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

Explosions at Nuclear Power Plants
Tsunami Swamps Fukushima Nuclear Power Plant

On March 11 at 14:46, a mammoth earthquake triggered the automatic shutdown of all nuclear reactors along Japan's northeastern Pacific coast. When the temblor struck, the Higashidori nuclear power station in Aomori prefecture was offline for inspection. At the Onagawa plant in Miyagi prefecture, three units were operating. In Fukushima prefecture, Fukushima I (also referred to as Fukushima Daiichi) had three units online and three under inspection, and at Fukushima II (also referred to as Fukushima Daini), four were active. Tokai 2's single unit in Ibaraki prefecture was also generating power. The large tremors apparently caused all operating reactors to shut down automatically (a final determination, however, will require further scrutiny). Of these plants, Fukushima I suffered catastrophic damage.

At Fukushima I, the massive tidal wave that followed the earthquake severed the outside electric power supply, and inundating seawater disabled 13 emergency diesel generators inside the plant. The tsunami also washed away diesel fuel tanks. This damage occurred within about an hour after the earthquake, effectively incapacitating the plant's cooling system. Technicians apparently believed that Unit 2 was in the worst shape at this point. At 21:00, Nuclear Emergency Response Headquarters** in Tokyo warned that by 21:40, the coolant level would drop, uncovering the upper part of the fuel rods. It estimated that damage to the

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core would begin by about 22:20, and that fuel-rod cladding would start to disintegrate by 23:50.

The subsequent emergency response was hammered out, moment by moment, to prevent a worst-case scenario: a loss of coolant leading to a full nuclear meltdown and cataclysmic disaster. At 22:30, three power-supply trucks arrived at the site, and by the following morning, many more were on hand. It is too early to know exactly how the off-site center, some 5 km away, responded at first, but mobile power units and other emergency equipment as well as Self-Defense Force (SDF) personnel were rapidly converging there.

The Emergency Response Headquarters convened its first meeting at 19:03 on March 11 and at 19:22 declared a nuclear emergency. At 21:23, Prime Minister Naoto Kan instructed local residents living within a 3 km radius of the stricken plant to evacuate the area and told those living within a 10 km radius to remain indoors. About 6,000 people were affected. At 5:44 on March 12, the evacuation zone was extended to 10 km, and at 18:25, it was enlarged once again to 20 km. At the same time, people within 10 km of the Fukushima II complex further south were also directed to leave their homes.

At just past midnight on March 12, the preliminary response seemed to be effective, and the situation appeared under control. In Unit 1, steam from the isolation condenser was cooling the core. In Unit 2, a temporary power source was maintaining the core's water level, and in Unit 3, the reactor core isolation cooling system was pumping water into the core. Moreover, early that morning, in Units 5 and 6 a short distance away, the water flow function was found to be intact, allowing the cooling system to be restarted, and it was thought that both reactors could be stabilized.

At dawn, however, pressure inside the Unit 1 containment vessel had soared to 8.4 atmospheres, nearly double the maximum pressure it was built to withstand (4.24 atmospheres). At that point, it was feared the containment vessel, which is designed to contain radiation from the core, would rupture, and at 9:07, steam was vented into the outside air. At 10:04, fuel rods began to protrude above the surface of the coolant.

On March 12 at 15:36, just as an aftershock jolted the site from directly below, a hydrogen explosion blew away the upper story of the outer building that houses Unit 1. This was the floor where equipment for periodic inspections, refueling machinery, and a heavy-duty crane were stored. The blast was not announced until some five hours later.

When fuel rods are exposed to air, they superheat, causing the zirconium cladding to react chemically with water and release hydrogen. Hydrogen is thought to have collected in the upper part of the outer building, where a spark from metal parts jostling together in the aftershock may have ignited it. As a result of the explosion, 500 microsieverts (μSv)/hour of radiation were released into the atmosphere (the exact location of the leak has not been pinpointed). That is 10,000 times the normal background radiation level (0.04-0.08 μSv/hour).

At 20:20 that evening, emergency personnel began to pump seawater into the Unit 1 reactor. This was an extraordinary measure necessitated by loss of coolant. The water level in the core could not be restored, however, and more than one-third of the fuel rods remained exposed to the air. It is estimated that 70% of the reactor core was damaged.

On March 13, Unit 3's emergency core cooling system also failed. Workers started spraying water on the containment vessel to bring core temperatures down. At the same time, steam was vented from the pressurized core chamber into the primary containment structure. These measures were intended to keep the fuel rods submerged. That afternoon, however, as the water continued to fall, more of the rods were exposed. From about 13:00, workers began injecting seawater into the core, but the water level did not rise, and about half the length of the 4 m rods remained uncovered. It has not been determined whether the core was seriously compromised, but the damage was probably even more extensive than at Unit 1.

Emergency personnel continued to bathe the Unit 3 core with seawater and vent steam periodically from the reactor chamber. On March 14, at 11:01, however, a second explosion erupted. The blowout was even more powerful than that at Unit 1 two days earlier. Judging from TV footage, it sent an enormous plume of steam rocketing some 300 m into the air and obliterated not only the upper section of the reactor building but also the thick concrete walls that protected its lower stories.

As a result, radioactive materials including iodine, cesium, and other rare isotopes were spewed over a wide area. On March 15, the entire Kanto plain was enveloped by contamination ranging in intensity from 20 to several hundred times the normal background radiation.

Meanwhile, at Unit 2, where workers had kept the fuel bundles under water, coolant began to recede, threatening to lay bare the rods. By the evening of March 14, the fuel was almost wholly exposed. The reactor's outer shell consists of concrete panels that are supposed to swing outward as the pressure inside increases in order to prevent a build-up of volatile hydrogen. At Unit 2, workers freed these panels as a precautionary measure, successfully averting another blast.

At Units 1, 2, and 3, workers struggled mightily to contain the crisis amid soaring radiation levels. On March 15, Unit 4 was rocked by another huge explosion. The media reported that the upper part of the reactor building was torn apart, leaving two gaping holes in the lower half. Photos later showed that, like Units 3 and 4, most of the wall facing the ocean was gone.

Unit 4 had been under inspection when the earthquake hit, and workers were transferring superheated spent fuel from the core to the storage pool in the same building. With the cooling system disabled, however, it is thought that water in the pool evaporated, uncovering the spent fuel. It is also possible that tremors caused a significant leak, which may have hastened the accident. The exposed spent fuel produced hydrogen, triggering an explosion. At this point, a major release of radiation could no longer be avoided. Subsequently, emergency workers and SDF personnel used helicopters equipped with airdrop devices and vehicles fitted with high-pressure water hoses to douse the stricken reactor. These operations proved to be effective up to a point.

On March 15, shortly before the blowout at Unit 4, Unit 2 was shaken by a blast that partially damaged the pressure suppression chamber in its containment vessel. At Unit 3, the March 14 explosion was thought to have dented or deformed the upper section of the structure, possibly opening a crack in it. This vessel performs the vital task of bottling up core radiation in the event of an accident, but at Unit 3, that function is no longer viable.

As I write (March 22), a full-blown catastrophe has been averted for the moment. But it is too soon to say that the crisis is drawing to an end. Until electricity has effectively been restored from the outside and the plant's operating systems are put back in order, it will continue to be touch and go. I salute the brave men and women at the site who expose themselves daily to high radiation doses as they struggle to bring this disaster under control.

By Hideyuki Ban (CNIC Co-Director)

Author's note: These observations are based on the assumption that data provided by Nuclear Emergency Response Headquarters are more or less accurate.

**Translator's note: In the event of a serious nuclear accident, the 1999 Act on Special Measures Concerning Nuclear Emergency Preparedness (Articles 15 to 24, Chapter III) requires the establishment of a Nuclear Emergency Response Headquarters and the declaration of a nuclear emergency.

Statement by Group of Concerned Scientists and Engineers Calling for the Closure of the Kashiwazaki-Kariwa Nuclear Power Plant

Our Views of the Accidents at the Fukushima Nuclear Plants after the Earthquake

March 23, 2011

Over ten days have passed since the Tohoku Pacific Offshore Earthquake hit the Fukushima Daiichi (No.1) Nuclear Power Plant on March 11, 2011. The progress of cooling the reactor cores is slow. The situation remains serious, and we do not yet know how this catastrophic accident will end.

The current situation clearly demonstrates the high vulnerability of nuclear plants throughout Japan to earthquakes and tsunamis. If a similar scale of earthquake hits other nuclear plants, it is quite possible that one or more accidents of a similar catastrophic scale may occur. Two nuclear plants in Japan are of particular concern to us: the Kashiwazaki-Kariwa Nuclear Plant, which was damaged by the 2007 Niigata Chuetsu Offshore Earthquake, and the Hamaoka Nuclear Plant, which is located on top of the potential source fault of the expected "Tokai Earthquake." We suggest that the possibility of another large-scale accident similar to the one at Fukushima Daiichi should not be underestimated.

We, the members of The Group of Concerned Scientists and Engineers Calling for the Closure of the Kashiwazaki-Kariwa Nuclear Power Plant, have discussed how the current situation should be evaluated, and what kinds of demands need to be made to the electric power companies and the government. The following is the summary of our views.

1. WHAT HAS HAPPENED AT THE FUKUSHIMA NUCLEAR PLANTS, AND WHAT IS THE CURRENT STATUS?

As of today, the amount of information that has been released is too limited and inadequate to fully evaluate the progress of this accident over the past 10 days. Furthermore, given that many of the measuring instruments (thermometers, etc.) within the reactors seem to have been broken, we may never know the details of this accident. With these limitations in mind, our current view is as follows.

At the time of the earthquake, Units 1, 2 and 3 of the Fukushima Daiichi Plant were in operation. Units 4, 5 and 6 were not in operation because of periodic inspections. All four units of the Fukushima Daini (No.2) Plant were in operation. When the earthquake hit, the control rods of the four reactors of Fukushima Daini were automatically inserted, and this terminated the nuclear fission reaction of the fuel. At Fukushima Daiichi, however, the external power supply was cut off, the emergency diesel generators also failed, and the fuel tank for the generators seems to have been swept away by the tsunami. As a result of these problems, it became impossible to cool down the reactor cores, a critical procedure that should have occurred right after the nuclear reactors stopped working.

The Pressure Vessel and the Containment Vessel of Nuclear Reactors

Within Units 1, 2 and 3 of the Fukushima Daiichi Nuclear Plant, once the cooling water became unavailable, the water in the reactor core evaporated as a result of the decay heat from the fission products causing a drop in the water level. This resulted in the exposure of the fuel rods above the water level. When this condition continued, the melting of the fuel rods was inevitable.

TEPCO (Tokyo Electric Power Company) first attempted to connect an external fire pump to the plumbing in order to pour water into the nuclear reactor. This attempt was not successful, presumably because the water was not supplied from the water tank normally used to provide water to the reactor. As a result, the water level within the reactor continued to drop. When this condition occurred at Unit 1, it is said that TEPCO discussed the possibility of cooling the reactor using sea water, but that they decided not to do this immediately because, at that point, they still wanted to avoid decommissioning. The decision to use sea water was made later after the hydrogen explosion occurred at Unit 1. Because of this delay, the situation deteriorated very quickly.

The nuclear reactor is designed so that when the water within the pressure vessel evaporates and the pressure within the vessel increases, a safety relief valve opens to lower the pressure. When this happens, the vapor within the pressure vessel is sent to the suppression chamber of the containment vessel. Releasing the vapor causes the water level within the pressure vessel to drop further. If the safety valve is continuously open, the fuel rods become exposed above the water. Without enough cooling water, the temperature of the fuel rods increases, and eventually temperatures reach the point where the zircaloy cladding tubes of the fuel rods react chemically with water vapor, to produce hydrogen.

We believe that hydrogen in the containment vessel was the cause of the explosions at Units 1, 2 and 3. It is important to note that hydrogen explosions occurred in the upper part of the building shells of Units 1 and 3. On the other hand, the explosion at Unit 2 occurred in the lower section in the suppression chamber. It is important to understand why these two different patterns occurred. It is likely that the suppression chamber of Unit 2, as well as the reactors and pipework of all the units, were already damaged by the earthquake.

Storage Pool for Spent Fuel Rods

On March 15, a hydrogen explosion occurred at the storage pool for the spent fuel rods of Unit 4. On March 16, another explosion was reported at Unit 3. It is likely that spent fuel rods that were taken out of the reactors and kept in the storage pools were exposed to air, because the water level decreased within the pools. The exposed fuel rods must have reacted chemically with the water vapor producing hydrogen, which then chemically reacted explosively with oxygen.

Exposure of the spent fuel rods may have been caused not only by the evaporation of water but also by the loss of water within the storage pool due to sloshing (spillage) during the earthquake.

As a temporary measure, fire trucks discharged seawater into the fuel pools of Units 3 and 4. Ultimately, it will be necessary to restore electricity so that the water pump can be restarted to circulate the cooling water.

The large amount of water discharged from Units 3 and 4 has increased the possibility that water contaminated by radioactive materials may flow into the sea and ground water. In fact, high levels of radioactive iodine, cesium and other elements have been detected. The amount of these elements is greater than the standards considered safe by the government (reported by TEPCO on March 22).

Possibility of Further Crises at the Daiichi Plant

On March 21, an external power supply was connected to the Fukushima Daiichi Plant. As of the morning of March 23, however, electrical power is not connected to various instruments. We still do not know when the circulation of the cooling water will be restored. Although the amount of heat resulting from radioactive decay will decrease over time, it is possible that the delicate balance between the heat release and the cooling may be lost. There is still a danger that molten fuel deposited at the bottom of the pressure vessel, or the containment vessel could melt through the bottom of these vessels. Alternatively, the cores of one or more reactors could go critical.

According to TEPCO, neutron radiation was observed on March 14 and 15. This might be an indication that nuclear fission, or "criticality" occurred. Criticality can occur not only within the reactors but also in the fuel storage pools. For example, if the earthquake damaged the storage racks which separate individual fuel rods (e.g., cranes, manipulators or other instruments may have fallen onto the racks), criticality could occur because the fuel rods would become too close to each other.

2. THE DANGER OF RADIOACTIVE MATERIALS THAT ARE BEING RELEASED

Radioactive materials are being released into the air from the Fukushima Daiichi Plant. High levels of contamination have been observed in the vicinity of the nuclear plant. Radioactive materials that originated from the plant have also been reported in many parts of northeastern Japan. On March 21, contamination of agricultural products (including milk and spinach) above the level of the temporary standards set by the Food Sanitation Act were reported in Fukushima Prefecture as well as in several prefectures in the Kanto Region. Contamination of the sea water near the nuclear plant has also been reported. This may affect marine products.

How should we evaluate the level of radioactive contamination? Should we evacuate? Is it safe to eat agricultural products? Our view is the following.

Currently, a major problem is that TEPCO has not made any official announcements about the amounts of the discharged radioactive materials. As a result, it is extremely difficult to grasp the complete picture of the radiation contamination. Reports of radiation measurements at various observation stations are also limited. As of March 23, we still do not have full access to the radiation measurements from each prefecture. No results of the simulation of the dispersal patterns of radioactive materials have been published either. Given these limitations, it is difficult to make a conclusive statement about the levels and range of radioactive contamination.

When judging the contamination levels and taking actions to deal with the situation, it is important to distinguish between external radiation exposure and internal exposure. Radiation exposure within or above the nuclear plant site mainly comes directly from the exposed fuel rods. On the other hand, radiation exposure in the vicinity of the plant as well as in the areas further away from the plant comes from radioactive materials that were discharged into the air. In the latter case, radiation exposure can occur not only to the outside of the body but also inside the body if radioactive materials are ingested.

Because alpha particles and the beta particles emitted from the radioactive materials inside the body only penetrate a short distance, they destroy the structure of cells nearby in an intensive manner. This results in a high incidence of cancer. Given this, some scholars suggest that the legal upper limit for radiation exposure should be lower than the standard set by the report of ICRP (International Commission on Radiological Protection).

Workers' Radiation Exposure at the Nuclear Plant Site

Monitors within and above the nuclear plant site indicate that high levels of radiation above 100mSv/hr have been observed. As a result, workers' activities had to be frequently interrupted. Although the stabilization of the reactors to avoid critical dangers is an urgent matter, it is also important to ensure the safety of workers, including those from TEPCO, contracted companies, firefighters, and members of the Self Defense Forces. These people should not be exposed to high levels of radiation. The Health, Labor and Welfare Ministry has raised the upper legal limit of safe radiation exposure from 100mSv to 250 mSv. This change should not lead to an underestimation of radiation doses. Nor should it result in coercion of workers to force them to work in areas where they could be exposed to radiation.

Necessity to Evacuate from the 30km Zone

According to the standard set by the Disaster Prevention Guideline of the Nuclear Safety Commission, evacuation is in order when the estimate of the cumulative radiation level is above 50mSv, and staying inside is in order when the radiation level is above 10mSv . It is not clear on what kinds of data the evacuation order for the 20km zone from Fukushima Daiichi and the order to stay inside for the 30km zone were issued. It is likely that the seriousness of the situation has been underestimated. Furthermore, people who are staying indoors within the 30km zone are suffering from scarcity of supplies, partly because some transport companies are not willing to send their workers into this zone. An immediate evacuation order from this zone should be issued.

Evacuation from the 80km Zone Recommended by the US and Others

The United States government announced that they had told their citizens to evacuate from the zone 80km around the Fukushima Daiichi Nuclear Plant. Several other countries have taken similar actions. It is reasonable to assume that these countries had reasons for taking these actions, and that Japanese nationals living within this zone may also be in danger.

The decision to evacuate or not should be made on the basis of multiple factors, including one's living environment, relations with other people, and the possibility of finding a secure evacuation place. However, the evacuation of pregnant women (and babies in the womb), infants, and children should be a priority.

Areas within the 200km Zone, including the Tokyo Metropolitan District

There are reports that the radiation level within the 200km zone is as high as 1μSv/hr. If a person keeps receiving this amount of radiation for one year (8,760 hours), the cumulative amount will be 8.76mSv. This is above the legal limit for members of the public to be exposed to radiation (1mSv/yr). Critics may say that this amount is not much larger than the level of natural radiation, which is 1.2mSv/yr. Given the risk of additional internal exposure, however, the continuous exposure to this level of radiation may not be desirable.

The critical issue here is how long it will take for this emergency situation to end. It is necessary to closely monitor what happens next at the nuclear plant site and how the radiation measurements change.

Impacts on Agricultural Products

Food contamination by radioactive iodine and/or cesium in amounts that are above the temporary legal limits set by the Food Sanitation Act has been reported from tests on milk from Fukushima and from tests on vegetables (spinach etc.) from multiple prefectures in the Kanto Region. Food safety is being threatened. Following the regulation of the Act on Special Measures Concerning Nuclear Emergency Preparedness, the government suspended the shipment of certain vegetables from several prefectures. As a result, farmers had to discard their products. The government and TEPCO are responsible for compensation to the producers. Depending on the duration of this emergency status, agricultural production from various parts of Japan may be heavily damaged. To prevent further damage, it is critical that the release of further radioactivity be stopped and the cooling function of the nuclear reactors and fuel storage pools be restored as soon as possible.

3. LESSON FROM THE KASHIWAZAKI-KARIWA NUCLEAR PLANT ACCIDENT WAS WASTED

It is clear that the past accident at the Kashiwazaki-Kariwa Nuclear Power Plant, which narrowly escaped turning into a major accident, was a warning about Japanese nuclear plant policies. For the past four years, we have been making this point. Unfortunately, the Japanese government and TEPCO did not learn the lesson from the Kashiwazaki-Kariwa accident. We are angry and extremely disappointed by this.

Underestimation of the Possible Size of Earthquakes and Tsunamis

Many people who previously denied the possibility of any nuclear power plant accidents state that the scale of the earthquake, M9.0, and the size of the resultant tsunamis were beyond their expectation. It should be pointed out, however, that the scale of the Sumatra Earthquake on

December 26, 2004 was also M.9.0 and that it was associated with large tsunamis. The assumed level of tsunamis (a phenomenon commonly associated with earthquakes) at the Fukushima Daiichi Plant was inadequate. For example, the fuel tanks for the generators of Unit 1, which seem to have been swept away by the tsunami, were located near sea level, and were not protected from a large tsunami.

Delay of the Use of Sea Water to Cool the Reactors

As stated above, sources report that TEPCO discussed the possibility of cooling the reactor of Unit 1 using sea water as early as the morning of March 12, the day after the earthquake. Unfortunately, the decision to use the sea water was delayed until the evening of the same day, when the Prime Minister ordered TEPCO to do so after a hydrogen explosion occurred at Unit 1. The decisions to use sea water for the other two reactors were further delayed. Use of seawater did not occur until March 13 for Unit 3 and March 14 for Unit 2. The fuel pools were not filled with sea water until March 15, when an explosion and fire occurred at Unit 4. Because of these delays, the scale of the accident was amplified.

It is said that TEPCO initially did not want to use sea water, because the decision to use sea water would result in having to decommission the units. If this is true, it implies that TEPCO made profits their priority rather than the safety of people, and that NISA (Nuclear and Industrial Safety Agency) and associated bureaucrats and scholars supported TEPCO's decision. This structure of decision-making is similar to the one used during the safety review about resuming the operation of the Kashiwazaki-Kariwa Nuclear Plant.

Delay in Public Information Disclosure

TEPCO has been slow in disclosing information about damage to various instruments within the nuclear plant. Disclosure of data about various parameters, which are critical to understanding the conditions of the reactors, has also been slow. To date, it still is not possible to obtain such information on a real-time basis. Disclosure of relevant information is extremely important not only for the people living in the affected areas but also for concerned scholars and engineers who can help predict what will happen and who can make relevant suggestions. For example, scholars could have advised that sea water be used at an earlier stage if the relevant information had been adequately disclosed.

Information about the amount of radioactive materials emitted is also limited. To date, no concrete estimate of the total amount of radioactive materials emitted has been published. Radiation measurements at the monitoring posts within the nuclear power plant site are not available on a real-time basis. Additional monitoring posts have not been set up. No permanent surveillance video cameras are available. The government should disclose the radiation measurement data at various monitoring posts inside and outside of Fukushima Prefecture, and simulate the results to predict the dispersal patterns of radioactive materials. As of today, this has not occurred.

4. DEMANDS RE THE FUTURE OF THE KASHIWAZAKI-KARIWA NUCLEAR PLANTS

Three local groups that are against the Kashiwazaki-Kariwa Nuclear Plant, as well as the Prefectural Residents' Group to Protect Peoples' Lives and Hometowns from the Nuclear Power Plant (Genpatsu kara Inochi to Furusato o Mamoru Kenmin no Kai) have requested that the governor of Niigata Prefecture, the mayors of Kashiwazaki City and Kariwa Village, and the president of TEPCO listen to their call to immediately stop the four units of the Kashiwazaki-Kariwa Nuclear Plant. We strongly support their demand.

We also support their claim that scholars who previously denied the possibility of nuclear power accidents should not be in charge of the safety review as members of the Prefectural Technical Committee. It is necessary to reorganize this committee and appoint new members. The new committee should consist of scholars who have raised concerns about the safety of nuclear power plants, engineers who are familiar with nuclear plants, and representatives of prefectural residents.

The Nuclear and Industrial Safety Agency and the Nuclear Safety Commission, both of whom have been in charge of the safety reviews of nuclear plants in Japan, are responsible for the current situation. The Japanese review system is inferior to the review systems of other countries, such as the US Nuclear Regulatory Commission. Since the scale of the earthquake that struck the Kashiwazaki-Kariwa Plant was much larger than originally assumed, the Japanese government carried out a review of all the nuclear plants within the country, including the Fukushima Nuclear Plants. The current "nuclear earthquake disaster" (genpatsu shinsai) at *Continued on page 8*

Can there be a silver lining?

Opinion Article published by Kyodo News, March 28, 2011 by CNIC International Liaison Officer, Philip White

The most remarkable thing about the response so far to the "gempatsu shinsai" (nuclear-earthquake disaster) that has engulfed Japan is that there are still people who think nuclear power has a future. Should this be attributed more to the dependence of modern industrialized societies on massive inputs of energy, or to a collective lack of imagination?

We do not yet know how this unfolding catastrophe will end, but we can be sure that if most of the radioactivity in the Fukushima Daichi Nuclear Power Plant remains on site, then the true believers will claim that this is as bad as it gets and that the risk is worth taking. The environmental damage of localized contamination and releases to sea will be discounted and long-term health impacts from exposure to low levels of radiation will be denied. Even those workers who suffer from acute radiation sickness will not find their way into the most commonly quoted statistics, unless they die promptly.

The truth is that even in the best-case scenario the environmental and human consequences of this disaster will be enormous. The potential impact of a worst-case scenario is beyond most people's comprehension. To give an indication of the amount of radioactive material involved, the total capacity of the three reactors that were operating at the time of the earthquake was double that of the Chernobyl number 4 reactor that exploded 25 years ago in the Ukraine. To this you have to add the radioactivity in the spent fuel pools of all 6 units and of the shared spent fuel pool.

All of this is at risk and, due to the long-term heat generating properties of the fuel, the situation will not be stabilized any time soon. Even if the radioactivity does not travel far, the release of just a fraction would have incalculable consequences for human beings and the environment.

Besides the true believers, there are also those who regard nuclear energy as a necessary evil. They don't particularly like it, but they see no alternative. But is it true that there is no alternative? For those who can't see beyond the current centralized, supply-driven electricity power systems and who assume an eternally increasing demand for energy, then perhaps it is difficult to imagine how modern societies could survive without nuclear power. But if you allow the possibility of decentralized systems that reward the efficient provision of energy services, rather than the supply of raw energy, then hitherto unimagined options open up.

After last year's oil spill in the Gulf of Mexico and now the Fukushima Daiichi "gempatsu shinsai", people must realize that business as usual is not an option.

To claim that nuclear energy has a future represents a colossal failure of our collective imagination - a failure to imagine the risks involved and a failure to imagine how we could do things differently. If future generations are to say that there was a silver lining to the cloud of the Fukushima Daiichi disaster, it will be because human beings now looked beyond their recent history and chose to build a society that was not subject to catastrophic risks of human making.

Continued from page 7 the Fukushima Plants revealed that the review was not thorough enough.

Scholars and Engineers of The Group of Concerned Scientists and Engineers Calling for the Closure of the Kashiwazaki-Kariwa Nuclear Power Plant have been working closely with local residents to examine the reliability of "seismic ground motion evaluation" and "seismic safety evaluation" of equipment. "Seismic ground motion evaluation", which deals with natural phenomena, is not always reliable. Furthermore, "seismic safety evaluation" of human-made instruments is also unreliable due to many unknown factors. Using "the judgment of engineers," the government and the electric power company dismissed the possibility of severe damage from an earthquake as unlikely, and resumed the operation of the Kashiwazaki-Kariwa Nuclear Plant. We have voiced our opinion that this decision was a mistake. The current "nuclear earthquake disaster" at the Fukushima Plants revealed that our concern was justified.

We will continue our efforts to prevent any future "nuclear earthquake disaster" in Japan.

Future of Kaminoseki Nuclear Power Plant Uncertain

In response to public concern about the great earthquake that hit NPPs in Fukushima on March 11, the governor of Yamaguchi Prefecture, who had granted permission to Chugoku Electric Power Company to begin sea reclamation work for the Kaminoseki Nuclear Power Plant, asked the company to suspend the work. Indicating its reluctance to respond to the request, the company is still sending a small number of workers to the site to evaluate the earthquake risk of the site.

Before the earthquake struck Chugoku Electric was forging ahead in the face of strong protests.

On Sunday, February 20, 2011, the People of Iwaishima's Association against the Kaminoseki Nuclear Station released an urgent notice on its blog: "We expect Chugoku Electric Power to come to restart sea reclamation work tomorrow, with hundreds of workers." Chugoku Electric had never been to the planned NPP site with such a large number of people.

As was expected, Chugoku Electric Power appeared on February 21. About two o'clock in the morning, 400 workers showed up on the seashore where the Kaminoseki Nuclear Power Station is proposed. Although it made no substantial progress in sea reclamation because of protest by Iwaishima islanders and others, the power company announced that they had duly restarted reclamation work.

At the site, Chugoku Electric also announced that those who hindered the reclamation work would be placed under the sanction of payment of 5 million yen. The company had applied for a provisional injunction against 12 protesters with the Yamaguchi District Court, and the court made a decision in favor of the company on the day. Also on the same day, the company applied for another provisional injunction, claiming that any fishing boats and kayaks should not interfere with the company's ships in the waters near the proposed NPP site. Criticism is arising that the application is a SLAPP suit (Strategic Lawsuit Against Public Participation).

The reason why the appearance of Chugoku Electric, the court decision, and the application occurred on the same day is unknown.

The tense standoff continued until the afternoon of February 23, when two protesters were injured. According to the People of Iwaishima's Association, they were crushed by security guards when they tried to stop workers from driving piles on the shore.

While mass media has been ignoring what is happening in Kaminoseki, the news is spreading on the Internet. Ustream channel Mangetsu TV was live broadcasting from the NPP site and showed the crush in real time. There were more than 1,000 viewers when it occurred. Opinions and thoughts were exchanged on Twitter.

The movie Mitsubachi no Haoto to Chikyu no Kaiten ("The hum of the honeybee and the rotation of the Earth"), which features Iwaishima islanders' protest against the Kaminoseki NPP project, opened in Tokyo on February 19, two days before Chugoku Electric appeared en masse. As an increasing number of people learn of the controversy, the theater has decided to prolong the period of the show.

In protest against the power company's unscrupulous move, Diet members, citizens concerned with nuclear power, and conservationists took urgent actions. At least two groups of citizens visited Chugoku Electric's Tokyo office and one group visited its head office in Hiroshima, demanding that the company suspend sea reclamation work.

An emergency gathering was held in a Diet members' building in Tokyo. Nine Diet members participated, showing the strong interest in the issue. The Japan Civil Network for Convention on Biological Diversity (JCN-CBD) also organized an urgent gathering. Pointing out that Japan was the host country of the COP10 Convention on Biological Diversity (held in Nagoya, Aichi Prefecture in October 2010), JCN-CBD demanded that the Japanese government make utmost efforts to meet the Aichi Targets adopted at the conference and review the Kaminoseki NPP project, which would destroy the environmentally valuable area in Kaminoseki. These gatherings were live broadcasted by Ustream.

Mayumi Nishioka
(Network of Citizens for the Cancellation of the Kaminoseki NPP Project and for the Preservation of the Seto Inland Sea Area)

Hunger Strike Against Kaminoseki Nuclear Power Plant

Further evidence of the depth of opposition to Chugoku Electric Power Company's planned Kaminoseki Nuclear Power Plant was provided by five young men (two aged 19, three aged 20), who braved cold and snow during a ten-day hunger strike from January 21 to 30 outside the Yamaguchi Prefectural Government offices in Yamaguchi City. The Ministry of Economy, Trade and Industry is currently conducting a safety assessment of the proposed plant, but landfill and sea reclamation work at the site, located on the coast of the environmentally sensitive Seto Inland Sea, has already begun. The Seto Inland Sea is sometimes referred to as Japan's Galapagos because of its rich environmental diversity (see NIT 133).

At the beginning of their action, the hunger strikers issued a statement in which they said, "We decided to take this action because we do not want the radioactive waste that will arise and the radioactivity that will accumulate in the sea and the atmosphere as a consequence of constructing and operating this nuclear power plant to be left to our own and our children's generations." In a follow-up statement issued after they ended their hunger strike they said, "We believe that it is precisely because Japan knows the horror of nuclear weapons that it should abandon nuclear power."

Some of the hunger strikers had previously participated in the 800-kilometer "7 Generations Walk" from Kaminoseki to Nagoya, where COP 10 of the Convention on Biological Diversity was held in October 2010.

In another initiative, the people of Iwaishima Island, located 3.5 kilometers across the sea from the proposed nuclear power plant, are aiming to achieve energy self-sufficiency. In January, a steering body was set up to raise funds and install solar cells and other renewable energy facilities. The project is being undertaken by a group of residents opposed to the nuclear power plant and the Institute for Sustainable Energy Policies (ISEP), a Tokyo-based nongovernmental organization. According to ISEP executive director Tetsunari Iida, the project is the first full-fledged attempt in Japan to fully meet energy demand in a specific region with renewable sources.

Philip White (CNIC)

Epidemiological Study of Workers at Nuclear Power Generating Facilities (4th Period FY2005 to FY2009)

The study should not simply say "how much irradiation is acceptable"

In September 2010, the Epidemiological Study of Workers at Nuclear Power Generating Facilities, etc. (4th Period, FY2005 to FY2009) was finalized and published. This epidemiological study was commissioned to the Radiation Effects Association by the Ministry of Education, Culture, Sports, Science and Technology (MEXT - formerly the Science and Technology Agency). The main aim of the study was to "gain scientific knowledge on the impacts of low-level radiation on the human body."

Previous reports (1st Period Study, FY1990 to FY1994; 2nd Period Study, FY1995 to FY1999; 3rd Period Study FY2000 to FY2004) have studied such topics as the comparison with the death rate of the total Japanese male population and the association between radiation dosage and death rate.

In this 4th Period Study, as shown in the tables, a comparison between the death rate of the total Japanese male population (external comparison: the standardized mortality ratio (SMR) from 20 years of age and over to 84 years of age) shows an SMR of 1.04 for all malignant neoplasms excluding leukemia (1.01 to 1.07 in the 95% confidence interval), confirming a significantly high death rate. The SMRs for cancers by site were liver cancer 1.13 (1.06 to 1.21) and lung cancer 1.08 (1.02 to 1.14), confirming a significantly high death rate.

In the trend test (internal comparison: trend test) for death rate and cumulative radiation dosage within workers for all neoplasms excluding leukemia, it was confirmed that there is a significant trend for death rate to increase with increasing radiation dosage. Looking at cancers by site, concerning death rates for cancer of the esophagus, liver cancer and lung cancer, and the death rates for non-Hodgkin's lymphoma and multiple myeloma, it was confirmed that there is a significant trend for death rate to increase with increasing radiation dosage.

However the report concludes, "It can be said that there is no clear evidence confirming that low-level ionizing radiation has an impact on cancer death rates." Regarding the statistically significant associations, the report states, "The possibility of impacts due to confounding with such lifestyle habits as smoking cannot be ruled out," and "The possibility that a significant association with radiation dosage has been indicated by chance cannot be ruled out."

These results have been shamelessly put forward in materials for the deliberations on a new Framework for Nuclear Energy Policy and in our negotiations with the government for widening the framework for approval for nuclear power facility workers under the Workers' Accident Compensation Insurance system that we have been campaigning for.

In the English paper by Tamiko Iwasaki

Table 1. Outline of the Epidemiological Study

	1st Period	2nd Period	3rd Period	4th Period
Tracking Information	To March 1994	To March 1999	To March 2004	To March 2009
Dosage Information	To March 1993	To March 1998	To March 2003	To March 2008
Cause of Death Information	To December 1992	To December 1997	To December 2002	To December 2007
Final Date of Observation	To 31 December 1992	To 31 December 1997	To 31 December 2002	To December 31 2007
Observation Period (a)	Total Observation Period	F-L Observation Period	F-L Observation Period	F-L Observation Period
No. of Subjects	114900	119484	200583	203904
Of these, Deceased	1758	2934	7670	14224
Total person-years	533000	539000	1373000	2227000
Avg. Length of Observation	4.6 years	4.5 years	6.8 years	10.9 years
Avg. Dosage (mSv)	13.9	15.3	12.2	13.3

Notes: (a) 'Total Observation Period' includes backward-looking observation. 'F-L' is 'forward-looking'. Forward-looking observation indicates that information is gathered and observation carried out onwards from the point in time when tracking has begun. When information is gathered and observations carried out by going back in time, this is known as backward-looking observation.

Table 2. Comparison of Death Rates of Workers with Death Rates of the Total Male Population of Japan

(External comparison; standardized mortality ratio [SMR] from 20 and over to 84 years of age)

Cause of Death	Observed Deaths	Expected Deaths	SMR	95% Confidence Interval	p value for the result of the two-sided test
All neoplasms	5839	5617.5	1.04	(1.01 - 1.07)	0.003
All malignant neoplasms	5711	5489.4	1.04	(1.01 - 1.07)	0.003
Liver cancer	938	829.2	1.13	(1.06 - 1.21)	<0.001
Lung cancer	1208	1117.8	1.08	(1.02 - 1.14)	0.007
All malignant neoplasms except leukemia	5576	5353.1	1.04	(1.01 - 1.07)	0.002

Note 1. Standardized Mortality Ratio, SMR = Observed Deaths / Expected Deaths

Note 2. 95% Confidence Interval: Indicates the 95% confidence interval of SMR (point estimation value)

Note 3. The two-sided test is a test that simultaneously looks to see if SMR is larger than 1 or smaller than 1. In this study, the p value of the two-sided test was calculated at the time as SMR determination. If the obtained p value of the two-sided test is 0.05 or less, it is judged that 'the SMR significantly differs from 1' at the 5% significance level.

(former Director of the Center for Radiation Epidemiological Studies) et al., published in Radiation Research 159 (2003), regarding the 2nd period epidemiological study (1986 to 1997 analysis) it was reported that, "A positive correlation was found with esophageal, stomach and rectum cancers and with multiple myeloma," despite the fact that releases inside Japan have consistently stated that, "Clear evidence of impacts on cancer death rates have not been confirmed."

A characteristic feature of the Japanese nuclear industry is the structure of multiple layers of sub-contracting, 96% of the total radiation dosage being borne by subcontracted workers. Those who have possibly been exposed to large radiation dosages, foreign nationals and those without a certificate of residence, have been excluded from this study. The attitude and policy that has been adopted is one that considers exposure up to a level where "clear evidence" of health impacts is seen as acceptable, but an epidemiological study should never be carried out on this premise.

Mikiko Watanabe (CNIC)

CNIC Statement Concerning Evacuation from Area Surrounding the Fukushima Daiichi Nuclear Power Plant

March 20, 2011

We Urge the Japanese Government to Take the Following Actions Regarding the Crisis at the Fukushima Nuclear Plants:

Despite strenuous efforts, there is an increasing danger that large amounts of radioactive material might be released from Unit No. 3, which is loaded with fuel containing plutonium. We are particularly concerned about the people currently within the 20-30 km zone from Fukushima Daiichi, who have been instructed to stay indoors until further notice. These people should be evacuated as quickly as possible far away from the nuclear plant.

CNIC has been urging the government to prioritize evacuation of pregnant women, infants and children. We once again strongly urge the government to take these actions.

It is also necessary to evacuate people from areas outside the 30 km zone that may be contaminated with significant amounts of radioactive materials. We demand that the government proceed to a rapid evacuation.

(We note that it is our understanding that a short-term stay in these areas for the purpose of rescue operations will not entail major risk.)

Table 3. Tendency Test of Cumulative Radiation Dosage and Death Rates of Workers

O/E Ratio by by cause of death and by cumulative radiation dosage group, and results of trend test

Cause of Death	Cumulative Radiation Dosage Group (mSv)					p value result of the two-sided trend test (a)
	<10	10-	20-	50-	100+	
	Observed Deaths	Observed Deaths	Observed Deaths	Observed Deaths	Observed Deaths	
	Expected Deaths	Expected Deaths	Expected Deaths	Expected Deaths	Expected Deaths	
	O/E Ratio	O/E Ratio	O/E Ratio	O/E Ratio	O/E Ratio	
	95% Conf. Int.	95% Conf. Int.	95% Conf. Int.	95% Conf. Int.	95% Conf. Int.	
All neoplasms	3.915	501	532	249	129	0.031
	3987.8	486	500	230.4	121.8	
	0.98	1.03	1.06	1.08	1.06	
	(0.95 to 1.01)	(0.94 to 1.13)	(0.98 to 1.16)	(0.95 to 1.22)	(0.88 to 1.26)	
All malignant neoplasms	3822	494	526	245	124	0.032
	3902.6	475	488.9	225.3	119.1	
	0.98	1.04	1.08	1.09	1.04	
	(0.95 to 1.01)	(0.95 to 1.14)	(0.99 to 1.17)	(0.96 to 1.23)	(0.87 to 1.24)	
Esophagal cancer	200	29	32	20	8	0.039
	215.3	26.4	27.3	12.9	7.1	
	0.93	1.1	1.17	1.55	1.12	
	(0.80 to 1.07)	(0.73 to 1.58)	(0.80 to 1.66)	(0.95 to 2.40)	(0.48 to 2.21)	
Liver cancer	620	90	86	39	25	0.025
	645.1	79.5	80.7	36.2	18.5	
	0.96	1.13	1.07	1.08	1.35	
	(0.89 to 1.04)	(0.91 to 1.39)	(0.85 to 1.32)	(0.77 to 1.47)	(0.88 to 2.00)	
Lung cancer	801	102	118	56	33	0.007
	832.4	100.3	103.9	47.9	25.6	
	0.96	1.02	1.14	1.17	1.29	
	(0.90 to 1.03)	(0.83 - 1.24)	(0.94 - 1.36)	(0.88 - 1.52)	(0.89 - 1.81)	
Non-Hodgkin's Lymphoma	69	9	14	7	4	0.028
	76.8	9.4	9.7	4.6	2.5	
	0.9	0.95	1.45	1.54	1.58	
	(0.70 - 1.14)	(0.44 - 1.81)	(0.79 - 2.43)	(0.62 - 3.17)	(0.43 - 4.05)	
Multiple myelosis	22	3	2	1	3	0.032
	22.8	2.9	3.1	1.5	0.7	
	0.96	1.03	0.65	0.68	4.06	
	(0.60 - 1.46)	(0.21 - 3.02)	(0.08 - 2.37)	(0.02 - 3.81)	(0.84 - 11.87)	
All malignant neoplasms except leukemia	3730	484	511	242	122	0.024
	3811.7	463.8	477.3	219.3	116.4	
	0.98	1.04	1.07	1.1	1.05	
	(0.95 - 1.01)	(0.95 - 1.14)	(0.98 - 1.17)	(0.97 - 1.25)	(0.87 - 1.25)	

Note (a). In this epidemiological study, the result indicated is the determination of the null hypothesis 'the death rate does not rise with an increase in cumulative radiation dosage.' When this p value is 0.05 (5%) or less, the null hypothesis is rejected and it is judged that the death rate of the analyzed subject group increases as the cumulative radiation dosage increases.

South Texas Project Nuclear Power Plant: International Letter and Petition to Japanese Government

The Japan Bank for International Cooperation (JBIC) posted a notice on its web site on January 7 saying that it had officially commenced the environmental and social screening process for two new nuclear power plants at the South Texas Project Nuclear Power Station. If approved it will be the first time JBIC has financed a major nuclear construction project.

Responding to JBIC's announcement, on February 24 more than 170 organizations from the U.S., Japan and across the world sent a letter (see below) to Japanese Prime Minister Naoto Kan and key members of his Cabinet urging them to reject a multi-billion dollar loan for construction of the two nuclear reactors.

The following week, on March 11, a petition signed by some 6,000 people from around the world was delivered to the Japanese government. The petition noted, "Investing in dangerous, dirty and expensive nuclear reactor projects in another country -- and leaving the citizens of that country to cope with the lethal radioactive waste and constant threat of nuclear meltdown -- is certainly not an example of 'international cooperation'."

This warning was confirmed that very day. I was in the Diet Offices delivering the petition to Government Ministers and other Diet Members when the Tohoku Pacific Offshore Earthquake hit the Fukushima Daiichi Nuclear Power Station.

When asked about the NGO letter at a press conference on February 25, government spokesperson Chief Cabinet Secretary Yukio Edano said that nothing has been decided, that financial risks will be duly considered and that the NGO letter will be taken into account. Common sense would suggest that the nuclear earthquake disaster effectively ended the chances of JBIC funding nuclear exports. Toshiba might have other ideas, but certainly TEPCO is in no position to participate in the construction of new nuclear power plants at South Texas Project.

Philip White (CNIC)

February 16, 2011

Mr Naoto Kan
Prime Minister of Japan

Honorable Prime Minister,

We are writing to urge you to prevent a loan guarantee from the Japan Bank for International Cooperation (JBIC) for the proposed atomic reactor project at the South Texas site in the U.S. state of Texas. Such a loan would entail extraordinary financial and social risk for the JBIC and the Japanese people.

All currently proposed reactor projects in the United States face a challenging economic environment caused by unfavorable market conditions; escalating projected construction costs; decreased electricity demand growth; low natural gas prices and increased competition from safe, clean renewable energy sources. With a deregulated, competitive power market and some of the lowest wholesale electricity prices in the country, Texas is a particularly risky U.S. state in which to invest in expensive new reactors.

The projected cost for the two South Texas reactors has increased from $5.6 billion in 2006 to as much as $18 billion today.[1] Last year, the City of San Antonio reduced its investment in the project by 85 percent because of the rising cost estimates. San Antonio's municipal utility, CPS Energy, sued their partner NRG Energy (the loan guarantee applicant) for $32 billion, alleging fraud, illegal conduct, and conspiracy over cost estimates and citing NRG's deals with outside partners. NRG has been desperately pursuing other municipal utilities to commit to purchase electricity from the proposed reactors by promising fixed priced energy and other incentives that would further undermine the economic viability of the project.

New nuclear reactors in Texas would produce energy at far higher costs than the market price of power in the state. An independent assessment conducted for Texas' main grid operator ERCOT (Electric Reliability Council of Texas) found that the cost of the South Texas reactors would exceed the revenue they would generate in the market by 33 to 52 percent.[2]

Texas has a host of lower-cost alternatives, especially wind and natural gas, that will continue to meet the need for electricity. Texas is the number one wind market in the United States with more than 10,000MW in service. Natural gas reserves are adequate for 100 years, thus assuring low-cost energy for a long time. A 2010 analysis done for ERCOT projects per kilowatt capital costs for solar power to already be cheaper than nuclear power in Texas-a cost advantage that is projected to grow wider under every possible scenario envisioned.[3] Currently, the average wholesale cost for electricity in Texas is 3.7 cents per kilowatt-hour, while electricity from new reactors with capital costs in South Texas' range is estimated to cost between 12 cents to 20 cents per kilowatt-hour. Moreover, 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. This is partly due to the U.S. recession, of course, but also due to increasing energy efficiency throughout the U.S. economy.

Due to Japanese corporate involvement in the proposed South Texas reactor project, it might appear that it would make a good investment. The reality, however, is that the projects involving Japanese companies will suffer the same delays, design problems, financial difficulties and determined public opposition as other proposed nuclear projects.

Moreover, the history of U.S. nuclear reactor construction does not provide room for optimism. According to a 1986 study from the U.S. Department of Energy's Energy Information Administration (EIA), the average cost overrun of the first 75 U.S. nuclear reactor projects was 207 percent - or more than triple the original estimated cost.[4] The cost overruns of the last 50 reactors built in the U.S. were even higher, reaching as much as 800% over-budget. Such extraordinary cost overruns led to multi-billion-dollar bond defaults, utility bankruptcy, and significant financial losses by utilities. Nothing in the U.S. experience suggests that new reactor projects will be any more successful at containing costs than past projects.

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 reactors in the United States. We respectfully suggest that Japanese taxpayers would not want to lose money on a U.S. reactor project. Nor would U.S. taxpayers want to bail out JBIC when the predictable losses occur. Such outcomes would obviously be uncomfortable on both sides of the Pacific.

Sincerely,

cc:
Mr Banri Kaieda
Minister of Economy, Trade and Industry

Mr Yoshihiko Noda
Minister of Finance

Mr Koichiro Gemba
Minister for National Policy

1. Nuclear Expansion could cost $18.2 billon, San Antonio Express-News, December 23, 2009
2. Potomac Economics, LTD., Independent Market Monitor for the ERCOT Wholesale Market, 2009 State of the Market Report for the ERCOT Wholesale Electricity Markets, July 2010, http://www.puc.state.tx.us/wmo/documents/annual_reports/2009annualreport.pdf.
3. ERCOT Scenario Development Working Group, Scenario Assumptions Spreadsheet, September 2010. http://www.ercot.com/calendar/2010/09/20100910-SDWG
4. An Analysis of Nuclear Power Plant Construction Costs, January 1, 1986, Energy Information Administration, Technical Report DOE/EIA-0485

Toshiba-Tenex Enriched Uranium Joint Venture: Japan-Russia Bilateral Nuclear Cooperation Agreement

On February 9 Toshiba announced that it had agreed to start discussions on establishing a joint venture for enriched uranium sales with Russian company Tenex. Tenex (Techsnabexport) is a subsidiary of Russia's Atomenergoprom (AEP), which supervises Russia's civilian nuclear power generation businesses and is a part of state nuclear corporation Rosatom.

Toshiba and Tenex are involved in continuing discussions on possible cooperation in the nuclear fuel business under a May 2009 memorandum of understanding. Toshiba says that the purpose of the joint venture is to “draw on the complementary capabilities of the companies: Tenex's supply of enriched uranium and Toshiba Group's nuclear fuel supply chain.”

Before its memorandum of understanding with Tenex, Toshiba and AEP signed a general framework agreement in March 2008 on the possibility of partnerships in fields including the front-end civilian nuclear fuel-cycle business, construction of commercial nuclear power plants and the manufacturing and maintenance of large equipment. In its February 9, 2011 press release Toshiba said that it and AEP "continue to discuss possible collaboration."

Besides the proposed uranium enrichment joint venture with Tenex, Toshiba has also invested in a uranium enrichment project in the United States. In September 2010 it invested in USEC’s American Centrifuge Plant as the first phase of a partnership agreement announced in May 2010. With these and other investments, Toshiba is attempting to connect the links in the front end of the nuclear fuel chain – uranium mining, enrichment and fuel fabrication – to ensure that it can guarantee a secure supply of fuel for nuclear power plants that it hopes to build around the world.

Bilateral Nuclear Cooperation Agreement

Meanwhile, the Japanese Government is preparing to submit a nuclear cooperation agreement between Japan and Russia to the Diet for approval. The Japanese and Russian Governments signed the agreement on May 12, 2009 when Prime Minister Vladimir Putin was in Japan. It was endorsed by the Russian Duma on December 22, 2010 and by the Federation Council on December 24, but submission to the Japanese Diet was delayed because none of Russia’s nuclear facilities were subject to International Atomic Energy Agency (IAEA) safeguards. This problem has not been solved, but the Japanese Government is now preparing to use a loophole to enable ratification.

The Japanese Government accepts the dubious principle that because Russia is a nuclear weapons state it does not have to place all its nuclear facilities (not even all its so-called “civilian facilities”) under IAEA safeguards. The bilateral agreement only requires that the IAEA must have selected at least one Russian facility for the application of safeguards. Japanese nuclear material, equipment and technology may be used in unsafeguarded facilities.

On December 13 the “first full-scale IAEA inspection” was carried out at a “storage facility” within the International Uranium Enrichment Center (IUEC)1, located on the Angarsk Electrolytic Chemical Combine in Siberia. Although the scope of the safeguards is not public, it appears that this storage facility refers only to a Low-Enriched Uranium (LEU) Reserve that Russia set up within the IUEC under an agreement with the IAEA signed in March 29, 2010. The purpose of the LEU Reserve is ostensibly to provide a backup supply for countries experiencing a disruption in the supply of LEU that is not related to technical or commercial considerations. Setting aside the impracticality of this “guarantee”, the LEU Reserve has no connection whatsoever with nuclear cooperation between Japan and Russia. Nevertheless, the existence of this single facility under IAEA safeguards is being used as an excuse by the Japanese Government to proceed with ratification of the bilateral agreement. The prime reason for the rush to ratify is that Toshiba wants to clear the way for nuclear cooperation with Russia.

In response to inquiries by CNIC, the Ministry of Foreign Affairs (MoFA) said ratification of the bilateral agreement should not be confused with approval of specific cooperation. No doubt the MoFA is encouraging Russia to place under IAEA safeguards facilities that could potentially be involved in nuclear cooperation between the two countries. In itself that is laudable, but it misses the fundamental point that no nuclear cooperation agreement should be ratified which permits Japanese nuclear material, equipment and technology to be transferred to unsafeguarded facilities.

Philip White (CNIC)

1. IUEC is jointly owned by Rosatom (80%), Kazatomprom (10%) and Ukraine's Nuclear Fuel holding (10%).

Anti-Nuke Who's Who

Hatsumi Ishimaru
a fired up ordinary housewife

by Kyoko Nakamura*

Hatsumi Ishimaru is just an ordinary country housewife of the type you might find anywhere in Japan.

She played the horn in her high school's brass band and married a rather handsome clarinetist in the same band. Together they have raised two sons and two daughters, all of whom are fine caring young people. Her husband deals in securities. At 60 he is not afraid to boast about his wife to anyone, saying, "Hatsumi's cute isn't she." Perhaps that is a bit strange, but in every other way all the family are normal cheerful people.

Hatsumi worked very hard while she was raising her children. She helped support the family by working as an accountant, a job at which she was very skilled. During that time, due to conflicts between the tendency for accounting to become mired in corruption and her sense of justice, she went from one company to the other. All the time this ordinary housewife just worked as hard as she could for the sake of her family.

Naturally, her life had no connection with nuclear power plants. But then in February 2006 Saga Prefecture announced that it would permit the implementation of pluthermal[1] at Unit 3 of Kyushu Electric Power Company's Genkai Nuclear Power Plant. A citizens campaign arose in opposition to this and, at the invitation of a former teacher, Hatsumi found herself attending a meeting, whether she wanted to or not. But as she listened Hatsumi's, or should I say rather "this ordinary housewife's" instincts told her, "This is dangerous." At the same time, her sense of justice told her, "This has to be stopped." Hatsumi was fired up and ever since she has been distributing leaflets and collecting signatures and the whole bit.

Hatsumi is now leader of the Genkai Pluthermal Lawsuit Group, but she is a bit different from other leaders. In fact, she is not really a "leader" at all. The role of "leader" wouldn't suit her. The reason why she is nominally the leader is because of her ability to connect people. The network she has created in the few years that she has been involved in the movement against nuclear power is amazing.

Hatsumi Ishimaru with her husband

She joins hands with people on equal terms. That's why she cannot be in a hierarchical relationship with them. Perhaps to some people the group just looks like a heap of old acorns lying around.

But isn't that just what civil society movements should be like? And in the end, bound together by Hatsumi's enthusiasm, real unity is formed. When the time comes for everyone to pull together and combine their wisdom, it is Hatsumi who is running back and forth between people. Unselfish, pure-hearted, intuitive and honest and mighty strong: that's the type of person the leader of our heap of old acorns club, Hatsumi Ishimaru, is.

1. The term 'pluthermal' refers to the use of plutonium in light water reactors. The fuel is made from a mixed oxide of plutonium and uranium (MOX).

* Kyoko Nakamura is a member of the Genkai Pluthermal Lawsuit Group.

NEWS WATCH

Permission to operate Fukushima I Unit 1 beyond 40 years granted - one month before it was wiped out by an earthquake and tsunami

On March 26 it would have been 40 years since commercial operations began for reactor Fukushima I Unit 1 (BWR, 460MW). Permission to continue operations beyond that date was given on February 7 by the Ministry of Economy, Trade and Industry. It was the third reactor in Japan for which permission was granted to extend operations beyond 40 years. The other two were Mihama-1 (NIT 140) and Tsuruga 1 (NIT 135).

JAPCO: the best laid schemes of mice and men

Over the past few months Japan Atomic Power Company (JAPCO) has been signing nuclear cooperation agreements left right and center with companies in countries wishing to develop nuclear power programs for the first time.

Agreements with Thailand, Kazakhstan and Vietnam were reported in NIT 139 and 140. On February 16 this year JAPCO announced that it had confirmed details with Electricity of Vietnam relating to the provision of information and technical support for a feasibility study covering two nuclear power plants referred to in an October 31, 2010 joint statement by Japanese Prime Minister Naoto Kan and Vietnamese Prime Minister Nguyen Tan Dung (see NIT 139). Then on March 3 the Denki Shimbun (Electric Daily News) reported that in January JAPCO had applied to carry out a feasibility study for the Indonesian Government.

However any rewards JAPCO might have hoped to reap as a result of these agreements are drifting away like a mouse on a tsunami. Representatives of the Thai and Indonesian governments have expressed caution since the Fukushima Daiichi nuclear earthquake disaster. Vietnam asserted that it was determined to proceed with its plans, but, rhetoric aside, it is hard to imagine that its nuclear power program will be unaffected by the disaster at Fukushima Daiichi. Even if Vietnam proceeds as planned, Japan's image as a safe operator of nuclear power plants has been severely tarnished and its ability to provide cheap finance will be challenged by the massive cost of recovery from the earthquake, tsunami and nuclear disaster. (See page 1.)

Cost Increases at Monju, Rokkasho Reprocessing Plant

On February 14, Japan Atomic Energy Agency (JAEA) announced costs of 1.38 trillion yen to recover the relay device that fell into the core of Monju's nuclear reactor vessel. Recovery of the fallen relay device is expected to cost about 0.94 trillion yen and a newly fabricated device for relay use is expected to cost about 0.44 trillion yen.

On February 21, at a meeting of the Japan Atomic Energy Commission's nuclear policy planning council, Yoshihiko Kawai, President of Japan Nuclear Fuel Limited (JNFL), announced a cost increase of about 200 trillion yen as a result of the two-year delay in completing construction of the Rokkasho Reprocessing Plant. However he explained that an investment in September last year of 400 trillion yen for debt reduction would, in the long-run, only represent a small minus, because of the consequent reduction in interest payments of about 200 trillion yen.

Monju official commits suicide

On February 14, the dead body of a 57 year-old man who was in charge of the fuel environment of FBR prototype Monju (280MW) was found in the mountains of Tsuruga City, Fukui Prefecture. He went missing on the 13th and it is presumed that he committed suicide. He was in charge of recovering a relay device that accidentally fell into the core of Monju's nuclear reactor. Also at Monju, after the 1995 sodium leak and fire accident responsibility for falsified reports fell on a public relations executive, who then committed suicide.

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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Editor: Nozomu Nagai
Translators: Philip White, Erik Strommen, Rick Ricketts, Junko Habu, Tony Boys
Proof Readers: Yukio Yamaguchi, Baku Nishio