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Citizens' Nuclear Information Center

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Fukushima Daiichi Nuclear Power Station Accident – Two Years On



Construction of a new water processing plant 'ALPS' at the Fukushima Daiichi Nuclear Power Station, October 2012. (cc) OZAKI TAKASHI

It is now two years since the Great East Japan Earthquake disaster and the Tokyo Electric Power Company (TEPCO) Fukushima Daiichi Nuclear Power Station accident.

Restoration and reconstruction in the disaster-stricken areas has not been easy. Although it was anticipated from the start, restoration work has been especially hard in Fukushima. This is because it is impossible to find an effective way of dealing with the radioactive contamination. Not only Fukushima Prefecture, but all the areas that are suffering from radioactive contamination share the problem of the uncertain future of the children. The mayor of Futaba Town, which moved

en masse to Saitama Prefecture after the accident, resigned on February 12, 2013 after stating that it would be 30 years before the people could return

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to their hometown. It is thought that the mayor intended to say that if the whole town could wait 30 years then the contamination would fall to half of what it had originally been, since 30 years is the half-life of Cesium-137. That notion, however, was not acceptable to the people of the town. The population has been severed from its town and the people have become divided amongst themselves.

The fear of radiation has brought about the existence of large numbers of families leading a double life, with the breadwinner remaining in Fukushima and the rest of the family evacuating to another prefecture. The people's hearts and the bonds between them have been sundered, and there is no sign that they will ever be able to return to the tranquillity of life they enjoyed before the disaster.

Large numbers of children are now living in areas where radiation levels are about the same as those applied as the criteria for compulsory relocation or right-of-evacuation areas at the time of the Chernobyl catastrophe. In June 2012, the Nuclear Accident Child Victims' Law was enacted, but this has not resulted in any concrete developments. Of 38,114 children surveyed thus far, three have been diagnosed with thyroid cancer and a further seven are suspected. On whether this frequency of occurrence of the cancer is high or not, it is reported that Shunichi Yamashita, chairman of the study committee of the Fukushima Health Management Survey, stated that "there is no comparative data." He seems to imply a denial of a connection with the nuclear accident, but considering the circumstances at the time of the accident and the subsequent daily lifestyle and evacuation, this does nothing to allay the fears of the parents.

We hear the cries of the farmers. The degree of contamination differs for each rice field or upland field, and even within each field. Although a detailed contamination map of all farmland should have been made at an early stage, this work has still not been carried out. The current two-kilometer square grid is far too large and this should be reduced at least to a 100-meter square grid, but it is doubtful that contamination would be uniform within that area. Unless a clear picture of the amounts and degree of dispersal of radioactive materials can be built up, ambiguities about the contamination of agricultural products will always remain.

The anxieties of fishermen are still continuing. The situation concerning the contamination of fish is not at all clear. There are voices that proclaim there is nothing to worry about, but the range and degree to which the sea has been contaminated by the nuclear accident is unknown. It is impossible to have confidence about eating seafood. The accident has turned out to be deeply criminal.

It is impossible to forget that this awful state of affairs was caused by a nuclear power plant, which is supposed to represent the peaceful use of atomic energy.

Public comments for nuclear power plant safety criteria

The five members of the Nuclear Regulatory Authority (NRA) were finally approved by the Diet on February 15. Prime Minister Noda of the previous government appointed the members by use of a special measure, but was unable to gain approval from the Diet. This was because the Declaration of Nuclear Emergency, the ground for the special measure, has not yet been lifted. As the NRA was actually established on September 16, 2012, it has taken five months to transform it into an official body.

In just the past year, the Nuclear Safety Commission and the Nuclear and Industrial Safety Agency have been abolished and the term of the members of the Japan Atomic Energy Commission (AEC) ended on 5 January 2013. Whether or not the AEC will continue to exist has not yet been decided, but it is thought that its historical mission has ended. The Nuclear Policy Planning Council has also been suspended, as have the Ministry of Economy, Trade and Industry Fundamental Issues Committee and the government's Energy and Environment Council.

As a result of the change in government, the official move toward a nuclear phase-out that began on March 11 two years ago has come to a halt. Prime Minister Abe has begun to speak in terms of reviewing the "zero nuclear" policy. This is an outcome of the House of Representatives election in December 2012. In a political situation such as this, the independence of the NRA will be further called into doubt. For a long time we have believed that with three of the five members being residents of the "nuclear village," and four out of the six members of the study team on the new safety standards for nuclear power plants having clear conflicts of interests, it would be impossible to have confidence in the work of the NRA. The fundamental question that remains is how is it possible to formulate new safety standards while what exactly happened in the Fukushima nuclear power plant accident is still not fully understood?

Our fears have been realized in actuality. An event that shows that the "nuclear village" is still as ever "alive and well" came to light on February 1, 2013. A high official close to the top leadership of the NRA had had eight personal meetings with the Japan Atomic Power Company and had handed over the result of the subsurface fault investigation at Tsuruga Nuclear Power Station before the study team's formal study meeting was held. It was reported in the media that

opinions among the NRA members were split, with some expressing regret while others said it was no big deal.

The draft outline of new nuclear power plant safety standards, to be finalized in July, was produced and public comments were solicited from the people with a February 28 deadline. The stance of the NRA Chairman Shunichi Tanaka is that the pros and cons of reactor restarts will be judged in accordance with these safety standards, which concern both nuclear reactor facilities and the problems of earthquakes and tsunamis. The deadline for comments on the disaster measures for nuclear power plants passed on 12 February 2013, with 3,155 public comments having been received.

TEPCO deceit uncovered

Four different reports have been published on the Fukushima nuclear accident. Of these, only the Report of the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission (NAIIC) claims that the earthquake was probably the primary cause of the Fukushima nuclear accident. This analysis was the conclusion of the study by commissioners Katsuhiko Ishibashi, Mitsuhiro Tanaka and their research team.

The report conservatively states that *“We believe there is a possibility that the earthquake damaged equipment necessary for ensuring safety, and that there is also a possibility that a small-scale LOCA occurred in Unit 1. We hope these points will be examined further by a third party.”* While not making definitive assertions about the effect of the earthquake on the reactors at Fukushima Daiichi, the report is exceedingly persuasive on this matter.

NAIIC commissioner Tanaka reasoned very soon after the accident that the loss of coolant resulting in the reactor core meltdown in Unit 1 was probably due to the earthquake. The soundness of the isolation condenser (IC) is in doubt. He was determined to go inside Unit 1 in March 2012 in order to check the IC, but it has now become clear that he was lied to by TEPCO in order to force him to abandon the attempt (Asahi Shimbun, February 7, 2013). He was told by TEPCO that the inside of the building was pitch dark, that they did not

know where or in what way wreckage was strewn about, that they did not know where there were holes in the walkway, that objects might fall from overhead, that they could not guide him in, that radiation levels were high, and that he would have to provide his own protective suit and headlamp. The explanation of TEPCO president Naoki Hirose, who was summoned as a witness to the House of Representatives Budget Committee on February 12, that this had not been done deliberately is one that cannot be trusted. The predisposition of TEPCO to forge data and hide anything inconvenient has not changed since the 2002 incident in which they covered up troubles at nuclear power plants.

Take back the sovereignty of residents and citizens!

The election of December 2012 tolled the death knell for the will of the sovereign people toward a nuclear phase-out and the Liberal Democratic Party (LDP), which is pro-nuclear, won an overwhelming victory with over 60% of the seats. This has a deep connection with the current election system. The proportion of the total number of eligible voters who voted for the LDP was 24.6% in the constituencies and 16.0% in the proportional representation poll. In spite of this, the number of seats gained by the LDP was 237 (79.0%) in the single-seat constituencies and 57 (31.7%) in the proportional representation poll. The Tokyo Shimbun evaluated the election in these terms: *“The LDP victory does not necessarily reflect the will of the people. It is quite clear that the large number of new parties participating in the election and the low voter turnout worked to the advantage of the LDP.”*

When one considers the grave state of affairs in Fukushima, none of the nuclear power plants on the Japanese archipelago can exist in safety, just as Fukushima's did not. The mantra of the “nuclear village” that “nuclear power plants are safe and cheap” has been completely destroyed by the Fukushima accident and Kenichi Oshima's research. Oshima's *“The Cost of Nuclear Power – The Viewpoint of Energy Transformation”* (Iwanami Shinsho) was awarded the 12th Osaragi Jiro Rondan Prize (for 2012).

Yukio Yamaguchi (Co-Director of CNIC)

An Attempt to Estimate Early-stage Radiation Exposure Dose at the Location of Every Household in Iitate Village, Fukushima

Independent Study for Determining Early-stage External Radiation Exposure and Thyroid Exposure due to Inhaled Radioiodine

Tetsuji Imanaka

Research Reactor Institute, Kyoto University

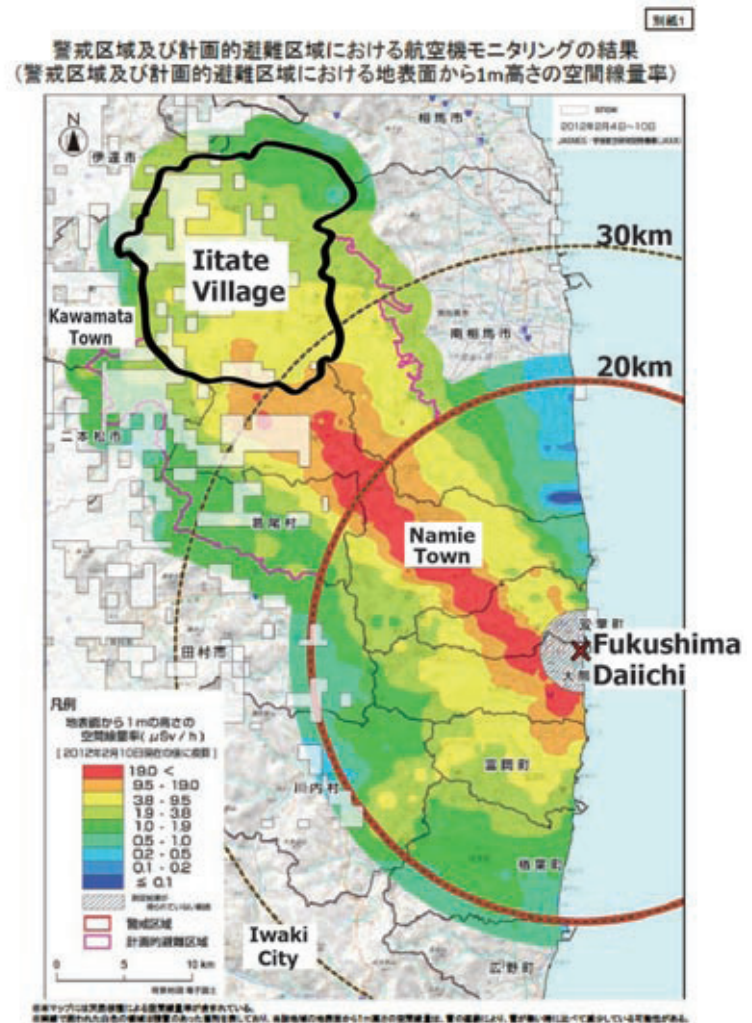
Immediately after the occurrence of the Fukushima Daiichi nuclear accident in March 2011, there were many things I found difficult to understand. One of them was that virtually no data on radioactive contamination in the vicinity of the Fukushima Daiichi power plant was publicized. Since Units 1 and 3 exploded due to hydrogen accumulation and residents living within 20 km of the plant had evacuated, it was clear that the accident was developing on a tremendous scale. Nevertheless, the only publicized data on contamination were air dose rates measured by Tokyo Electric Power Company at the boundaries of the plant premises. Contamination in the areas surrounding the plant was totally unknown.

Because no data was available, I thought that I should visit the areas myself to collect measurements. I visited Iitate Village, Fukushima, on March 28 and 29, 2011, and surveyed the radioactive contamination there. The highest dose rate measured during this survey was 30 microsieverts per hour ($\mu\text{Sv/h}$), recorded in the Nagadoro–Magata area located in the southern part of the village. This survey clarified that the contamination in Iitate was not something that could simply be expressed by the term *hotspot*, but that serious contamination covered the entire village. The further to the south, namely, the closer to the plant, the severer the contamination in the village.

Highly contaminated areas outside the 20-km zone, such as Iitate Village, were designated as planned evacuation zones on April 22, 2011 and most of the residents had evacuated from the village within two months following that.

Early-stage exposure estimation yet insufficient

The Japanese government has not estimated on its own responsibility how great a radiation dose those who evacuated immediately after the accident and those who stayed in contaminated areas, such as Iitate, for some time, were exposed



Based on the website of the Ministry of Education, Culture, Sports, Science and Technology

to. The results of calculations from the System for Prediction of Environmental Emergency Dose Information (SPEEDI), administered by the Nuclear Safety Technology Center, an affiliate of the Ministry of Education, Culture, Sports, Science and Technology, were published for the first time on March 23, 2011. According to an instruction from the now liquidated Nuclear Safety Commission (NSC), which was concerned about children's thyroid exposure, 1,080 children in Iwaki City, Kawamata Town, and Iitate Village, all located in Fukushima Prefecture, were given a thyroid monitoring test between March 26 and 30.



Figure 1.
The DOE Team Flight Trajectories over Iitate Village for three surveys conducted on April 1, April 15 and May 3.

Their thyroid radiation dose was measured with a radiation survey meter placed on their throat. The report prepared by the NSC states that no child had a thyroid dose rate in excess of $0.2 \mu\text{Sv/h}$, which was equivalent to a thyroid dose of 100 mSv , and that 55% of the total number of children showed $0 \mu\text{Sv/h}$, and 26%, $0.01 \mu\text{Sv/h}$. When this test was conducted, we were in Iitate for the survey. The radiation dose rates in the vicinity of Iitate municipal hall were 5 to $7 \mu\text{Sv/h}$, and the dose rates inside the concrete structure of the hall were about $0.5 \mu\text{Sv/h}$. It is a mystery to me how they could precisely measure $0.01 \mu\text{Sv/h}$ under such conditions in the village.

It is common knowledge among radiation workers that during a short period of time immediately after a nuclear accident, the greatest attention should be paid to exposure to radioiodine, especially the exposure of children's thyroids to I-131 (with a half-life of eight days). Why thyroid monitoring was not performed on a large scale before the I-131 physically disappeared is another mystery to me. (After the Chernobyl accident, data on a total of 400,000 cases, including 200,000 in Belarus, 150,000 in Ukraine, and 50,000 in Russia, was collected by thyroid monitoring, the data then being used to estimate thyroid radiation dose.)

“Regarding the evaluation of radiation doses received by residents, Fukushima Prefecture will hereafter conduct surveys in target areas...and will estimate and evaluate the radiation dose received by each resident” writes the Fukushima accident report the Japanese government submitted to the International Atomic Energy Agency (IAEA) in June 2011. *“There are estimated to be about 2 million residents of Fukushima Prefecture to be surveyed and the survey would*



Figure 2.
Cs-137 Deposition Contours and Household Locations (Dots)

be conducted as part of the health management survey of Fukushima Prefecture.” This indicates that the national government has entirely passed responsibility for early-stage exposure estimation to the prefectural survey organizers.

The Fukushima Health Management Survey is overseen by the study committee of an expert commission headed by Dr. Shunichi Yamashita. The committee has been criticized for its exclusiveness and opaqueness. The Survey includes the dose estimation of residents, and the survey for this estimation is called the basic survey. The basic survey is conducted in the form of a questionnaire, in which residents are expected to write down their activities at the time of the Fukushima accident. Each resident's external dose is then estimated based on the written responses in the questionnaire form (thyroid exposure to radioiodine is outside the scope of this survey). As of January 31, 2013, the average retrieval rate of the completed basic survey forms from the population across the prefecture was 23.2%. The rate was 56.7% in areas where the survey was started earlier, which include Namie Town, Iitate Village and part of Kawamata Town. As of January 25 last year, the rates were 20.8% and 50.2%, respectively. Although the prefecture has been actively encouraging the population to turn in the questionnaire through prefectural public relations efforts and newspapers, the increase in the rates since one year ago is not impressive. Dr. Shunichi Yamashita and his group entered Fukushima before we went to Iitate for the survey. It is well known that they toured the prefecture repeating the notion that “Radioactive exposure is nothing to worry about.” As a result, many people were needlessly exposed to radiation that could have otherwise been avoided. Dr. Yamashita and his team became

extremely notorious among the Iitate villagers I know of. I assume that the low retrieval rates for the questionnaire can be attributed to people's lack of confidence in the Fukushima Health Management Survey.

According to the report of the Fukushima Health Management Survey released on February 13, 2013, the external exposure dose of 3,106 Iitate villagers (about half the total population of the village) during the four months (from March 11 to July 11) from the occurrence of the accident was: less than 3 mSv, 49%; less than 5 mSv, 75%; and less than 10 mSv, 98%. The average dose was not indicated, but I calculated it using my own method based on this dose distribution and obtained an average of 3.6 mSv. The estimation of external exposure dose based on the basic survey data is farmed out to the National Institute of Radiological Sciences but the details of the estimation method have not been made public.

An independent attempt to estimate early-stage exposure dose

In August 2012, Japan's Cabinet Office Nuclear Emergency Response Headquarters launched a new research grant project named "Research and Survey Project on the Influence of Radiation on Health" and put out a public call for research applications. Because I am involved in the survey of radioactive contamination in Iitate Village, and because dose evaluation is one of my specialties, I had been hoping, if there were an opportunity, to conduct my own estimate of the early-stage dose of Iitate villagers. I decided to apply for the project and quickly formed a research team, which includes myself as representative, Dr. Nobuhiro Sawano (Kanazawa Seiryu University), and six other co-researchers. I named the research plan "Research on Evaluation of Early-stage Exposure Dose of Iitate Village Residents after the Fukushima Daiichi Accident." Fortunately, the application was accepted. (About 14 million yen was granted. The project office has now been shifted from the Cabinet Office to the Ministry of the Environment.) Since November 2012, the entire team has worked enthusiastically, including the company we requested to carry out a simulation of atmospheric diffusion. We gave a presentation on the grant research at the "Research Achievements Report Meeting" on February 6, 2013, in Tokyo, to explain our achievements

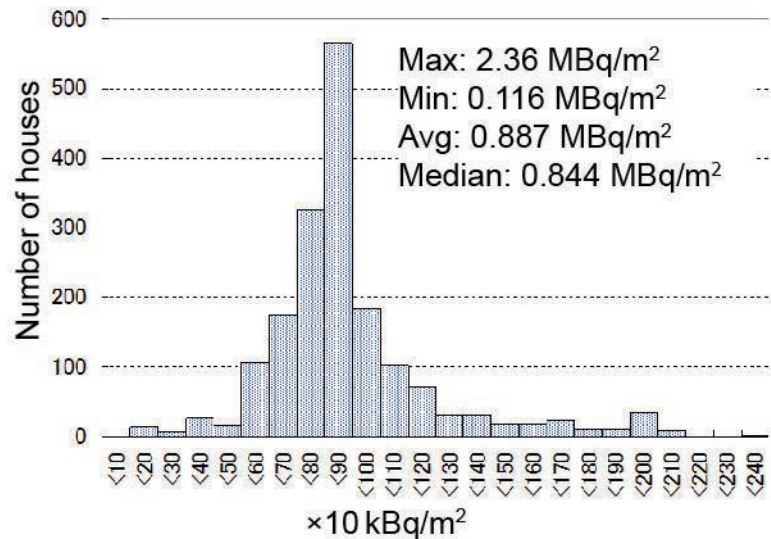


Figure 3
Distribution of Cs-137 Deposition Rates at 1,768 Houses across Iitate Village

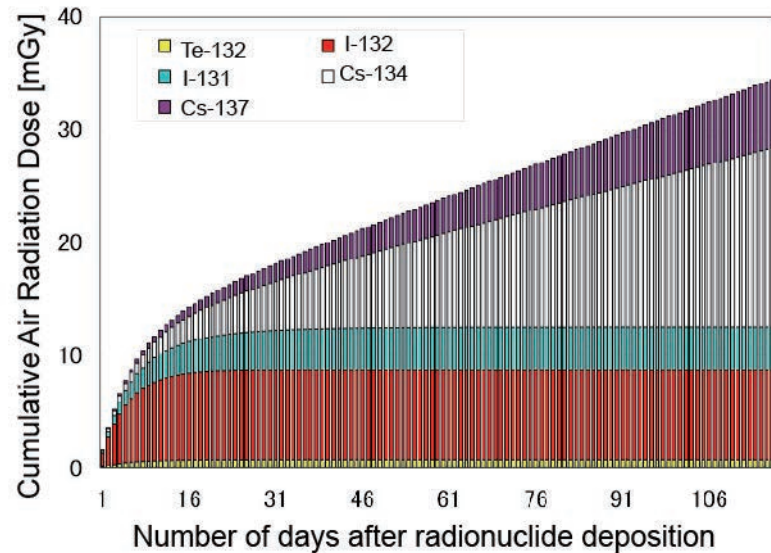


Figure 4
Cumulative Air Dose per MBq/m² of Cs-137 Deposition [mGy]

during FY2012. I would like to summarize the achievements the team has made thus far.

Step 1: Determination of the coordinates for every household in Iitate Village

When the Fukushima Daiichi accident occurred, Iitate had a population of about 6,200 in about 1,700 households. Using commercially available household maps, telephone directories, the Japanese Geographical Survey Institute's 1/25,000 maps, and Yahoo's address to coordinates (longitude and latitude) transformation function, we determined the geographical coordinates of every household in Iitate.

Step 2: Creation of a detailed Cs-137 deposition map based on data collected by the U.S. Department of Energy

Co-researcher Dr. Sawano is a specialist in the geographic information system (GIS). When the Fukushima nuclear accident occurred, the U.S. Department of Energy's National Nuclear Security Administration (NNSA) sent a large-scale radiation measurement team to U.S. military bases in Japan, and performed an airborne radiation survey using helicopters and aircraft (**Figure 1**). The survey data are published on the NNSA website. Based on this data, Dr. Sawano created a cesium deposition map of Iitate Village (**Figure 2**).

Based on the contamination map, we obtained the distribution of Cs-137 deposition at 1,768 locations in Iitate Village (**Figure 3**).

Step 3: Estimation of cumulative air dose per unit of Cs-137 deposition

Figure 4 shows the cumulative external dose a person is exposed to after Cs-137 of 1 MBq/m² (million becquerels per square meter) is deposited on the ground. To calculate the contribution of radionuclides other than Cs-137, we used five soil samples collected during the on-site Iitate survey in March 2011, using the averages obtained to calculate the contribution of these other radionuclides. Supposing that the radionuclides were deposited at one time, on the evening of March 15, 2011, and that residents stayed outdoors until they evacuated on June 30, calculated from the Cs-137 deposition, the cumulative air dose was 32.6 mGy per MBq/m². When 0.8 is used as the Gray-to-Sievert conversion factor, 0.4 as the wooden house shielding factor, and a person is assumed to have spent eight hours a day in outdoor activities, one Iitate villager's external dose was on average 14 mSv, a maximum of 37 mSv, and a minimum of 1.8 mSv, based on the cesium distribution shown in **Figure 3**.

Step 4: Atmospheric diffusion simulation

We commissioned Visual Information Services, which had been calculating its own atmospheric diffusion simulation and publishing the findings on its website, to simulate air diffusion around Iitate Village. **Figure 5** shows the I-131 concentration in the surface atmosphere across Fukushima Prefecture on the evening of March 15, 2011. **Figure 6** shows the distribution of

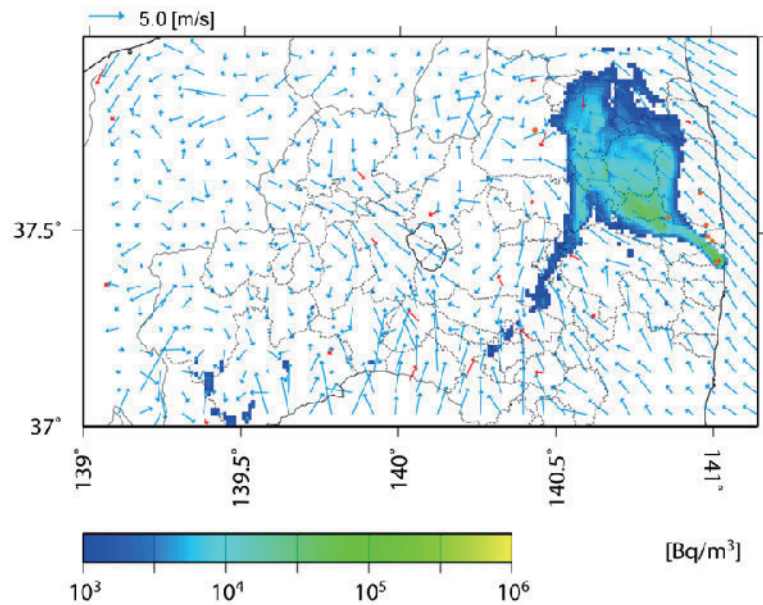


Figure 5
Simulated I-131 Concentration in the Surface Atmosphere across Fukushima Prefecture at 19:00, March 15, 2011

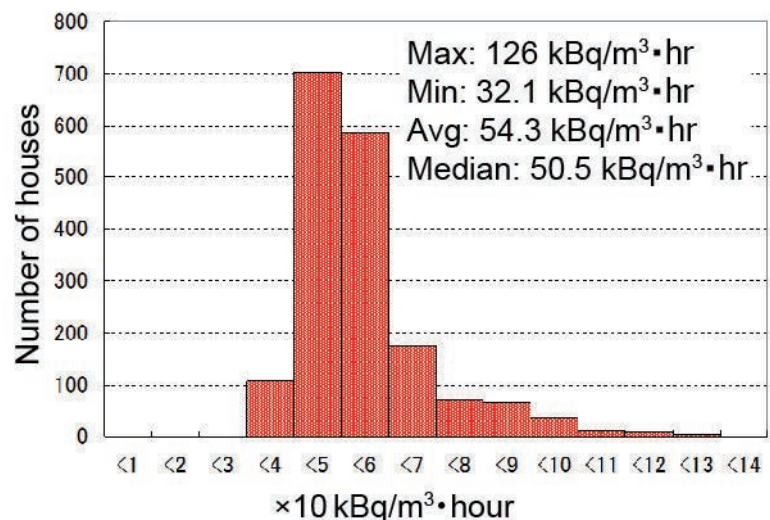


Figure 6
Distribution of Cumulative I-131 Concentration in the Surface Atmosphere at 1,768 Houses across Iitate Village

cumulative I-131 concentration in the air for each house in Iitate. Supposing a one-year-old (with a respiration rate of 0.31 m³/h and a thyroid equivalent dose conversion coefficient of 1.4 × 10⁻³ mSv/Bq) was outdoors all the time, the one-year-old's thyroid dose would be on average 24 mSv, a maximum of 55 mSv, and a minimum of 14 mSv. For details, please refer to our paper (in Japanese) at the following address:

<http://www.rri.kyoto-u.ac.jp/NSRG/ISPa.pdf>

From April 2013, we intend to interview Iitate villagers about their activities at the time to determine more precise dose estimates.

Problems emerge in operations to bring the Fukushima Daiichi Nuclear Power Station accident to an end, and in decontamination operations

We demand the abolition of the multi-layer subcontractor system and the provision of jobs and wages for workers whose total accumulated radiation exposure has exceeded the official limit

Two years have passed since the outbreak of the disastrous nuclear accident at the Fukushima Daiichi Nuclear Power Station (FDNPS). Even now, about 3,000 workers are engaged in various operations in the plant every day. Without the hard work of the workers and their struggles with the fear of accumulating radiation exposure in the plant's extremely severe condition, it would be impossible to achieve an end to the accident.

Table 1 is based on data for the evaluation of plant worker exposure to radiation published by Tokyo Electric Power Co. (TEPCO) on January 31, 2013 and shows cumulative internal and external exposure up to the end of December, 2012. Total accumulated exposure has reached approximately 300 person-Sv, an enormous amount. Of this, roughly 70% is accounted for by cumulative exposure of workers hired by subcontractors. In March 2011, the TEPCO officials who took charge of the work to deal with the accident suffered overwhelmingly large exposure to radiation. But in and after April 2011, the total accumulated exposure of the workers employed by subcontractors exceeded the levels of the TEPCO officials.

According to TEPCO's report on the overall situation regarding accumulated radiation exposure levels of the workers at FDNPS released

on December 3, 2012, the levels are on the decline due to the overall situation at the plant. The report noted that the radiation levels of the majority of the workers were far below the exposure limit, and that they are still able to take part in radiation-related operations. The report thus indicates that TEPCO is extremely optimistic about the workers' accumulated exposure levels.

The number of workers whose one-month radiation exposure topped 10 mSv totaled 20 in October 2012 (the highest was 16.94 mSv), 15 in November (19.28 mSv), and 8 in December (15.85 mSv). According to data compiled in FY2009, before the nuclear accident occurred, the annual radiation exposure levels of 94% of the workers were 5 mSv or less, with the highest level standing at 19.5 mSv, and the average exposure level at 1.1 mSv. Considering these wide gaps, it is evident that the workers are currently working in a far more severe environment at the nuclear power plant than previously. The electric utility should realize the fact that the workers are exposed to incomparably large amounts of radiation compared with the pre-accident period.

Although two years have passed since the accident occurred on March 11, 2011, it has been disclosed recently that TEPCO has yet to submit to the Radiation Effects Association (REA), a public interest incorporated association that manages

radiation exposure data of workers at nuclear power plants across the nation, data on more than 20,000 workers that have worked at the Fukushima plant since the nuclear accident (TEPCO announced on March 25 that it had submitted the data for FY2011 and FY2012).

In Japan, nuclear plant workers are working under a multi-layered subcontractor system with the electric power companies at the top. Some of them

Level[mSv]	March 2011~Nov. 2012			March 2011~Dec. 2012			Increase and Decrease		
	TEPCO	Subcon-tractor	Total	TEPCO	Subcon-tractor	Total	TEPCO	Subcon-tractor	Total
250<	6	0	6	6	0	6	0	0	0
200~250	1	2	3	1	2	3	0	0	0
150~200	22	2	24	22	2	24	0	0	0
100~150	117	17	134	117	17	134	0	0	0
75~100	217	65	282	224	66	290	7	1	8
50~75	303	414	717	303	437	740	0	23	23
20~50	599	2,973	3,572	599	3,032	3,631	0	59	59
10~20	705	3,263	3,968	708	3,316	4,024	3	53	56
5~10	162	2,836	2,998	165	2,912	3,077	3	76	79
1~5	817	5,710	6,527	822	5,823	6,645	5	113	118
~1	667	6,042	6,709	661	6,163	6,824	-6	121	115
Total	3,616	21,324	24,940	3,628	21,770	25,398	12	446	458
Max[mSv]	678.80	238.42	678.80	678.80	238.42	678.80	-	-	-
Ave[mSv]	24.73	9.71	11.88	24.79	9.74	11.89	-	-	-
Collective effective dose[man·mSv]	89,423	207,026	296,287	89,938	212,039	301,982			

Table 1. Accumulated External and Internal Dose of Workers Engaged in Radiation-related Operations at Fukushima Daiichi Nuclear Power Station. Accumulated Dose Distribution at the End of December (March 11, 2011 to December 31, 2012)

Notes: 1) Values for external exposure use the sum of the APD values for each area entered, but these can vary due to replacement by monthly dose values from cumulative dosimeters. 2) Significant internal exposure is not recognized after October 2011. This table was prepared from data published by TEPCO to which total exposure data has been added. (CNIC)

are engaged in work involving regular inspections of nuclear power plants, moving from one plant to another. Unless their exposure data are collected and managed by one organization, their cumulative exposure levels may sometimes exceed the legal limit. These cumulative exposure levels are collected and managed in a database by the Radiation Dose Registration Center (RADREC). This is the private-sector system for registration and management of radiation exposure doses financed mainly by electric power companies.

Under this system, the original contractor or subcontractor records data in the worker's personal "radiation work passport" (in most cases, this passport is managed by the subcontractor), and electric power companies send the data to the REA Central Registration Center. This means that Japan's system for the management of radiation-related worker exposure data is fragile and not legally binding.

Wages and compensation for workers with above-limit exposure to radiation under the subcontractor system.

Since July 2012, when it was discovered that worker exposure to radiation was being concealed by covering the personal dosimeter with a lead plate, TEPCO conducted a questionnaire survey with the workers, and the government ministries concerned, such as the Ministry of Health, Labour and Welfare (MHLW), also carried out various types of investigations on the management of worker exposure.

The MHLW report, titled "Results of the Investigation on the Management of Worker Exposure at the TEPCO Fukushima Daiichi NPP," was released on October 30, 2012. The report stated that the first-tier and the lower-tier subcontractors discuss the future with plant workers when their cumulative exposure levels approach the limit set by the original contractor, and in most cases are taking the following measures.

In the case of general contractors, the workers whose cumulative exposure levels approach the limit will be transferred to the low-exposure-level workshop in the plant. When the workers' exposure level exceeds the limit despite the transfer, they will be assigned to other general construction work or decontamination work. (Such workers are sometimes forced to switch jobs.) In the case of the subcontractors engaged solely in work at nuclear power plants, it is difficult to find other jobs for such workers outside the plant. The subcontractors have therefore set up a rotation system for their workers among the company's branches so that the exposure levels of all the workers are almost evened out. Should the worker exposure level approach the limit, the workers will be transferred to jobs carried out in a low-dosage environment in the plant or to decontamination jobs.

These measures can be taken only by the first-tier and other high-tier subcontractors that are to some extent providing their workers with a guarantee of status. The lower-tier subcontractors are unable to transfer their workers to other workshops and the workers will lose their jobs if their exposure levels exceed the limit. There is also another problem of intermediary exploitation of their wages.

In a series of investigations conducted so far, it was disclosed that there are many labor brokers disguised as subcontractors, and the mass media have begun reporting on these questionable people. In view of this situation, it is necessary to abolish this multi-layered subcontractor system, and provide the plant workers with guaranteed wages. There is also a need to establish a system to secure jobs for workers with above-limit exposure levels and guarantee them social security. The government must tackle this problem immediately, as it is expected that the workers will be required to work in even more severe environments during the coming decades until the nuclear power plant is decommissioned. This has been a major problem since nuclear power plants first began operation, and our society as a whole must face this problem and cope with it in a conscientious manner.

Cutting corners in decontamination operations and sloppy management of worker exposure data. Decontamination workers have filed a complaint with the government over the pocketing of special allowances by employers.

The decontamination projects launched for restoration of disaster-hit areas by the central and local governments are creating "new exposed work". In the pilot decontamination project carried out in 2011 in the evacuation zone and the planned evacuation zone, one of the workers was exposed to a total of 11.6 mSv over the 108-day period. It was reported that this worker's accumulated radiation exposure would reach 129 mSv, far greater than the official limit of 100 mSv, if he continued to do the same job for five years. The most serious aspect of this problem is that neither the decontamination workers nor the residents engaged in decontamination work in their communities on a voluntary basis are fully aware of this risk.

It was also revealed that cutting corners is rampant in decontamination operations. One example is that contaminated water from decontamination works is not collected and is simply drained off into the environment. Although the Ministry of the Environment (MOE) has been informed, it is very slow to respond to such problems, and its competence as the ministry in charge of a national project to which a massive budget is allocated is in doubt.

The government and MOE are paying a 10,000-yen per day special job allowance in addition to wages to decontamination workers in consideration of the radiation exposure risk.

However, the reality is that the workers are not receiving the allowance. MOE is handing out the contracts for decontamination operations to general contractors, but there are a number of subcontractors under each general contractor. Among the subcontractors are temporary job placement agencies, construction companies, civil engineering and building contractors, painting companies, and other local medium- and small-sized businesses. They form a complex, multi-layered subcontractor system.

Our organization, the Radiation-exposed Workers' Solidarity Network has received more than 100 complaints and inquiries from decontamination workers. "I received the allowance, but instead they reduced my wages to the lowest level," "Although the employer is required to provide me with accommodation and food costs, they deducted those costs from my wages retroactively," "The employer didn't prepare masks for workers. So I had to buy one for myself. The company doesn't measure personal dosimetry and I don't know how much radiation I have absorbed so far," are some of the examples of their complaints. Their comments have revealed that the subcontractors are not taking proper measures to reduce their worker exposure risks, that they have unilaterally reduced the workers' wages or changed their working conditions, and that they are attempting to conceal the fact that they are pocketing the special allowances.

Since last year, the Fukushima Solidarity Union, Iwaki Free Labor Union and other groups participating in the Radiation-exposed Workers' Solidarity Network have been helping decontamination workers through joint negotiations with a number of subcontractors. Confronted with strong indignation expressed by the workers, the subcontractors have apparently come to the conclusion that they could no longer conceal their misconduct, and begun admitting that they had pocketed the special allowances. Meanwhile it has also been revealed that the second-tier and third-tier subcontractors have not been paid sufficient sums of money from the original contractor to pay the special allowances to their workers. This means that the lower-level subcontractors were also victims.

On February 28, the Radiation-exposed Workers' Solidarity Network and its affiliated groups negotiated with MOE and MHLW about the problems appearing in decontamination projects. Many workers took part in the negotiations and complained of various issues that have arisen in decontamination operations. They demanded thorough investigations regarding the multi-layered system, from the original contractors down to the subcontractors, and called for ministerial guidance vis-à-vis the contractors. "I really want to know who has pocketed the special risk allowance paid by taxpayers' money," said one of the workers. A MOE official replied, "It is not so important to know who has pocketed the allowance, but whether the allowance was paid to each worker or not."



Workers negotiating with the government concerning problems with the decontamination operations (Feb. 28, 2013) Photo by Akira Imai.

He went on to say that the ministry is checking the workers' wage ledgers. The workers were not convinced by his reply and retorted angrily. "The workers' wage ledgers do not tell the truth. The reality is that we haven't received anything, even an employment contract," "You have left everything to general contractors and that's why you cannot discover the truth," said the workers. The MHLW official said the ministry will launch an investigation if the workers consult the local labor bureaus about the matter, or if they give information about their problem to the bureau. The workers replied angrily that the labor bureau did not take up their problems and did nothing for them. Another worker also complained that he went to an MHLW office and told the official there about the unpaid risk allowance, but the official urged him to continue negotiations with his employer and eventually did nothing. The issue of the management of decontamination worker cumulative exposure and other problems were not taken up and remain pending.

As for management of decontamination worker cumulative exposure to radiation, REA is charged with creation of the database, just as in the case of the nuclear plant worker exposure data. But the truth is that REA has yet to receive any data on decontamination worker radiation exposure. MOE drew up a contract form to be used when signing with general contractors for decontamination projects, and clearly stipulated in the contract that each worker must obtain a radiation work passport whenever possible. REA called on MOE to urge the subcontractors to send exposure data for each worker to REA when each decontamination job is completed so that the organization can manage the data for all the workers in a uniform manner. MOE said it would comply with the request. REA says, however, that it has not received any such data yet. The Radiation-exposed Workers' Solidarity Network plans to clarify who is responsible for the management of the worker exposure data in future negotiations with the government, and will strive to resolve the problem.

Mikiko Watanabe (CNIC)

Let's Link with Fukushima! Sayonara Nukes! Huge Rallies on Consecutive Days



"Fukushima without Nukes! Great Prefectural People's Gathering" (March. 23, 2013) Photo by Akira Imai

To mark the passing of two years since the Tokyo Electric Power Company Fukushima Daiichi Nuclear Power Station accident on March 11, 2011, rallies and demonstrations were held in the Tokyo area on the three consecutive days of March 9, 10 and 11. The organizers were Citizens' Committee for the 10 Million People's Petition to say Goodbye to Nuclear Power Plants (9 and 11) and the Metropolitan Coalition Against Nukes (10). The citizens' enthusiasm and will to not allow the Fukushima disaster to be swept under the carpet and to ensure that a nuclear power phase-out is realized was expressed in a massive groundswell of feeling in these events. Not only were events held in more than 200 locations nationwide, rallies, demonstrations and petition campaigns were also held in solidarity with the people of Fukushima in Europe and Brazil.

On March 23, a "Fukushima without Nukes! Great Prefectural People's Gathering" organized by the Gathering's Planning Committee, was held at the Azuma General Gymnasium in Fukushima City. Seven thousand people participated in the event from both inside and outside the prefecture, and also from overseas. In fact, so many people attended that many had to stand or watch the proceedings on a monitor screen in another room.

Before the gathering began, traditional drum and dance performing arts that have been passed down in Date City, Kitakata City and Naraha Town in Fukushima Prefecture for several hundred years were performed on the stage to deafening roaring applause.

Following the opening greeting from the representative of the organizers and conveners, Satoshi Kamata made a strong appeal to everyone never to forget the terrible sacrifice of Fukushima, never to forget Fukushima and to protect the

health and livelihoods of the people of Fukushima. The Prefectural Governor, the Mayor of Fukushima City and the Mayor of Minami Soma City sent messages to the Gathering calling for all nuclear power plants in the prefecture to be decommissioned, the building of a society that does not depend on nuclear power, the restoration of a daily life where everyone can feel safe and secure, and the transformation of Fukushima into a base for renewable energy.

This was followed by appeals from seven people from Fukushima Prefecture representing different walks of life. Representatives from the Futaba JA (Japan Agriculture Cooperatives), the Soma/Futaba Fisheries Cooperative Association, the High School Students'

Peace Ambassador, the Prefectural Forestry Cooperative, The Prefectural Inn, Hotel and Environmental Health Cooperative, evacuees in other prefectures, and the Project for the Children of Fukushima all talked about their current situation and their terrible predicament of finding themselves in a tunnel with no apparent end in sight.

Ms. Sakura Takano from Minami Soma City, whose family is now split between Yamagata and Fukushima Prefectures, is due to graduate high school this spring and start at a university in Fukushima Prefecture in April. Ms. Takano said that when she visited Switzerland as the first High School Peace Ambassador in August last year, the people there thought that Fukushima Prefecture had already recovered from the disaster. She also related how she was asked unexpected questions by people in Brazil, such as, "How did the government handle the crisis?" and "What do you think of the government?"

Ms. Takano said that she is now participating in exchanges with Nagasaki *Hibakusha* (people exposed to radiation from the Nagasaki A-bomb) and that she does not want to forget the abnormal life she is living now because she is afraid that if it is forgotten then the same kind of accident will happen again. She was given thunderous applause when she concluded by saying that she is determined to communicate what has happened in Fukushima to the people of the world.

The gathering approved a final declaration that read: *Attracting nuclear power plants to Fukushima was a mistake and it is our mission as a disaster-stricken prefecture to raise our voices to tell the whole country. A Fukushima without nuclear power and a Fukushima where people can live in peace and security is the aspiration of the people of the prefecture.*

Yukio Yamaguchi (Co-Director of CNIC)

Anti-Nuke Who's Who

Kenichi Hasegawa**Dairy farmer maintaining visual records of Iitate Village since the Fukushima nuclear crisis**

by Noboru Kobayashi*

*Mr. Kenichi Hasegawa (Photo by Noboru Kobayashi)*

Kenichi Hasegawa was born and raised in Iitate Village and has lived continually in the village in Fukushima Prefecture since he was born there in 1953. Before the village was severely contaminated by the Fukushima Daiichi nuclear accident, the dairy farmer raised cows and boars, living with his eight-member family, including his parents, wife, children, and grandchildren.

In March 2011, the accident at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station showered Iitate, selected as "one of the most beautiful villages"*** in Japan, with high-levels of radiation. The village had 20 wards, and Mr. Hasegawa was the mayor of Maeda Ward. Having learned of the radioactive contamination ahead of other villagers, he held a gathering of residents, explained the ongoing situation, and told them how to avoid radioactive exposure. Mr. Hasegawa demanded that the village administration and Japanese government evacuate the villagers as soon as possible, but the government's evacuation order was not issued until April 22, 2011. It was late June before all the villagers had left the village.

After the accident, Mr. Hasegawa felt that he should keep a visual record of the days of Iitate as one who was directly involved in the situation. He purchased a video camera and digital still camera and started to record the village as an amateur cameraperson. The severe realities he saw through the cameras sometimes made him unable to continue recording. However, he never gave up recording the village scenes, and took more than ten thousand photographs and 180 video DVDs up to December 2012.

I (the author) learned that Mr. Hasegawa was recording scenes in Iitate when I participated in the No Nukes Asia Forum in Korea in March 2012. The photographs by Mr. Hasegawa I saw there represented the realities of the village. I was extremely impressed, and started to consider introducing these visual records to people not only in Japan but also around the world.

I visited Iitate in August 2012 with a research team of six people. We had heard that the air radiation dose rates indicated by the monitoring posts in Iitate were lower than the actual rates. During the visit, the team members discussed what could be done for the village. We decided to organize exhibitions of Mr. Hasegawa's photography and called for people to come forward to form a voluntary organizing committee.

The photograph exhibition held in Tokyo in January 2013 attracted many visitors. Today, twenty exhibitions are being organized in Japan. Exhibitions are also planned in Australia and France.

The committee members would like you to volunteer to organize, or help organize, an exhibition of Mr. Hasegawa's photographs in order to share his strong desire for the nuclear accident never to be forgotten or the memories fade away.

*Representative, Iitate Village Photograph Exhibition Organizing Committee (TEL: +81-44-987-7951, +81-80-3486-5090)

** Iitate was selected as one of the most beautiful villages by the Alliance of Most Beautiful Villages in Japan, a group aiming to protect irreplaceable landscapes and local cultures in Japanese agricultural, mountainous villages, which can never be recovered once lost.

NEWS WATCH

New guideline for nuclear disaster countermeasures

The Nuclear Regulation Authority finalized new guideline for nuclear disaster preparedness on February 27. The guidelines stipulate a zone of 5-km radius around a nuclear plant site as a PAZ (Precautionary Action Zone), and a 30-km zone as the UPZ (Urgent Protective Action Planning Zone). Iodine tablets will be distributed in advance among residents of PAZs to enable them to take the tablets when they evacuate immediately after an accident occurs.

When radiation measurements exceed 500 $\mu\text{Sv/h}$ in the UPZ, residents are to evacuate within several hours, while those in areas over 20 $\mu\text{Sv/h}$ are to evacuate within a week and maintain vigilance over radiation levels. Although the standard of 500 $\mu\text{Sv/h}$ is stricter than that of the IAEA, 1,000 $\mu\text{Sv/h}$, ordinary people will reach the normal annual radioactivity exposure limit in only two hours. Over 3,000 public comments were sent to the Nuclear Regulation Authority demanding a review of the plan to enable more rapid evacuation, but the Authority made no changes to the guideline.

Radioactive materials released before venting at Fukushima Daiichi NPP Unit 1

The Mainichi Newspaper reported on February 22 that at the time of the accident at Fukushima Daiichi nuclear power plant, radioactive materials had spread over 10 km in all directions about five hours before venting. This was revealed after Fukushima Prefecture collected and analyzed accumulated data (which were not transmitted due to loss of power) from its 20 automatic monitoring posts in the vicinity of the nuclear power plant. Data analysis had been put on a back-burner because prefecture officials were tied up with massive amounts of work immediately after the accident. They say the analysis was completed around September 2012. Radioactive materials had been dispersed before the national government ordered the evacuation. If the data had been transmitted, it should have served as important information for appropriate evacuation. Lack of preparedness for the power loss resulted in the data remaining unused.

Japan Atomic Power Co. sells uranium

Jiji Press reported on February 20 that Japan Atomic Power Co.(JAPC), a nuclear power plant specialist power wholesaler funded by the ten electricity utilities, has sold part of the uranium in its possession. JAPC says it has to secure funds repay bank debts due in April, while restart of its three idling reactors (Tokai-2 Nuclear Power Plant, BWR, 1,100 MW; Tsuruga-1 Nuclear Power Plant, BWR, 357 MW; Tsuruga-2 Nuclear Power Plant, PWR, 1,160 MW) are uncertain. JAPC disclosed neither the buyer nor the amount sold. TEPCO is also reported as considering the sale of uranium.

Toshiba to be given preferential negotiation rights in construction of new Finnish NPP

On February 25, Toshiba was given preferential negotiating rights in a bid for the Hanhikivi NPP, which Finnish corporation Fennovoima is planning to construct. The bidding took place in January with the participation of Toshiba and Areva, Toshiba proposing a 1,600 MW class EU-ABWR. Also considering the possibility of a 1,000 to 1,300 MW class reactor, besides interest in the Toshiba ABWR, Fennovoima will continue talks with Areva and Rosatom with a view to making a final decision before the end of March.

Japan Atomic Power Co. and Marubeni to cooperate in Kazakhstan NPP plan

On February 18, JAPC and Marubeni Utility Services Ltd. signed a memorandum on cooperation with the National Nuclear Center of the Republic of Kazakhstan toward introduction of a nuclear power plant in that country. Kazakhstan plans to construct a new nuclear power plant in the 2020s, and it is reported that the Japanese side will assist in human resource development, feasibility studies, as well as the construction and operation of nuclear power plants in Kazakhstan.

Japan to assist Saudi Nuclear Energy Plan

In his visit to the Middle East, the Minister of Economy, Trade and Industry, Toshimitsu Motegi, held talks in Riyadh, Saudi Arabia, with Vice President Faraj of “The King Abdullah City for Atomic and Renewable Energy” on February 9. In response to the vice president’s request for cooperation, METI’s Motegi expressed the intention to support Saudi Arabia by, for example, accepting trainees to develop human resources that would play a role in the operation and regulation of nuclear reactors. However, in answer to a question in a press briefing on February 10 about signing an atomic cooperation agreement, METI’s Motegi said that they had not yet reached that stage.

HLW returned from the UK

High-level radioactive waste has been returned to Japan from the UK. The HLW consisted of spent fuel from Japanese nuclear plants reprocessed in the UK. On February 27, a total of 28 vitrified HLW canisters were transported in the third shipment to the Japan Nuclear Fuel Limited storage facility in Rokkasho Village, Aomori Prefecture. With this, 132 canisters in all have been returned, leaving about 770 (including middle- and low-level radioactive wastes exchanged for an equal amount of radioactivity) still to be returned. Shipments from France have been completed with the return of 1,310 canisters.



High-Level Vitrified Waste from Japanese spent nuclear fuel arrives at Mutsu-Ogawara Port in Aomori Prefecture. Photograph taken on September 15, 2011.

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