1	1	5	0	0	7 (0.0)
25～30mSv	0	0	0	0	0	0	0 (0.0)
30～40mSv	0	0	0	0	0	0	0 (0.0)
40～50mSv	0	0	0	0	0	0	0 (0.0)
50mSv～	0	0	0	0	0	0	0 (0.0)
Total Number of Workers	56667	12836	4346	1456	508	175	75988
(%)	(74.6)	(16.9)	(5.7)	(1.9)	(0.7)	(0.2)	(100)
Average Dose (mSv)	0.6	2.0	3.0	3.8	3.8	2.9	1.1

Figure 1: Fluctuation in Total Dose

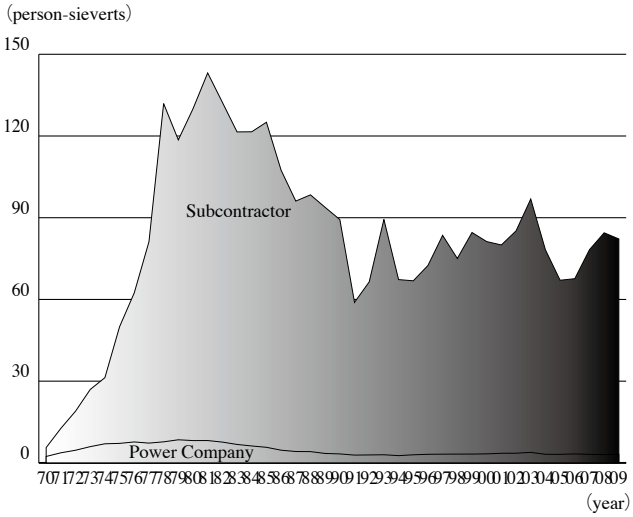
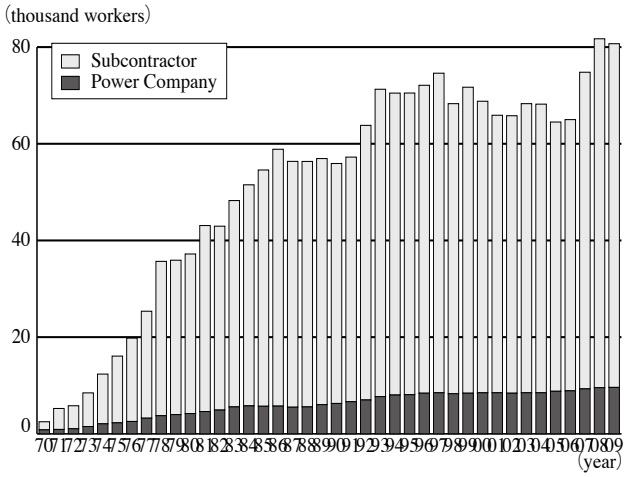


Figure 2: Fluctuation in Number of Exposed Workers



Group Introduction

Citizen Science Initiative Japan Exposure to Low Level Radiation Research Group

By Mikiko Watanabe*

I am a member of the *Exposure to Low Level Radiation Research Group*. The *Research Group* is now working on the history of surveys of the damage caused by the atomic bombing 65 years ago of Hiroshima and Nagasaki. As part of our study, members of the *Research Group* visited Hiroshima from March 21 to 24, 2009.

We carried out a document study and visited sites connected with a-bomb surveys. By actually seeing these sites, we were able to gain a shared sense of the geography and other things that cannot be obtained from documents alone. We hoped that our shared experiences would inject more vigor into the *Research Group*'s future discussions. Since then we have carried forward our study through regular monthly meetings, putting the experiences of our fieldwork trip to good use and sharing documents that we have found.

The basis for the study is a book entitled *Atomic Bomb Studies Under the US Military Occupation* (*Beigun Senryo-ka no Gembaku Chosa*, Shinkansha, 1995) written by one of our members Yukuo Sasamoto. We are particularly conscious of the perspective expressed in the book's subtitle, "Japan - inflictor of atomic damage". The Japanese Government carried out surveys immediately after the atomic bombings, but the question is, did these surveys really benefit the victims? Sasamoto says that it is not enough to simply say that the results of these surveys were seized by the US military. Rather, he believes we must consider the peculiar situation in which the victim country, Japan, was conducting surveys of the damage caused by the atomic bombs under the nose of the occupying forces of the country which dropped these weapons of mass destruction. Apparently the occupying forces condoned this research. The implication of the subtitle of Sasamoto's book is that by conducting these surveys, which had nothing to do with helping the victims, Japan became an accomplice.

We lost a great pillar of our project when Sasamoto died suddenly in March this year. However, the members of the *Research Group* continue to work on the remaining issues. We want to carry on the work where he left off.

Members of Exposure to Low Level Radiation Research Group (Yukuo Sasamoto left)
(Photo taken at Miyajima, Hiroshima by Mariko Shinoda)

We are now working to bring together all the material, interpreting the meaning of each individual document, while keeping an eye on the overall picture. In addition to material collected by Sasamoto, we have gathered communications related to internal surveys by the US occupying forces (GHQ/SCAP documents), orders by the Japanese Government and the Army and Navy found among documents in the National Archives of Japan and the Diplomatic Records Office of the Ministry of Foreign Affairs, writings of people directly connected with a-bomb surveys, as well as newspaper articles.

We believe that by revealing the involvement of Japanese government, military and academics in the a-bomb surveys of the US Government and military our study reinforces Sasamoto's work.

In addition to our study of the history of a-bomb surveys, we also held two citizen science seminars. In one session we used the NHK documentary *The Lost Decade Survivors of Atomic Bomb* as a basis for addressing the question "Who were the Japan-US joint atomic bomb studies for?" In another we viewed a documentary about science during the war, *Resurrecting the Kyoto University Cyclotron* (*Yomigaeru Kyodai Cyclotron*).

**Mikiko Watanabe is CNIC's radiation campaigner and editor of our Japanese newsletter.*

NEWS WATCH

Lawsuit to Stop the Use of MOX Fuel at Genkai-3

On August 9, a lawsuit against Kyushu Electric Power Company demanding a halt to the use of MOX in the Genkai-3 Nuclear Power Plant (PWR, 1180MW) was filed in Saga District Court by 130 people from all prefectures in Kyushu. Genkai is in Saga prefecture of Kyushu. The plaintiffs' claim there is a danger that the reactor vessel could be destroyed for the following reasons: when MOX fuel is in use a space can easily form between the fuel and the cladding; fuel at high temperature melts; as a result of pressure damage to pipes can occur. Additionally, a disposal method for spent MOX fuel has not been established. They pointed out that if MOX is stored long-term, a crack in the storage pool could release radioactively contaminated water.

Lawsuit to Stop Construction of Ohma Nuclear Power Plant

On July 28, a lawsuit was filed in the Hakodate District Court demanding compensation for damages, termination of construction, and annulment of the license for the Ohma Nuclear Power Plant (ABWR, 1383MW) being constructed by J-Power in the town of Ohma in Aomori Prefecture. The claim was filed not in the Aomori District Court as would normally be expected, but rather in the Hakodate District Court, because many of the plaintiffs are from Hakodate. The city of Hakodate is in Hokkaido, across the Tsugaru Strait from the town of Ohma. It is separated by a distance of 18km at the closest point. There are participating plaintiffs from all over Japan. They claim that because the Ohma Nuclear Power Plant will operate with a full MOX core, a wide area would be damaged in a major accident.

Fukushima 1-3 Begins Operating with MOX Fuel

On September 18, Tokyo Electric Power Company (TEPCO) started up its Fukushima I-3 Nuclear Power Plant (BWR, 784MW) using MOX fuel. It loaded MOX fuel into the reactor on August 21 and plans to begin generating electricity on the 23rd.

Over 10 years had passed since this fuel was fabricated. It was fabricated between 1997 and 1998 and arrived at the nuclear power station in 1999, but it was never loaded. Falsification of fuel quality control data for MOX fuel for Kansai Electric Power Company's Takahama-3&4 nuclear power plants was discovered and troubles and cover-ups were discovered at TEPCO nuclear power plants. In response, the prefectural government revoked its agreement with TEPCO. On January 20 2010, TEPCO applied again for permission to use MOX fuel and on August 6 the governor gave his consent.

Part of KEPCO's MOX Fuel Fabrication Plans Postponed

On August 31, Kansai Electric Power Company (KEPCO) announced that of the 36 MOX fuel assemblies scheduled to be fabricated this year, fabrication of 16 of the assemblies will be delayed until next year. The MOX fuel is for use in KEPCO's Takahama-3&4 Nuclear Power Plants (PWR, each 870MW). The reason is that French company Areva has had trouble at its Melox plant and production capacity fell. It is said that this year between January and June at the Melox factory several items of equipment for handling materials, including uranium, plutonium and cladding tubes, broke down and part of the production line stopped. However, the details are unclear.

Conceptual designs for next generation LWR

Conceptual designs for next generation light water reactors (LWR), development of which is being promoted as a national project by the Ministry of Economy, Trade and Industry (METI), have been prepared, and on July 29 a report on future activities was released by METI, The Federation of Electric Power Companies (FEPC), Toshiba, Hitachi-GE Nuclear Energy, Mitsubishi Heavy Industries and The Institute of Applied Energy (IAE). IAE has been contracted to develop the conceptual design. According to the report, the conceptual designs improve safety and economy based on current ABWR and APWR designs. The HP-ABWR (High Performance ABWR) design is for a 1,760MW plant, while the HP-APWR is for a 1,780MW plant. The aim is for the reactors to be operating in 2030. Total development costs, estimated at 55 billion

yen, are to be split evenly between government and the private sector.

The plan is to reduce electricity generation costs through large power output, a high capacity factor (target of 97%), fuel that can be used for long periods of time, and improved fuel burning efficiency. The August 18 edition of *Denki Shimbun* spoke of "attractive merits of scale", but added, "the risk associated with outages is large. Will it be easy to find a site? The real and the conceptual worlds are different."

Government-private sector sales pitch to Vietnam

A mission including Minister of Economy, Trade and Industry Masayuki Naoshima, and senior executives of Japanese electric utilities Tokyo Electric, Chubu Electric, Kansai Electric and Japan Atomic Power Company, and plant makers Toshiba, Hitachi and Mitsubushi Heavy Industries visited Vietnam from August 24 to 25 to encourage it to order nuclear power plants from Japan. Vietnam plans to build 14 nuclear power plants by 2030. Russia won the order for the first plant, but Japan still entertains hopes of building the second.

The government-private industry mission met with senior members of the Vietnamese Government, including Prime Minister Nguyen Tan Dung, Minister of Science and Technology Hoang Van Phong, Minister of Planning and Investment Vo Hong Phuc, and permanent member of the Secretariat of the Communist Party of Vietnam Truong Tan Sang.

A new government-private company, tentatively named 'International Nuclear Energy Development of Japan', is due to be launched this autumn to promote power plant projects in emerging nuclear countries.

Troubles at nuclear fuel plant covered up

On August 4 the Nuclear and Industrial Safety Agency (NISA) announced details of an incident that occurred in May at Global Nuclear Fuel Japan's (GNF-J) nuclear fuel plant in Yokosuka City, Kanagawa Prefecture. Hydrogen leaked from a pellet sintering furnace and ignited. The information was provided anonymously to NISA, but when NISA made inquiries GNF-J denied the incident. A committee established within NISA to consider responses to whistleblowers judged that NISA's response was inadequate and demanded a further written report. GNF-J, which was no longer able to conceal the incident, then admitted that it had put out the fire with a fire extinguisher.

Unfortunately, the company's attitude in covering up the problem in the first place and NISA's inappropriate handling of the matter suggest that similar problems will occur again in future.

Another radioactive leak at Rokkasho Reprocessing Plant

On August 2 Japan Nuclear Fuel Ltd. (JNFL) announced the possibility that there had been a leak of a tiny amount of high-level radioactive liquid waste from the concentration equipment at its Rokkasho Reprocessing Plant in Rokkasho Village, Aomori Prefecture. Leaked liquid was found in a stainless steel protective pipe around a thermometer that is installed inside the equipment to measure the temperature of the liquid waste. A high radiation reading was noticed near the tip the thermometer on July 30 when it was removed in order to replace it. It seems that the liquid leaked out, with some of it sticking to the thermometer. Radioactive liquid waste also leaked onto one worker, who was exposed to radiation as a result.

Continued from page 4 was viewed with concern by the electric power companies and other shareholders. Once the new third-party allocations are made, JNFL's equity ratio will top 20%...."

The stock issue shows that JNFL is experiencing financial difficulties, but a question that remains unanswered is the impact that this and previous delays will have on the total cost of the Rokkasho Reprocessing Plant. After so many delays, it is inconceivable that construction costs will not exceed the official figure of 2.14 trillion yen (see NIT 98).

Masako Sawai (CNIC)

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

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