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JCO Criticality Accident Three Years on: Questions Still Unanswered

A survey assistant explains about a survey form of the effects of JCO criticality accident to the residents near JCO Co. on February 2002 (Naka-town, Ibaraki Prefecture. Photo by Noboru Kobayashi)

Three years have passed since the JCO criticality accident occurred on 30 September 1999. This article reviews results of the second field survey of Tokai-mura (Tokai Village) and Naka-machi (Naka Town) residents, carried out by the JCO Criticality Accident Comprehensive Assessment Committee in February 2002, and summarizes the current status of trials concerning the JCO criticality accident that have not been covered since Nuke Info Tokyo 86.

The JCO accident left deep scar

Citizens' Nuclear Information Center and the Japan Congress Against the A- and H-Bombs together organized the "JCO Criticality Accident Comprehensive Assessment Committee" in 1999 and issued a report in Septem-

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ber 2000 (See NIT 80). The Committee has been supported by the TOYOTA foundation in assessing the JCO accident since November 2001. In February 2002, more than two years after the September '99 accident, the JCO Committee members carried out a second field survey of Tokai Village and Naka Town residents.

The survey was carried out as a part of a series of research surveys begun in February 2000, and which have been led by Koichi Hasegawa, a professor of environmental sociology at the Graduate School of Arts and Letters, Tohoku University, and Yuko Takubo, an assistant professor of sociology at the College of Environmental and Disaster Research, Fuji Tokoha University. The aim of the surveys is to examine current health condition of the residents, the effects of the accident on their daily activities, and their opinions regarding nuclear power.

As a result of this survey, 1,008 questionnaires were completed from 535 households. The recovery rate of 77 percent from the sample households indicates keen interests among local residents about this issue. Prof. Hasegawa reported on the results and analysis of the survey in Tokai Village in April and in Tokyo in May.

The results of the survey show that those who have been suffering from mental and physical complaints have increased as compared to 2 years ago, whose results were more than anticipated, and it was found to be statistically significant that those living closer to the accident site tended to claim higher rates of abnormalities (Table 1 and 2). 25 percent of the participants who have received medical diagnosis check-ups by Ibaraki Prefecture reported that their anxiety and fear have not been resolved, and 64 percent of them still had concerns for the effect that the radiation may still have on them.

76 percent of them indicated a negative attitude toward the installation of additional nuclear facilities in Tokai Village. 46 percent of them opposed the hosting of the ITER (International Thermonuclear Experimental Reactor) in Naka Town, while 24 percent favors hosting the ITER project. In addition, more than half of the participants replied negatively to the question suggesting that they would rather not talk about topics relating the JCO accident and nuclear power. Although the JCO criticality accident left local residents with deep scars on the one hand, the opinion survey enlightens on how the accident has affected them and in what way the community of this area has changed; i.e. it can be seen that they have begun an open discussion regarding nuclear power among themselves.

The ruling on the JCO trial will be delivered next spring

On April 23, 2001, the first JCO public trial was held at Mito district court, where the public prosecutor described how the JCO relentlessly continued its operation, resulting in the death of two of their staff. Since then several hearings have been held to question witnesses.

Table 1. Correlation between distance from the JCO site and the awareness of physical abnormalities

	not changed	not feeling well	in bad health	Total
within 350m	27	12	4	43
	62.8%	27.9%	9.3%	100%
350-500m	138	12	2	152
	90.8%	7.9%	1.3%	100%
500-1000m	187	24	3	214
	87.4%	11.2%	1.4%	100%
1000-1500m	253	20	4	277
	91.3%	7.2%	1.4%	100%
1500-2000m	282	16	5	303
	93.1%	5.3%	1.7%	100%
Total	887	84	18	989
	89.7%	8.5%	1.8%	100%

upper: number of responses

lower: %

χ^2=43.217, d.f.=8, p<0.001

Mr. Yokokawa, one of the workers at the scene, testified in February and the testimony of five defendants' were followed. The hearings were completed in June. It is expected that the prosecutor's as well as the defendants' final speech and recommendation for punishment for the accused will be made at Mito district court on September 2 and October 21 respectively. A ruling in this case is expected to be handed down at the end of this fiscal year (next spring).

Table 2. Correlation between distance from the JCO site and the number of cases who have physical abnormalities

	0	1	2 to 4	5 to 9	10	Total
within 350m	29	2	7	5	1	44
	65.9%	4.5%	15.9%	11.4%	2.3%	100%
350-500m	115	12	19	4	3	153
	75.2%	7.8%	12.4%	2.6%	2.0%	100%
500-1000m	169	25	15	5	4	218
	77.5%	11.5%	6.9%	2.3%	1.8%	100%
1000-1500m	221	21	34	7	0	283
	78.1%	7.4%	12.0%	2.5%	0.0%	100%
1500-2000m	254	26	22	6	2	310
	81.9%	8.4%	7.1%	1.9%	0.6%	100%
Total	788	86	97	27	10	1,008
	78.2%	8.5%	9.6%	2.7%	1.0%	100%

upper: number of cases

lower: % =33.728, d.f.=16,

The trial of the JCO case was taken place after each defendant confirmed and agreed to the basic facts of the indictment. Defendants claimed that various factors, along with an error made by the JCO, were involved in the cause of the accident. It is known that the JCO conversion building where the incident took place passed a safety inspection in 1984, fifteen years before the accident. However, the inspection was very superficial, and this is thought to be one element in the cause of the accident. It was revealed for the first time in the course of the trial that the appointed safety inspector from the Science and Technology Agency (STA) had been contracted out from Japan Nuclear Cycle Development Institute (JNC), formerly the Power Reactor and Nuclear Fuel Development Corporation (PNC), which had submitted an order for uranium processing from JCO. It was also stated during the trial that the PNC repeatedly demanded that the JCO should carry out rush jobs for them.

Since the PNC and the STA have not been charged with any crime for this trial, their responsibilities have not been fully unveiled. In particular, there has never been any official investigation of the members of the Committee on Examination of Nuclear Fuel Safety in the Nuclear Safety Commission (NSC), which approved JCO's safety inspection, during the session of the Special Committee on Investigation of Nuclear Accident and Failures in the NSC and during the criminal trial.

It was extremely regrettable that human relationships between the PNC and the NSC, and a detailed account of how and why a "precipitation tank" was used in the JCO factory, have never been uncovered.

With regard to the economic damage caused by the accident, a fermented soybean production company has filed a suit, seeking 18 billion yen compensation against JCO. A fish retailing company and a marine products company have brought cases to seek reparations of 56 million yen and 80 million yen respectively. In September 3 of 2002, three local residents appealed to a court for compensation for damage to their health. All the trials are currently ongoing.

The JCO Criticality Accident Comprehensive Assessment Committee is planning to issue an interim report (in Japanese) in September 2002. (The final report is expected to be issued in the autumn of 2003). The interim report will include the committee members' reports on the status of the trials mentioned above, the results of the field survey of local residents, and problems associated with disaster prevention measures. By Satoshi Fujino

Attending the 14th International Summer Symposium on Science and the World Affairs

I had an opportunity to attend an international symposium entitled the "14th International Summer Symposium on Science and the World Affairs," which was held at the University of Illinois in the United States from July 15 to 21, 2002.

The symposium was hosted by the Union of Concerned Scientists (UCS), a U.S.-based non-governmental organization established by American scientists. Since the U.S. was the host country this time, the study program on Arms Control, Disarmament, and International Security at the University of Illinois cooperated in the organization of the symposium.

For the past 30 years, according to the UCS, technically informed specialists have began to play an important role in the policy arena with regard to the issues of international safety assurance and arms control. While such specialists watch the government and industry's activities in such areas, they can also provide basic scientific information to help policymakers arrive at their decisions.

The aim of this symposium was to support young scientists whose research interest is related to international security and arms control. In particular, the organizer urged many scientists to attend whose home country's natural science field has not paid special interest to the issues discussed. Another important purpose of this symposium was to create a network linking researchers working in similar situations. The symposium started in 1989 and has been staged in Russia, the U.S., China, and Germany, with researchers participating from more than 18 countries, including Japan.

This year, about 40 participants attended from 9 countries, most of whom were engineers and physicists working in universities. However, their specialties were not limited to only nuclear engineering but to other specializations such as laser physics and space engineering.

Because it was the first symposium to be held after the last year's September 11th terrorist attacks in the U.S., many presentations concerning nuclear terrorism attracted the audiences' attention. For example, a Chinese researcher calculated the damages that would occur if terrorists launched a small-scale atomic bomb from a ship or a truck. Other researchers, considering the kinds of nuclear weapons terrorists might use, indicated that reactor-grade plutonium could be used for such purposes.

Other than terrorist related nuclear issues, a Russian presenter talked about the capacities for storing spent fuels at a plant named RT-2, whose construction is currently suspended, and the way an operational procedure for securing safety of the plant might be established. In addition, the following risk calculations were performed for each case: an earthquake and strong wind as exterior hazards; a fire as an interior hazard; the treatment of a cask; loss of cooling water; and the loss of electrical power.

A researcher from Germany reported that reactor-grade plutonium could be used to create a nuclear explosion by breeding tritium from a fusion power plant where the pre-ignition problem will be lessened.

I presented on the possibilities of nuclear fusion technologies being applied to the development of nuclear weapons in Japan. Nuclear fusion R&D is said to be conducted only for peaceful purposes. I demonstrated from the engineering point of view, however, that it could be possible for research to be used for military applications. By drawing attention

to the Magnetic Confinement Fusion device JT-60 at Japan Atomic Energy Research Institute (JAERI) and the inertial Confinement Fusiondevice Gekko-XII at Osaka University, I argued that we already had both nuclear technologies, such as neutron sources and tritium production technologies, had potential military applications, and there are possibilities to transfer the development of certain other technologies, i.e. laser and beams, in order to utilize them for space weapon military purposes. In the discussion time, many questions were raised regarding Japan's three non-nuclear principles. It seemed that Japan's plutonium stockpile and highly advanced technology posed serious threats to many foreign observers.

Apart from nuclear issues, there were many presentations related to space weapons and technical criticisms of the Bush administration' s missile defense strategy.

During the symposium, I used the university's housing and dining rooms, which provided me with the experience of an American college student. During a break, many participants visited an Amish village, which was located around an hour's drive from the university. The Amish have chosen not to participate fully in modern civilization - consuming a very small amount of energy - without any compulsion in their living. In particular, their beautiful houses and attractive dress appealed to many participants. We enjoyed a simple but tasty meal there.

Following the symposium, on the 22nd and 23rd of July, the "1st International Professional Meeting of Independent Technical Security Analysts" was held in Chicago. I had a chance there to meet Dr. Frank Von Hippel, who served as an assistant director of national security at the White House, and is a professor at Princeton University, and Richard L. Garwin, who has experience in developing nuclear weapons and served on the President's Scientific Advisory Committee.

Marvin Miller of the Massachusetts Institute of Technology, made an interesting presentation entitled, "Japan and Nuclear Weapons, and Reactor-grade Plutonium." He emphasized the fact that Japan took seven years to ratify the Non-proliferation Treaty (NPT), which appeared to confirm Japan's affirmative stance towards the utilization of nuclear weapons. He concluded that therefore Japan could be regarded as essentially nuclear weapons state in light of the current advanced ability of Japan's science and technology.

Regarding the impression of this symposium it seems to me that it was not wholly satisfactory since there was little discussion about the importance of citizens' participation in this field. Perhaps this was unavoidable because most participants came from universities and research institutions; very few participants from non-governmental organizations at the symposium. There were sometimes situations reflecting complicated national outlooks in which the use of nuclear weapons was justified as a necessary condition to protect the home country. However, all the experiences that I gained during the symposium were very valuable, prompting me to think about how I should work in this field in the future.

By Tadahiro Katsuta

Picture: Memorial photograph of symposium participants

Data: Japan's Separated Plutonium Inventory

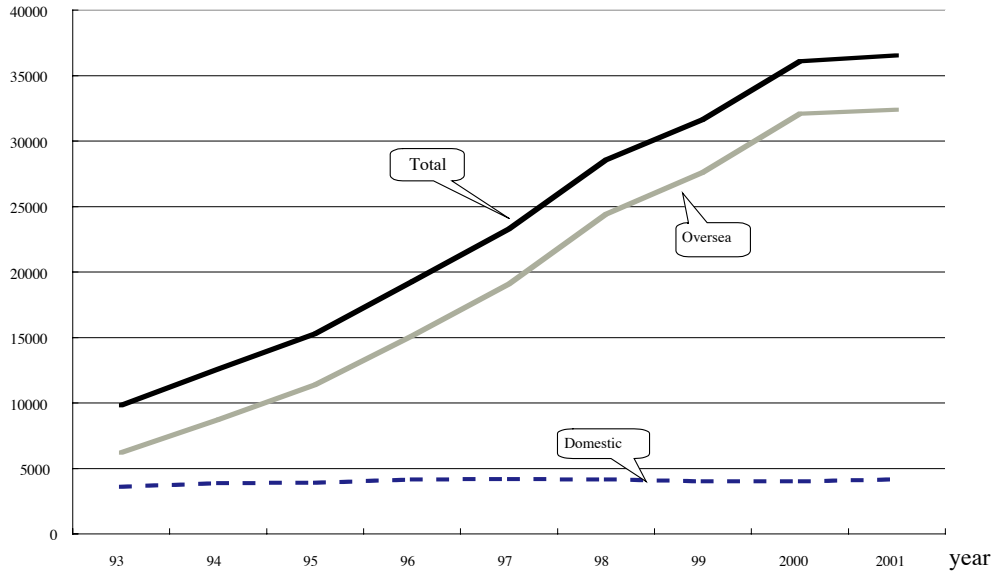
Amount of Plutonium as of the end of the year (kg, total plutonium)

FACILITY	1993	1994	1995	1996	1997	1998	1999	2000	2001
Reprocessing plant of which	326	836	753	602	538	537	528	582	842
as nitorate	288	710	597	384	385	384	375	365	539
stored as oxide	38	126	156	217	153	154	154	217	303
MOX fuel fabrication plant of which	3269	3018	3146	3543	3649	3596	3491	3413	3294
stored as oxide	2339	2032	1980	2346	2553	2737	2652	2515	2323
under processing	790	948	985	786	726	473	481	439	551
completed fuel	140	38	181	411	370	386	358	360	420
Reactor sites of which	1089	498	823	887	819	832	1298	1290	1546
Joyo	15	6	31	48	23	2	38	18	64
Monju	637	15	367	367	367	367	367	367	367
Fugen	12	53	0	43	0	34	0	0	0
LWR							465	465	670
Critical assemblies	425	425	425	429	429	429	428	440	444
Overseas reprocessors of which	6197	8720	11378	15090	19083	24398	27596	32070	32379
BNFL	1286	1412	1418	2437	3549	6109	6957	10118	10713
COGEMA	4911	7308	9960	12653	15534	18290	20639	21953	21666
TOTAL	10881	13072	16100	20122	24089	29363	32913	37355	38061

Compiled by CNIC

Data source: Ministry of Education, Culture, Sports,

Figure: Japanese Pu surplus



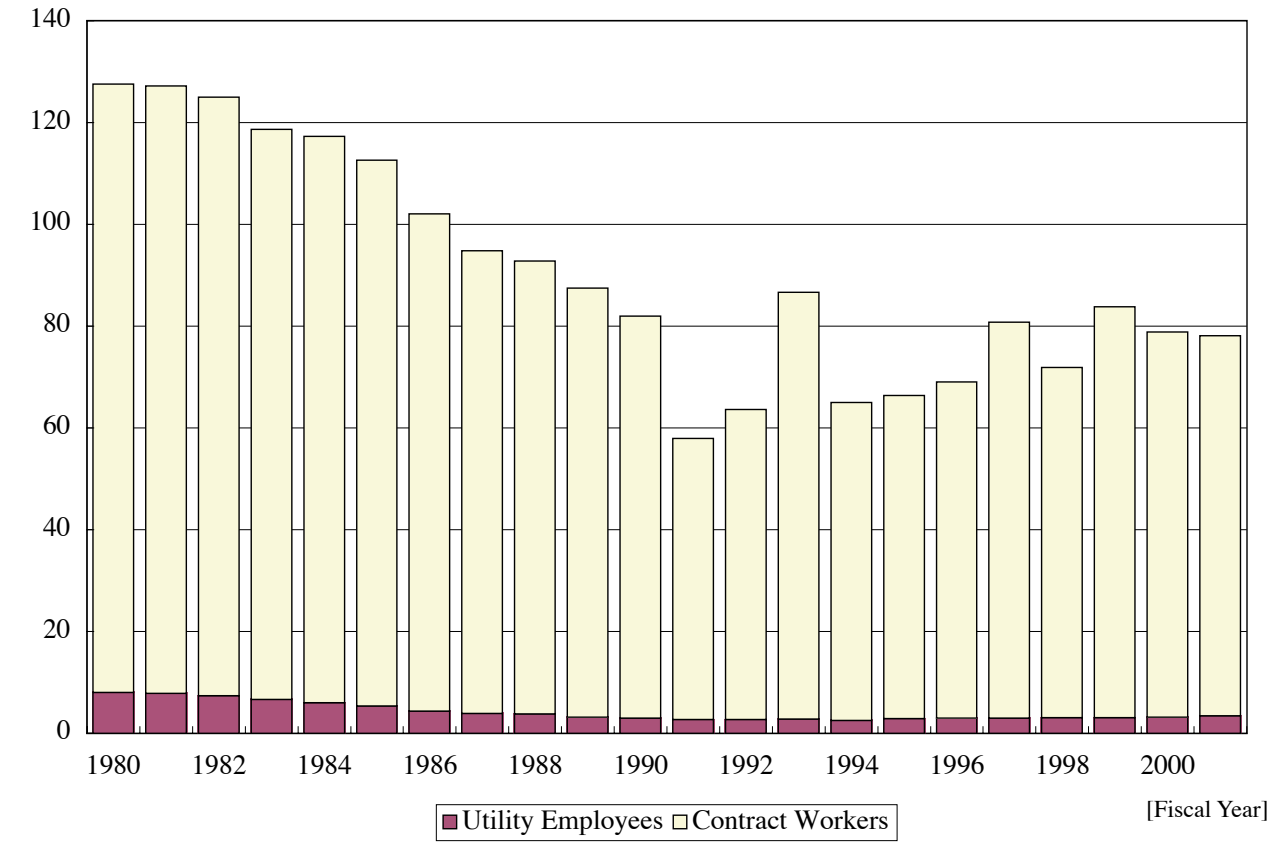
86 kgHM of plutonium was recovered at the Tokai reprocessing plant in 2001. Electric companies say that they will finish reprocessing the entire amounts - which were contracted out - by 2002 or early 2003. The primary factor of increasing plutonium could attribute to its recovery in Japan and Britain. The plutonium stored at France was decreased since some of the fuels were shipped to Kashiwazaki-Kariwa nuclear power plant (NPP) fabricated as MOX (Mixed Oxide plutonium) fuel (205 kgHM in the table above) in Belgium or others were on the manufacture line for fabricating new MOX fuel at MELOX in France. By Hideyuki Ban

Data: Workers' Exposure at Nuclear Plants

Workers' Radiation Exposure at Nuclear Plants, 1980-2001
Annual Collective Dose of Nuclear Plant Workers (person-Sv)

Fiscal Year	Utility Employees	Contract Workers	Total
1980	7.96	119.52	127.47
1981	7.84	119.33	127.18
1982	7.33	117.67	125.00
1983	6.60	112.06	118.67
1984	5.97	111.25	117.23
1985	5.36	107.25	112.59
1986	4.31	97.68	101.98
1987	3.88	90.93	94.82
1988	3.76	89.00	92.76
1989	3.12	84.28	87.39
1990	2.96	79.01	81.94
1991	2.69	55.16	57.86
1992	2.66	60.89	63.54
1993	2.78	83.86	86.65
1994	2.45	62.48	64.89
1995	2.85	63.50	66.32
1996	2.92	66.10	68.99
1997	2.98	77.77	80.77
1998	3.07	68.78	71.85
1999	3.06	80.69	83.78
2000	3.13	75.72	78.83
2001	3.35	74.69	78.05

*Fugen Prototype Advanced Thermal Reactor excluded
Source: Agency of Nuclear and Industrial Safety



TEPCO announced the postponement of the Plu-thermal program

Disputes at Fukushima Prefecture: Atomic Energy Commission (AEC) and Fukushima Energy Policy Review Committee (FEPRC) exchange their views.

The 20th Fukushima Energy Policy Review Committee (FEPRC) was held in Fukushima city on August 8 where five members of the AEC attended the meeting to exchange their views with the committee members of the FEPRC including Mr. Eisaku Sato, the Governor of Fukushima Prefecture. The meeting was open to the public. The more than 220 people attending this meeting - there are usually about 20 - indicated the strong interest of the citizens of Fukushima Prefecture.

After hearing initial statements from both sides, Mr. Sato explained his view that Fukushima has long cooperated with the nation's nuclear policy, but has been tossed about by the central government's stated policy and their real intentions. In short, the government promised that spent fuels would not be stored at the Prefecture for a long time since the second fuel reprocessing facility was expected to start its operation around 2010. The Long Term Program for the Research and Utilization of Atomic Energy, which was issued in June of last year, revised the principle that "the decision will be made based on the reprocessing capacity and the availability of technology around 2010. The government's promises regarding spent fuels were easily overturned. Finally, the Governor submitted fourteen items of "questions on energy policy."

Then, prefecture officials and the AEC members discussed the nuclear fuel cycle and information disclosure. The officials pointed out, referring to their original data, that the implementation of the Plu-thermal program could not reduce the stockpiling of plutonium even if the Rokkasho Uranium Enrichment Plant started its operation. Questions were raised about AEC's claim that the Plu-thermal program will resolve the problem of stockpiling of plutonium. It was proposed that the current reprocessing policy should be changed so that spent fuels could be stored at an interim storage site until it is certainly necessary to use plutonium. Additionally, the FEPRC requested that the government should promote more information disclosure on nuclear energy. This request is based on their experience in which they went through many difficulties obtaining information during their research.

In response to the EPRC, the AEC repeatedly claimed that the future success and the development of science and technology would not be realized if it has to be started from now, and therefore, it was necessary to continue the development of the FBR and the reprocessing of spent fuels. However, in the course of the discussion, there was a situation where one of AEC members let slip real belief that the reason the government should stick to the reprocessing policy is that if the current reprocessing spent fuel policy were changed to store spent fuels at an interim storage, it could be thought that the government changed their policy. Apprehending the risk that the APLTP will be seen as failure, the government has clung to the goal of the old APLTP, which doesn't reflect the actual situation of nuclear energy.

After the meeting on August 21, the AEC sent to the Governor, Mr. Sato, a letter presenting answers to the fourteen questions regarding the nation's energy policy. The letter also asked for another meeting with the Governor. The contents of the letter mostly affirm the status quo of the nation's nuclear energy policy; it doesn't address any questions raised by the FEPRC. However, the concluding part of the letter deserves attention. It says: "nonetheless, as a practical issue if the Plu-thermal program were stopped at this point, we suspect that the suspension would necessitate taking appropriate measures to deal with spent fuels for the electric power generation area," referring to the fact that the reprocessing business of spent fuels could be regarded as means to deal with spent fuels stored at nuclear

power plants, which could influence the utilization of whole nuclear power plants. Fukushima citizens criticized it as an intimidatory and unreasonable argument. Governor Mr. Sato declined to arrange a further meeting with the AEC.

Disputes at Niigata Prefecture: fight to protect the outcome of public referendum

Aiming to load MOX fuels during a periodical inspection, which is expected to start from August, several preparations were started in Niigata prefecture. The Governor Mr. Hirayama of Niigata Prefecture remarked that the prefecture could become the first to introduce the Plu-thermal program. Soon after the Kansai Electric Company's MOX fuel was shipped back to England, Kariwa village chief Mr. Shinada went to Belgium for the examination of falsified data on MOX fuels, and he reported upon returning from his trip that suspicion on data falsification no longer remained. He carried out meetings with village people in each 20 district in the village. At the same time, the mayor of Kashiwazaki-city visited Belgium and France and announced that doubt about the maintenance of quality verification data was cleared. On the contrary, citizens who oppose the implementation of the MOX program, mainly local residents, visited local residences door-to-door to ask people to keep the result of referendum. On August 27th, the results of an opinion survey, which was conducted August of this year and consulted 4,200 village residents, showed the majority of residents (80%) agreed that the mayor should respect the outcome of the public referendum last year (those who disagree comprised 18.4%). Following such activities, it was found during a periodic inspection that the Kashiwazaki-Kariwa Unit-3 core shroud has some cracks, making it impractical to load MOX fuels during the test.

Two days after that incident, it was reported by the Nuclear and Industrial Safety Agency and TEPCO that TEPCO has covered-up and/or falsified data on voluntary test from the mid-1980s through to the 1990s. A detailed account of this incident has not yet emerged, however, based on what has been reported so far, TEPCO seems to have provided inaccurate data and omitted to mention in its inspection report that cracks had been found in reactor components such as the core shroud, the jet pump and the steam dryer. Initially, reports suggested that GEII (General Electric International Incorporation) had engaged in illegal operations, but it was later revealed that TEPCO had instructed GEII to falsify the data.

An influential local person who has worked with TEPCO felt this incident was a "betrayal." According to a news report on September 2, it was unanimously decided that Okuma town assembly and council would reverse the previous agreement on the MOX program (see table 1). It is certain that the MOX-program in Japan will delay at least several years. The Plu-thermal program, governemnt's de-facto policy, has failed. The operation of the Rokkasho Reprocessing Plant will bethe next issue, granted that the AEC's reply to the Fukushima Governor on the fourteen questions regarding the nation's energy policy were true. By Hideyuki Ban

Table 1. Plu-thermal plan

Plant	Start year	Current situation
Fukushima I-3	1999	Okuma Town has cancelled the previous agreement on plu-thermal program (2002/9/2).
		Futaba Town has declared the suspension of plu-thermal program for the time being (2002/9/8).
		Fukushima Governor withdrew the previous approval on the Plu-thermal program (2002/9/26)
Kashiwazaki Kariwa 3	2000	Kashiwazaki City assembly has decided to call off plu-thermal program.
		The mayor cancelled the previous agreement (2002/9/11).
		Kariwa Village assembly has cancelled the previous agreement (2002/9/11)
Takahama 4	1999	Return of MOX fuel to UK due to falsification of quality management data.
Others		There are no concrete plans so far.

Anti Nuke Who's Who
Who's who: Ms. Toshiko Baba

At first glance, Ms. Toshiko Baba seems to be an ordinary woman, but in fact she is quite unique. Her activity stems from nothing special, but from something that anyone who lives in contemporary society knows. She values something that everybody knows about, but doesn't care about any more. She acts on her own responsibility with her quiet faith that things can be done differently.

"Life" is one of the examples. Every human being appreciates his or her life. Yet, how many of them have a serious desire to protect their lives? Food enables life; the human mind cares for life; but man-made materials threaten life. How many people actually think about life and make their decisions with life itself as the basis of their thought?

When she was a college student Toshiko was devoted to drama. There, she met her man of destiny, became a housewife and had children. Hers was just an ordinary life until the baby inside her spoke to her one day during a beautiful sunset. "I will be born from all the air you breathe, all the water you drink, and all the food you eat."

Having her children and seeing her life in terms of a "life valuing" perspective, she realized the truth that even her breast milk was contaminated with pesticides and radiation. Since then, she has been continuously active in doing what she can while also valuing her time with her family as a housewife. Although she feels that what she has done so far is not so important, she has participated in many activities such as "A Radiation Measuring Room," "Chernobyl Relief in Shizuoka," and "Lectures for a Healthy Life" and many more, including activities as an individual and also collaborative work in which she sometimes cries and laughs with others.

As Toshiko's two children are now eighteen and thirteen years old, she has more free time than before. Last year, she accepted a secretariat position in the court trial which is seeking to shut down the Hamaoka nuclear power plants. If the plants cannot ensure safety against an inevitable earthquake, they have to be shut down. Toshiko's attitude, stemming from a purely life-centered perspective, has attracted much sympathy. We should not take the current situation for granted. Rather, we should continue to speak out about how we think society should be and try to work towards its realization. We should not fight with others, not get angry, and not blame others for what is happening. Rather, we should talk to others, grieve, and pray and try to indicate a new direction. This approach shows Toshiko's commitment to her long-cherished ideals.

However, she said, "To be honest, I want to perform in plays again." It seems that she wants to live a life that is as free as the wind. What could be better than if all her worries were resolved so that she could live in the way she desires? By Ikuko Sugiura

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NEWS WATCH

ANRE Begins Nuclear Promotion Education in Earnest

On July 8, the Agency of Natural Resources and Energy (ANRE) set up the Energy Information and Planning Division. It is an organization of experts whose major functions include control and supervision of publicity (public information) on energy policies, a role, which used to be performed by the respective sections. The new division will also deal with interactive communications and energy education. What triggered the creation of this division was the discussions held at the MOX Energy Promotion Council organized by related ministries and agencies on the need for such division since the planned program to use plutonium in thermal neutron reactor (Plu-thermal Program) has seen little progress. It is obvious from this fact that the energy education aims at nuclear promotion.

On the basis of the interim report issued by the above-mentioned council in August 2001, ANRE, in cooperation with the Ministry of Education, Culture, Sports, Science and Technology (MEXT), has begun, starting from this fiscal year, to select 60 model schools for energy education, and is distributing teaching materials and a collection of guiding examples for nation-wide elementary and junior and senior high school teachers. A major task of the newly established Energy Information and Planning Division is to further strengthen these measures.

In addition, each power company has been incorporating nuclear promotion in school education using various measures. Officially claiming that they are for energy education, power companies are providing teaching materials including CD-ROM software and sending lecturers.

An ANIS' Assistant Section Chief Arrested on Suspicion of Bribery

An assistant section chief of the Agency for Nuclear and Industrial Safety (ANIS) was arrested on July 31, on suspicion of bribery. ANIS was established in January 2001 as part of reform of the central ministries to unify the nuclear regulatory administration, which used to be carried out separately by the former Science and Technology Agency (STA) and the Agency for Natural Resources and Energy, the former at the development level and the latter at the commercial level. The arrested individual is suspected of receiving about 23 million yen from former officials of industrial waste management contractors during the period between 1998 and 2001 when he was working at STA, and of helping them to procure orders for nuclear-related businesses. The orders they attempted to secure include the project to computerize drawings of nuclear plants. The arrested person provided materials such as drawings and introduced staff in charge at power companies to the officials. But the attempt did not succeed.

New Construction of Tsuruga 3 and 4 Incorporated into the Government's Plan

On August 2, the Ministry of Economy, Trade and Industry decided to include Tsuruga 3 and 4 (both APWR and 1,538 MW), which Japan Atomic Power Co.(JAPC) is planning to construct, in the government's Electric Power Development Master Plan. The construction of these reactors will start after approval is given following safety inspection.

With regard to the construction of the reactors, however, the negotiations between three power companies are not going smoothly over the question of who would take over the electricity generated from the reactors. JAPC is the wholesaler, and Kansai, Chubu and Hokuriku Electric Power companies are to take over the generated power. Kansai Electric is expected to guarantee to take over 50% of the electricity, but it is reluctant to guarantee, claiming that it has excess generation facilities. To a question from a Nihon Keizai Shimbun reporter after he submitted a plan in April 2000 for the construction in Fukui Prefecture and Tsuruga City, JAPC's president Yoshihiko Sumi stated that there is a possibility that

the power to be generated from the reactors to be constructed at a cost of 830 billion yen may not be sold. His fear is becoming a reality.

NFI Begins Preparation for PBMR Fuel Plan

On August 1, Nuclear Fuel Industries Inc. newly established the Fuel Plant Development Department. This is an organization for the development of a fuel manufacturing pilot plant for a Pebble Bed Modular Reactor (PBMR), for which the company has received an informal order from South Africa. The department was established in expectation of future orders for commercial-size plants. The department is said to start with a director and five or so staff members, and to be gradually expanded.

With regard to PBMR, Mitsubishi Heavy Industries, Ltd. has received an order for the development of a helium gas turbine for power generation.

Mitsubishi Heavy Industries Making a Large-Scale Investment in Plant and Equipment

Mitsubishi Heavy Industries (MHI) plans to invest some 10 billion yen by the next fiscal year in its plant in Kobe City, Hyogo Prefecture, to introduce large-sized machine tools including large cranes. The construction of pressurized water reactors manufactured by MHI had stopped since Kyushu Electric Power's Genkai 4 was completed in 1997. MHI decided to make a large-scale investment, however, since the construction of Hokkaido Electric Power's Tomari 3 was decided in November 2000, followed by Japan Atomic Power Co.'s Tsuruga 3 and 4 in August 2002 (See article on p. 11). With this large-scale investment, which MHI is going to make over 10 years, the company is planning to reinforce the production system in line with exports of reactor-related equipment for the United States.

Ground-Breaking Ceremony for the Mizumani Underground Research Laboratory

On July 8, the ground-breaking ceremony was held for the Mizunami Underground Research Laboratory, which the Japan Nuclear Cycle Development Institute (JNC) is planning to construct in Mizunami City, Gifu Prefecture. It is planned to drill a shaft 1, 000 meters deep and 6 meters in diameter, to conduct basic research for underground disposal of high-level radioactive wastes. The ceremony was not for the shaft itself but for a pond to dump mud and other material which would be produced during the development of the site. The ceremony ended in ten minutes after the simple digging a hole, and after the ceremony the hole was reclaimed the construction of the shaft itself is scheduled to begin in FY2004.

However, as a result of this ceremony, Mizunami City will be granted a subsidy from the national government for local development. This was the purpose of the ceremony. The local government accepted the construction of the laboratory for this subsidy. Residents have opposed to the plan in fear of a waste disposal facility adjacent to the laboratory. The ceremony was also intended to encourage citizens' to give up their opposition

BOOK REVIEW

Imanaka T., ed. 2001. "Recent Research Activities about the Chernobyl NPP Accident in Belarus, Ukraine and Russia." Research Reactor Institute, Kyoto University. KURRI-KR-79 (ISSN 1342-0852)

Sixteen years have passed since the accident at Chernobyl nuclear power plant. However, many issues remained unresolved such as the nature of the reaction process from its runaway nuclear reaction leading to the explosion, the degree of contamination around the area soon after the accident, and the amount of radiation exposures. It is also necessary to continue to examine long-term health conditions caused by the accident, e.g. the increasing incidence of thyroid cancer among the people. Dr. Tetsuji Imanaka, Kyoto University Research Reactor Institute (KURRI) has many times visited the affected area to examine the situation after the accident and exchanged opinions concerning the effects of the accident with researchers who have done significant work, some of whom Dr. Imanaka requested to write articles about their work. The report consists of five sections: the physical process (three articles), the radioactive contamination (six articles), the assessment of exposure dose (four articles), health effects and epidemiology (five articles), and radiation biology (four articles). It was published as an English technical report from the Kyoto University Research Reactor Institute.

The report is available as a PDF file at the following URL:
http://www-j.rri.kyoto-u.ac.jp/NSRG/reports/kr79/KURRI-KR-79