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MOX Program Postponed

- Nuclear Industry hit hard by dishonesty



Plaintiffs for the case against Kansai Electric Power Co. (KEPCO) on using MOX fuel for Takahama 4 rejoice over their victory after KEPCO announced on Dec. 16 that it will cancel the use of the fuel for Takahama 4.

An Ever-Growing Scandal

It has been revealed by *The Guardian* and the UK Nuclear Installations Inspectorate (NII) that in addition to falsifying quality control data for mixed plutonium-uranium oxide (MOX) fuel for Takahama 3 plant, British Nuclear Fuels plc (BNFL) workers falsified quality control data for MOX fuel for Takahama 4, which has already been shipped to Japan. NII had been investigating BNFL following the revelation of data fabrication in September 1999. Following the reports of subsequent data fabrication, Kansai Electric Power Company (KEPCO) canceled the use of the fuel for Takahama 4 and is attempting to have the fuel sent back to the UK. KEPCO had already ordered the reproduction

of Takahama 3 fuel in October. Citizens' groups considered the fuel data for Takahama 4 suspicious ever since the scandal broke out over the fuel data for Takahama 3. However, the company claimed that no fabrication had taken place with the data for Takahama 4 and tried to enforce the loading of the fuel. The release of a series of new information fol-

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lowing the report by *The Guardian* finally forced KEPCO to admit that data fabrication had taken place. It is regrettable that KEPCO's admission took so long, but it was fortunate that they abandoned their plans before the fuel was loaded.

Data Fabrication by BNFL

The revelations about BNFL's data fabrication first surfaced on September 14, when *The Independent* newspaper (UK) published a major report based on inside information. The news was received as quite a shock by the Japanese public since a vessel carrying some of the MOX fuel manufactured by BNFL had already left Europe and was on its way to Japan. The ship left England on July 21, 1999, and was carrying eight fuel assemblies for Takahama 4. The ship waited as another ship unloaded fuel in Fukushima prefecture on September 22, before arriving in Fukui prefecture on October 1. It was thus shortly before the arrival of the fuel that the scandal broke.

BNFL falsified the quality control inspection data by copying and pasting quality control data from previous lots. Following the allegations, KEPCO and the Agency of Natural Resources and Energy (ANRE) dispatched inspectors to the UK to investigate the matter. KEPCO put out a final report on the investigation on November 1, 1999, and the following day the ANRE and the NSC addressed the Fukui Prefecture Legislature and stated that the investigation by KEPCO was satisfactory. The final report concluded that data for 22 lots of Takahama 3 fuel was falsified and that the fuel would have to be refabricated, but insisted that no falsification had taken place with the quality control data for Takahama 4 fuel.

KEPCO's Investigation

One BNFL employee interviewed by BNFL testified that he had copied pellet diameter data from previous lots and pasted it into subsequent lots. Thus KEPCO investigators limited their investigation into putting data from separate lots side-by-side and comparing them to see if there were any perfect matches. By this method they found 22 lots, all for Takahama 3, which looked suspicious.

However, this method of analysis is quite inadequate, since if, for example, the last part of the data for 200 random inspections had been brought to the top and then copied, data falsification would not have been apparent.

Wanting to put an end to the investigation, and to the political storm generated by the revelation of data manipulation, KEPCO and the Ministry of International Trade and Industry (MITI) insisted that the data for the MOX fuel for Takahama 4 had not been tampered with. MITI did not want to see any further delays to the MOX fuel program, and was keen to use the Takahama 4 fuel which had already arrived in Japan. At this stage, the planned loading of the fuel into Takahama 4 in April 1999 had been postponed to November 1999. The original plans for the MOX fuel program were to have a couple of nuclear plants using MOX fuel by the end of the '90s. The plans were then adjusted to have Tokyo Electric Power Company (TEPCO) and KEPCO burn MOX fuel at one plant each by the end of 1999. The Government probably feared that a further delay to the program would affect Japan's plutonium program, based on the Long Term Program for the Development and Utilization of Nuclear Energy which has been under review since early 1999. Ironically, with the news of further data fabrication, MOX fuel plans were postponed at Fukushima prefecture and Fukui prefecture in addition to Takahama 4. Thus all MOX fuel plans at Kashiwazaki-Kariwa (Niigata prefecture), Takahama 3 and 4 (Fukui prefecture), Fukushima I-3 (Fukushima prefecture), and Tsuruga 2 (Fukui prefecture) have been postponed for the time being.

Citizens' Analysis of BNFL's Data

KEPCO received data on quality control inspections and fuel processing from BNFL and brought it back to Japan in October. Fukui prefecture made this data available to the public to relieve citizens' concerns. Instead of being reassured by the data, two citizens' groups carried out a statistical analysis of the inconsistencies in the random inspection data and the total pellet inspection data and found that in some lots the data distribution graphs for the quality control inspection did not match the data distrib-

ution graphs for the automatic inspection (see NIT 74). The two groups appealed to the residents of Kansai, and on November 19, 212 plaintiffs asked the Osaka District Court to issue an order of provisional disposition to prohibit the use of MOX fuel in Takahama 4. In Japanese courts a provisional disposition can only be obtained when there is an emergency, and then later the matter is officially reviewed. The court decision would have been given on December 17. However, KEPCO held a press conference the day before the decision was to be given and admitted that data for Takahama 4 fuel had also been fabricated and that they no longer intended to use the fuel. At last KEPCO and the Government had admitted that data fabrication had taken place. This admission was brought about because of a series of new revelations following the article by The Guardian featuring reports from the NII on data fabrication by BNFL. Such information had created a favorable ground for the local residents' court case. For example, from the questioning in the Diet by Diet member Sumiko Shimizu, it was learned that the MITI knew of the data fabrication on November 8 through a letter from the NII to the Japanese Embassy in the UK. This letter was given to the court as evidence on December 16. At this juncture, KEPCO and MITI realized that they were no longer able to brazen it out, and decided to admit that data fabrication had taken place and to cancel the use of the fuel. KEPCO has decided to bar BNFL from bidding for contracts for MOX fuel and is now asking BNFL to ship the fuel back to the UK. Thus the fuel that was shipped from the UK to Japan amid grave international concern will most likely be shipped from Japan back to the UK, once again posing enormous risks to the environment, economy, and citizens of the en-route countries.

Dishonesty Present Throughout Nuclear Industry

The data fabrication by BNFL and the cover up of information by Government officials and KEPCO has led to a further decline in the credibility of the nuclear industry. Doubts naturally arise over the quality control of Belgonuclaire, the manu-

facturer of MOX fuel for Fukushima I-3 which has already arrived in Japan. The report released by TEPCO in September 1999 claimed that all data is automatically put into the computer and that employees wouldn't have been able to tamper with it. However, TEPCO refuses to release this data, claiming that it needs permission from Belgonuclaire. Meanwhile, Belgonuclaire claims that it cannot release the quality control data because it needs permission from TEPCO. The subsequent revelation of data fabrication by BNFL caused TEPCO to postpone the introduction of the MOX fuel program in Fukushima I-3 which was scheduled to begin in February 2000. TEPCO was ordered by MITI to reinvestigate the MOX fuel manufactured for Fukushima I-3 and has sent an investigative team to Belgium. An investigation by a third party is also planned. However, unless TEPCO obtains specific quality control data and releases the data to the public, citizens' groups will remain critical of any investigation carried out by TEPCO.

It is worth mentioning that data fabrication also took place with the MOX fuel transport cask that contained the fuel for Takahama 4. Fuel with fabricated data in a cask with fabricated data! In 1998, a Japanese company fabricated quality assurance data for the transportation cask of MOX fuel to meet the then existing quality standards (see NIT 68). This scandal was put to rest by lowering the safety standards so that the original, undoctored data of the cask could pass safety requirements. Dishonesty runs through the entire nuclear industry regardless of whether it is in the West or the East.

Compared to burning uranium fuel, the burning of MOX fuel increases the risk of accidents and lowers the safety margin of light water reactors. In addition, transportation of MOX fuel poses environmental, economic, and health risks to en-route countries. These unnecessary risks are made all the more worrying by the dishonesty of the nuclear industry. Representing all concerned people, CNIC will continue to approach the government and utilities to withdraw from the folly of the MOX fuel program.

By Hideyuki Ban

1999 Workshop of Sustainable and Peaceful Energy Network Asia Held in Thailand

The 1999 workshop of Sustainable and Peaceful Energy Network Asia (SPENA), for which CNIC is a secretariat, was held on Coral Island in Thailand from November 26 to 28. Thirty-six representatives from 11 different countries including India, Indonesia, Korea, Japan, Thailand, Taiwan, the Philippines, Malaysia, Sweden, Denmark, and the United States participated, and there was much lively discussion about the current situation regarding energy, and people's engagement with the issue in each country.

Session 1 on the first day was on "Global and Regional Environmental Situation and Trends." Gurmit Singh (Center for Environment, Technology, and Development, Malaysia) gave a report on the present situation in Asia, titled "Asian Energy Situation and Trends: A Perspective." Gurmit said that while construction of the Bakun dam in Malaysia and new nuclear power plants in Korea is being postponed, plans to build nuclear power plants have been advanced or are in progress in the Philippines, China, and Taiwan. He also pointed out that it would be difficult for Asian countries, being mostly developing nations, to develop sustainable energy policies unless industrialized countries pursue such policies as well.

Prof. John Byrne (Center for Energy and Environmental Policy, the University of Delaware, US) could not attend the workshop this time, but submitted a report, "Atmosphere for Sale: Democratic Failures in Climate Change Negotiation."

Session 2 was about "The Present and Future of Renewable Energy." Prof. Roland Simblun

(Nuclear Free Philippines Coalition, the Philippines) gave a report on "Community Experiences in the Quest for a Sustainable Energy Future in the Philippines," relating examples of the introduction of renewable energy by NGO groups in remote areas of the Philippines. Prof. Simblun weighed the success and implications of these endeavors. Fabby Tumiwa of Yayasan Geni, Indonesia, told us that Yayasan Guni had been manufacturing and utilizing solar panels in cooperation with the Japanese NGO, Solar Net, and had coordinated a biogas project using horse manure with local horse carriage laborers, contributing stable income for this workforce. During the Question and Answer period, I asked about the current state of nuclear power development in Indonesia. Anung Karyadi (WALHI, Indonesia) gave a promising answer, saying that the new Indonesian government has been delaying plans for nuclear development.

K.R.Datye (Society for the Advancement of Renewable Materials, India) showed us methods for introducing renewable energy, based on quantitative analysis and abundant experience.

In the afternoon the host of this workshop, Dr. Chirapol Sintunawa (Association for the Development of Environmental Quality [ADEQ]/Mahidol University, Thailand) organized a game called "Fish Game: Renewable Resource Utilization and Management," in which players learn about the depletion of resources.

In the evening, we had Session 4, "Energy Efficiency: Experiences and Prospects." In this session, Prof. Jorgen Norgard, of the Technical University of Denmark, explained that energy demand in Denmark had always been



<Participants discuss green energy policies in a working group. Coral Island, Thailand>

expected to rise continually, as a result of which the Danish government had considered introducing nuclear power. Norgard and his colleagues, however, had argued that energy demands would not necessarily keep rising, and they had turned out to be right. Prof. Norgard also pointed out that even the current energy strategies of the Danish government, which is regarded as having some of the most environmentally progressive policies in the world, were inadequate, given the many other possible means of saving energy. Dr. Chirapl Sintunawa gave a report on a "demand-side management (DSM) project," which his NGO, ADEQ, has been strongly promoting in cooperation with the Thai government. In Thailand, an energy-saving campaign, incorporating TV commercials and energy-saving contests in schools and the community, are proving an effective way of raising people's awareness about energy consumption. As a result of the DSM project, carried out over five years, it is estimated that this program enabled a reduction of 311 MW from the peak electricity demand and a 1,826 GWh reduction from electricity consumption.

The second day began with Session 5, "The Path to Sustainable Energy and Scenarios for Asia and Other Regions." Prof. Jong-dall Kim (Research Institute for Energy, Environment and Economy, Kyungpook National University,

South Korea) gave a talk titled "A Sustainable and Peaceful Energy Alternative in Developing Countries." He made some challenging suggestions regarding the ways to introduce sustainable and peaceful energy in developing countries: these countries should reorganize energy, environment,

and economy comprehensively, and change the current economic model based on increasing energy consumption into a sustainable development model based on energy efficiency. This requires establishment of decentralized energy policies, cooperation in the community, and leadership from the developed countries.

Next, Prof. Leif Gustavsson (Lund University, Sweden) gave a report on "Energy Use and Supply in Sweden in 2050 - Some Scenarios." According to the "energy end use scenario" proposed by Prof. Gustavsson and his colleagues, final energy consumption could be cut in half by 2050 even if economy growth remained substantial. This could be accomplished through innovations such as environment taxes, education programs emphasizing the intricate connections between environment and energy, and popularization of energy-efficient goods and practices. Peter du Pont (International Institute for Energy Conservation, Asia, Thailand) gave a report on "Green Independent Power Producers (IPPs) for Southeast Asia," in which he described a study conducted by IIEC, at the request of Greenpeace International, on the possibility of "green" electricity for Southeast Asia. Using actual data from countries, IIEC's analysis shows that the cost of electricity produced by a Green IPP for Southeast Asia is only slightly higher than the

cost of electricity produced by a coal-fired IPP - 5.0 cents/kWh vs. 4.8 cents/kWh. Thus when the externality costs are added to the cost of electricity from coal-fired IPP, Renewable IPP becomes the most economical option in the region.

Session 6 was on the "Past, Present, and Future of Nuclear Energy." Baku Nishio, Hideyuki Ban, and Dr. Tadahiro Katsuta from CNIC reported on the current nuclear power situation in Japan, the Tokai JCO criticality accident, and various problems regarding decommissioning. Dr. Katsuta's study on decommissioning is Phase 3 of the Life Cycle Assessment (LCA) of nuclear power which CNIC has been conducting since 1997.

Also in this session, Prof. Jong-dall Kim explained the cost model that he himself had developed. While the government estimates the decommission cost to be about 10% of construction costs, he made a cost comparison with other sources of electricity to determine whether the decommission costs would exceed this estimate. Seok Kang-hoon (Green Korea United, South Korea) also gave a report on the situation regarding nuclear power in Korea.

Session 7, held that afternoon, was devoted to "Energy Future Working Groups." Working groups were set up to hold separate discussions on "Interactions," "Collaboration and Partnership," "the Sustainable Future of NGOs in the Region," and "Green Consumerism: Energy and Environment." The groups then submitted proposals on energy policies for the region. Participants expressed their expectations of future activities of SPENA as well.

In Session 8, Prof. Gloria Hsu (Taiwan University/Taiwan Environmental Protection Union, Taiwan) gave a report called "Live on Borrowed Time?" and talked about global warming and its serious effects.

The third day started with session 9: "Green Energy Policy." Dr. Tetsunari Iida (Japan Research Institute, Japan) gave a report entitled "Policy and Scenario for a Sustainable Asia: the Greening and Democratizing of the Elec-

tricity Market" and talked about the situation of Green Power in Japan and those western countries in the middle of the process of electric utility deregulation. He proposed various measures such as cooperative work between NGOs and utility companies, establishment of a politicians' coalition aiming to establish a law to promote renewable energy, and a green electricity certification system.

Session 10 was on "Roles of NGOs in a Sustainable Energy Future." Prof. Andrew Jamison (Aalborg University, Denmark) gave a report entitled "From Movement to Institution: Changing Roles for Environmental Organizations." He argued that it is crucial for NGOs to develop the necessary specialised skills and to be closely involved in concrete activities such as policy making and promotion. He said that NGOs could also be involved in the actual practice of energy renewal. Following Prof. Jamison, Anung Karyadi gave a report titled "Grassroot Cooperation: On the Roles of NGOs in a Sustainable Energy Future." Karyadi stressed that grassroot organizations must play a key part in the realization of new and better energy policies.

This workshop had so many topics to cover and each session did not always give enough time to the speakers. As well as the speakers mentioned here, newspaper reporters from Thailand and Korea, Thai, and Japanese energy specialists and environmentalists, and Greenpeace International representatives participated in the workshop and contributed their views.

Although this was the second such workshop (the first one having been held in Korea), it was the first since the official Steering Committee for the network had been established. Significantly, I noticed that many more cooperative studies were being undertaken. This three-day workshop has clarified our thinking and given us a firmer sense of purpose in our quest for sustainable energy policies in Asia.

By Mika Ohbayashi

*Mika Ohbayashi left CNIC at the end of December 1999.

JCO Criticality Accident

The Victims and the Final Report

Victim of Tokai

Hisashi Ohuchi, one of the three seriously exposed JCO employees in the criticality accident at Tokai on September 30, died at 11:21 p.m. on December 21 at the University of Tokyo Hospital. He was only 35. Mr. Ohuchi was the first casualty from acute radiation injury since the dropping of the A-bombs at Hiroshima, Nagasaki and the Bikini tests in which a Japanese crew member of "Daigo Fukuryūmaru" died. It is the first time in the history of nuclear power development in Japan that a life was lost due to an accident, and it is therefore a serious blow to the industry.

Mr. Ohuchi was exposed to 16~20 Sv (equivalent) and died from multiple organ failure. His face, arms, and torso were burnt



A mother holds her feverish child at the community center used for evacuation. (Photo By Kenji Higuchi)

by radiation. His lymphocyte count dropped to zero, and white blood cells were drastically reduced. Due to the damage to his marrow, affecting his ability to produce blood cells, he underwent a transfusion of peripheral stem cells which were taken from the peripheral blood of his brother on October 6 and 7. His burnt-off skin could not regenerate. His intestines were continually bleeding, and he was given more than 10 L of blood and infusion solution every day. By mid-November the functioning of his liver and kidney had deteriorated and breathing became difficult. Drugs to boost blood pressure were administered after his heart failed temporarily on November 27. His heart was barely functioning by December 18. Death came 83 days after he was exposed. As for the two other employees, Mr. Masato Shinohara, who was exposed to 6~10 Sv, is still receiving treatment at the Institute of Medical Science of the University of Tokyo. Mr. Yutaka Yokogawa, who was exposed to 1~4.5 Sv has reached a stable condition for the time being and left the National Institute of Radiological Sciences on December 20.

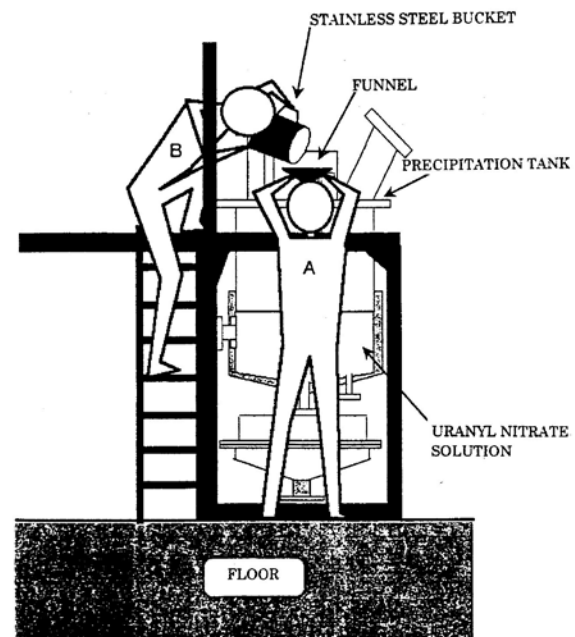
Final Report Released by the JCO Accident Investigation Committee

Three days after the death of Mr. Ohuchi, the eleventh meeting of the JCO Criticality Accident Investigation Committee was held and the final report on their investigation was released. Almost no criticisms or remarks were made about the final report by the committee members at the last meeting, and it

was clear that they had already settled the matter amongst themselves. Although the report is 170 pages long, many of its contradictory claims are left unresolved and it can hardly be called a product of an exhaustive debate. The report was put together in a mere three months, and it is hard to avoid the impression that it was patched up in great haste. It is quite clear that there was an implicit deadline. Following is an examination of this hastily-produced and extremely problematic document.

First of all, the report's analysis of the accident is not based on sound scientific analysis. The estimation of the total number of fissions which occurred during the criticality reaction has not been changed from the estimation reported in the interim report, that is 2.5×10^{18} . The estimated number corresponds to the fission of about 1mg of uranium 235. However, the estimated contributions to the cumulative radiation dose from the initial burst and the succeeding plateau of the criticality reaction given in the interim report -48% and 52% respectively- were drastically altered to 11.4% and 88.6%. (Fission reaction consists of an initial burst and a prolonged plateau.) The new figures derive from statistical analysis of data from the neutron monitor at the Japan Atomic Energy Research Institute (JAERI)-Naka Research Institute. Then the radiation dose received by local residents was estimated using the neutron monitor data during the plateau period rather than calculating directly from the total number of fissions. However, this estimate can vary dramatically according to how the background count (naturally existing neutron dose from cosmic rays) is estimated and how the precision of the monitors is evaluated. Therefore, the results of the report still contain significant uncertainties and it looks as though the uncertainties were actually used to the benefit of the Committee to minimize the estimated residents' exposure.

Secondly, the report does not address the



A figure of the process that led to the fatal accident on September 30, 1999. The workers are pouring uranyl nitrate solution into the precipitation tank in an attempt to homogenize the solution.

responsibilities of the Japan Nuclear Cycle Development Institute (JNC), which ordered JCO to provide them with homogenized uranium in the form of nitrate solution. The accident occurred because JCO employees were handling uranium enriched to a relatively high concentration of 18.8% in an amount far above the minimum critical mass. This came about because JNC (then known as PNC or Donen), responding to strong concerns from the US about the danger of the proliferation of nuclear materials, had ordered JCO to supply uranium solution for manufacturing mixed uranium-plutonium oxide (MOX) fuel for the Joyo Fast Breeder Reactor. Originally, plutonium and uranium were prepared separately as powder and then mixed together to manufacture MOX fuel. However, to decrease the risk of plutonium theft/diversion, JNC had to switch to a method where uranium and plutonium are mixed together in the form of solution before providing mixed uranium and plutonium powder. When providing uranium powder to JNC, JCO refined the imported uranium powder to purify the uranium by dissolving the

powder and then making it into powder again. However, to provide JNC with uranium solution, JCO had to re-dissolve the refined uranium powder. JCO did not equip itself with additional installations for this new operation and thus had to come up with ways to do the job using the existing process line. In addition to ordering JCO to provide them with uranium solution, JNC demanded that the solution be completely homogenized. In order to homogenize the solution, JCO began a process called "cross-blending." In this method, 40 L of uranium solution was divided into ten 4 L stainless steel bottles. Then 1/10 of the solution from each bottle was put into a separate set of 10 bottles. This method was eventually abandoned due to its troublesome nature, and the company began to combine the solution in the buffer column before transferring the solution into the 4 L bottles. The buffer column was designed to prevent criticality and thus JCO employees were able to homogenize the solution without causing an accident. However, for the process that led to the accident, the company used the precipitation tank, which was not designed to prevent criticality, to homogenize the solution. According to one of the three employees directly involved with the process, they had used the precipitation tank to cut time and to simplify the process since the structure of the buffer column made it difficult to transfer the solution from the column to the 4 L bottles. JCO employees did not

take the time to see if using the precipitation tank was definitely safe. Our analysis indicates that for uranium powder re-dissolution to prepare the required 370g of Puranyl nitrate solution, JNC or JCO should have constructed a separate re-dissolution and homogenizing facility, which they chose not to do. In view of the fact that JNC is finally responsible for the whole MOX fabrication procedure in a proliferation-resistant manner, JNC, not JCO, should have provided the uranium solution. If JCO was commissioned for the job, as was the actual case, JNC should have supervised the process. Instead of taking responsible measures, JNC had even rushed the delivery date for JCO to provide them with the uranium solution. CNIC believes that the unreasonable demands of JNC had a very significant part to play in the circumstances leading to the events of September 30. Why is it, then, that the extent of JNC's responsibility is not examined at all in the final report? Could this have something to do with the fact that two members of the investigation committee are JNC employees? A final report lacking a solid scientific analysis and a thorough examination of the events leading to the accident is far from convincing. The final report presents no less than 103 countermeasure plans and suggestions. However, the greater the number of suggestions, the greater are our concerns about accidents of a similar scale - or worse - happening in the future. By CNIC

SUBSCRIPTION

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Conference on "Carriage of Ultra Hazardous Radioactive Cargo By Sea: Implications and Responses"

By Tadao Ishibashi
(Attorney At Law, Aomori Prefecture)

Malaysia and the conference

I attended the Conference on "Carriage of Ultra Hazardous Radioactive Cargo By Sea: Implications and Responses" held in Malaysia on October 18 and 19, 1999 as one of the speakers. The conference was sponsored by the Maritime Institute of Malaysia (MIMA) and was attended by a wide range of nationalities. Speakers ranged from University professors, NGO staff, to members of International Atomic Energy Agency (IAEA) and International Maritime Organization (IMO). MIMA is a policy research institute set up by the Malaysian Government. By virtue of an extended Exclusive Economic Zone jurisdiction, Malaysia has a sea area much larger than its land mass. More than 90% of Malaysia's exports are seaborne, and the maritime sphere holds great importance in economic and security terms. MIMA's role is to deal with national, regional, and global maritime matters affecting Malaysia and is expected to contribute towards national maritime policies.

Transportation issue comes in focus

In the first session of the conference, the representative for the Scientific Technology and Environment Minister gave a speech outlining the Malaysian Government's deep concerns about the marine transportation of radioactive substances. The second session focused on the issue of the September 30 criticality accident at Tokai-mura. Shaun Burnie of Greenpeace International, who is in charge of plutonium issues, explained the seriousness of the accident by presenting various photographs.

I myself was asked to speak on "Japan's policy and outlook regarding the marine transportation of highly toxic substances." I spoke about the situation created by Japan's present nuclear policy: the fact that although the plutonium policy is a virtual failure, the government is working even harder to utilize MOX fuel in light water reactors; and how Japan has vast and ever-growing stockpiles of plutonium and radioactive waste in Europe which, under the reprocessing consignment contract, must be returned to Japan. Since shipping these radioactive substances through international waters in secrecy would violate international law, Japan should immediately cancel the reprocessing contracts. As for the transportation of Japanese plutonium, high level waste, and unprocessed used fuel already in Europe, Japan must pay proper respect to the en-route countries by consulting them and sending them adequate notice of the shipments.

During the Q&A session, I was asked why Japan assigns reprocessing to Europe, and what kind of liability arrangements it has in case there is an accident.

The third session saw a heated discussion between Edwin Lyman of Nuclear Control Institute in Washington and Ronald B. Pope, a member of IAEA's nuclear safety division, who is in charge of the safety of transportation casks. They spoke on the safety of transportation casks, especially the safety standard of IAEA's type B cask. Pope explained that the IAEA standards are based on the results of fire, sinking, collision, and falling experiments held in the U.K. and U.S., and showed video tapes

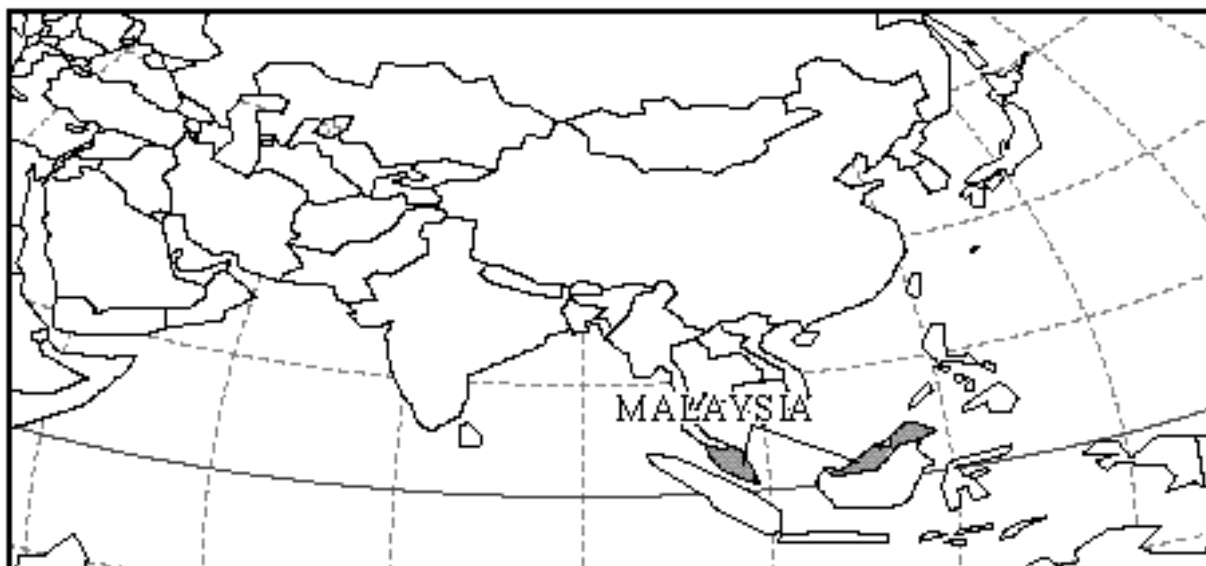
taken in both countries. He added that all IAEA member countries have approved the standards. He also said that the concept of "safety" in regard to transportation is not only about casks, but is a comprehensive idea relating to other factors such as crew and equipments. I was very interested to learn about IAEA's idea of safety.

In the fourth session, held on the second day, chief navigator Hartmat Hesse of the IMO Marine Safety Division gave a detailed explanation of the history of IMO and its duties up to now. He then spoke about how radioactive waste has been transported a number of times through the world's waters and how, even within IMO, there are opinions for and against providing advance notice to the en-route countries. He also suggested that IMO is still continuing to review the INF Code which controls the safety of transporting spent fuel, plutonium, and high-level radioactive waste. However, during the fifth session, Hesse, speaking from the floor, said that the IMO is in a kind of dilemma over the current situation, in which Japan's shipments of radioactive substances are provoking international debate and creating problems in regards to international law.

Following Hesse was Professor John Van Dyke of the University of Hawaii Law School. Referring to precedents from the 1982 UN Convention on the Law of the Sea, the 1989 Basel Treaty, the International Environmental

Law, and the International Court of Justice, he argued that even if these shipments of radioactive substances are to go through international waters, the obligation to explain and discuss the matter with the en-route nations still exists. He explained in detail the various conditions which the consignor must meet in order to conduct the shipment, such as drawing up an Environmental Impact Assessment (EIA) and making proposals for dealing with the anticipated effects. He also argued that in IAEA's view, the sovereign rights of nations are limited to their own territorial waters, and that Japanese claims about the safety of the shipments are limited to technical aspects. Based on the above arguments outlined in his paper, Prof. Van Dyke offered two proposals and announced a "protocol for preventing pollution caused by the marine transportation of radioactive substances."

The last speaker, Doctor of Law Wafi Naslin Abdul Hamid of Malaysia, spoke on the rights and obligations of the ship owner and consignor involved in transporting radioactive substances in respect to common law. He stated that even under common law, transportation without notice is not permitted, that the consignor holds "strict responsibility," and that damage to marine life is unlawful. The fifth session was a panel discussion between five speakers hosted by President Hamsa of MIMA. Many questions were raised from the floor dur-



ing this session, and the discussion became very heated.

The Japanese Government Must Be Polite and Respectful

The discussions during these two days all focused on the return of plutonium and high-level radioactive waste from Europe to Japan. Until now, both official and unofficial conferences on this subject were held in Europe or Japan, aside from a small number held elsewhere, such as the South Pacific Nations conference. This was improper, however, because the en-route countries who have so much at stake in this matter were not consulted. Holding the conference in Malaysia, which is right at the center of all the island countries, was a meaningful breakthrough in this respect, and I would like to take this opportunity to express my deepest gratitude to the Malaysian Government and MIMA.

As for the speakers and participants, I think we could not have had a better variety of speakers. It was significant that IAEA and IMO joined the conference, and MIMA's reputation as a reliable organization was enhanced by the participation of those organizations. The reports presented by IAEA and IMO were of a high quality, and Dr. Lyman and Prof. Van Dyke's criticisms of them were also candid and concrete. Participants came from Malaysia, Thailand, the Philippines, and Singapore. Most of them were either government officials involved in such fields as nuclear power, foreign affairs, transportation, and energy, or specialists from universities and the marine force. Discussions were ardent but calm throughout the conference. Participants from Japan included members of the Japan Association for Prevention of Sea Disaster (Singapore liaison office), and representatives of trading firms.

In the final session, opinions were exchanged as to what should be done in the future. The discussion was wound up after someone suggested that the important thing was for the coastal nations to unite, which

brings us back to the protocol proposed by Prof. Van Dyke. This protocol represents the highest level of modern international law, and my greatest hope is to have all the involved nations adopt this in the form of a treaty. I feel there is a real possibility that this protocol could be our next major step in a new phase of efforts to deal with this crucial issue.

The present situation is that Japan is left with no choice but to ship the mixed plutonium-uranium oxide (MOX) fuel and both mid- and high-level radioactive wastes through international waters for the next 20 to 30 years. And it is no longer viable for Japan to try and do this by changing the route each time and cloaking all other aspects of this dangerous transportation in secrecy. During the Second World War, Japan fought against the Southeast Asian countries, including Malaysia, and ruled over their land. In Kuala Lumpur, there is a monument commemorating the nation's independence which features a statue of a Malaysian soldier marching over corpses with the national flag in his hand. The statue has left a strong impression on me. The day of Japan's defeat in August 1945 was also the day of independence for the Southeast Asian countries. Japan's current stance on international cooperation, reflected in its constitution, was founded upon its will to reconsider such horrendous conducts.

The Japanese Government's plan to utilize plutonium ignores the coastal nations' concerns. If the Government continues in its present course, it will damage its relationships with these countries, thereby harming its own national interests.

There is no doubt that the conference was as meaningful as it could be, and its impact is likely to be seen in various ways in the near future. For this reason too, the Japanese Government should rid itself of its tunnel vision and start putting some effort into showing respect and understanding for the concerns of the countries that are affected by the shipment of nuclear materials.

Data on Spent Fuel and Radioactive Waste As of March 1999

(Figures for spent fuel given in numbers of assemblies)

(Figures for high level waste given in numbers of 200 ℓ canisters)

(Figures for low level waste given in numbers of 170 ℓ drums)

	Nuclear plant sites	Rokkasho Disposal Facility	Tokai Reprocessing Plant
Low level waste	488,329	127,040	65,342
High level waste	—	128	62
Spent fuel	32,318	44	393

Electric Power Company	Power plants	Low level waste	Spent fuel
Hokkaido	Tomari	3,012	511
Tohoku	Onagawa	12,540	856
Tokyo	Fukushima I	173,538	5,208
	Fukushima II	21,241	6,384
	Kashiwazaki-Kariwa	8,395	6,285
Chubu	Hamaoka	31,964	3,450
Hokuriku	Shika	1,238	106
Kansai	Mihama	25,492	533
	Takahama	30,077	1,573
	Ohita	23,563	1,175
Chugoku	Shimane	25,688	1,374
Shikoku	Ikata	12,804	696
Kyushu	Genkai	16,088	780
	Sendai	7,541	1,122
Japan Atomic Power Co.	Tsuruga	56,566	1,110
	Tokai	348	—
	Tokai II	38,234	1,155
TOTAL		488,329	32,318

Anti-Nuke Who's Who

Sanshiro Kume

An Instructor Inside and Outside School

On December 16, 1999, Kansai Electric Power Co. announced that data for the MOX fuel for Takahama 4 had been fabricated, and that it had therefore canceled the use of the fuel. Sanshiro Kume - a 74 year-old nuclear scientist who plays a leading part in Japan's anti-nuke campaign - heard the news at Ayabe city in Kyoto, near the Takahama Plant, where he has lived for about ten years since retiring as a lecturer at Osaka University.

Mr. Kume became popular among local residents through his efforts in writing letters to local newspapers and encouraging local discussions on nuclear power focusing on, but not limiting to, Takahama Plant. Mr. Kume entered the Department of Science of Osaka University in 1944. He worked for a medical company after graduation, but returned to Osaka University in 1950 to work as a lecturer.

Before long, Japan began developing nuclear power, and the budget for development was formed in 1954 - the year of Bikini Exposure, which resulted in the death of a Japanese crew member of the ship "Daigo Fukuryu-maru". The Bikini tests, like the Vietnam War, affected Mr. Kume deeply and led him to change his major from physical chemistry to nuclear chemistry.

Problems in nuclear developments started to be apparent in the 60s and 70s, and some scientists were seen among residents in anti-nuke movements. Mr. Kume was also there. He made hundreds of trips around the country, participating in local meetings and making numerous contributions to the rise of informed public debate on nuclear power. He also led the successful campaign in the 70s against the construction of the Self Defense Force Nike-Mis-



sile base at Nose in the north of Osaka. He was an advisor for the nation's first nuclear lawsuit, served on Ikata 1 nuclear plant in 1973, and has also been involved in other cases, such as those against Monju and Takahama 2. He has always insisted, however, that the efforts of the citizens themselves are of utmost importance.

There are many groups in Kinki area expressing concern over nuke plants in Wakasa which were formed at the suggestion of Mr. Kume. These groups have provided a forum for people to discuss the nuclear power industry, and have enabled citizens, whatever their stance on nuclear power, to focus on the common ground of their justifiable anxiety about accidents at nuclear plants. In addition to his involvement in the Monju case, the recent rush of news about the JCO accident and MOX fuel scandals has kept him very busy. He will be 75 on March 22 - the very day on which the decision regarding the residents' suit against Monju is due to be given. By CNIC staff members

NEWS WATCH

Fifth Shipment of High-Level Waste

The ship "Pacific Swan," carrying high-level radioactive waste destined for Japan, left France on Dec. 29, 1999. This is the fifth shipment of high-level waste, and the waste is planned to be loaded at Rokkasho, Aomori prefecture. This shipment is highly controversial because of its contents and because of security issues due to the transfer of control of the Panama canal from the U.S. to the government of Panama.

The French Company COGEMA is returning 104 canisters of vitrified waste. The waste was produced at COGEMA's UP-2 plant. As all spent fuel from Japan is processed at the UP-3 plant, this means that wastes from French gas-cooled reactors and Super Phoenix Reactor reprocessed at UP-2 are coming to Japan.

The Panama Canal Authority (PCA) assumed control of the canal at noon on Dec. 31, 1999. Concerns over terrorist attacks on the Pacific Swan forced PCA to step up security. The ship passed through the Panama Canal on Jan. 17, 2000 amid the tightest security operation since Panama took over the waterway. The ship is expected to arrive in Japan in late February.

Nuclear Industry Accelerates Restructuring

Unreasonable cost-cutting decisions have been cited as one of the factors leading to JCO's criticality accident. During fiscal years 1995-1998, JCO's annual production decreased by 25%, and with price reductions added to this, the company's sales fell by 50%. This led to a drastic reduction in personnel while workload per worker nearly doubled.

Such price reductions were demanded by power

companies, which cited as their major reason the current wave of liberalization sweeping the electric power industry. These price-cutting demands were made not only to JCO but to all reactor manufacturers and nuclear fuel makers, resulting in overall price reductions of 20-30%.

Production work itself has been on the decline. Orders received by Toshiba and Hitachi in the 1990s were only half of those received during the 70s and 80s. Mitsubishi Heavy Industries received no orders. As a consequence, the companies have accelerated staff reduction plans. (See the next article.)

Cost reduction leaves less room for safety. Following are some of the comments made by employees of manufacturers that reached the mass media. "The power companies used to demand that we make products whose quality was far above safety standards, but now they tell us it's okay if the products meet the basic standards." "The power companies used to tell us it's time to change equipment, but now they ask if we can use it a bit longer."

Sales Further Reduced for the Nuclear Industry

On Dec. 18, 1999, the Japan Atomic Industrial Forum (JAIF) published its FY1998 survey report on the state of the nuclear power industry. The report was a compilation of responses to a questionnaire from 11 electric power companies, 376 companies in the manufacturing and mining industry, and 32 trading companies.

According to the report, nuclear power-related sales in the manufacturing and mining industry were 1.34 trillion yen, a 19% decrease from the previous fiscal year. Since the previous year also saw a 12% decrease, sales fell two years in a row. Sales

from power enterprises was 980 billion yen, or 73% of the total sales. This amount is almost half of that in FY1993, which was 1.74 trillion yen.

There are 56,000 workers in the field of nuclear power. This includes 10,000 in the power enterprise and 46,000 in the manufacturing and mining sector. This figure represents a 2% rise from the previous fiscal year, but 5,000 fewer as compared to that of five years earlier. There are 2,000 researchers, 300 people less than the previous year and 1,200 less than that of five years earlier.

A question in the survey asked whether or not it is possible to construct 20 additional power reactors by 2010. Those who said "possible" accounted for 8.5% of the answers. Those who thought it was "possible to build 16-19 reactors" were 0.4% of those surveyed. The rest broke down as follows: "11-15 reactors," 11.7%; "6-10 reactors," 57.1% and "1-5 reactors," 22.3%.

Advanced Move for NSC's Autonomy

The autonomy of the Nuclear Safety Commission (NSC) remains in doubt. The Commission does not have an independent secretariat. Instead, administrative responsibilities are lodged with the Science and Technology Agency (STA). Plans were originally in place to move the secretariat to the new Cabinet Office as part of Government restructuring scheduled for implementation in Jan. 2001. However, it was announced on Dec. 22, 1999, that the secretariat would move in April 2000 to the current Prime Minister's Office, which will later be absorbed into the Cabinet Office.

With this move the number of staff members of the secretariat will significantly increase from the current number of 20 to 92. There will be 51 staff from the Prime Minister's Office, plus 41 part-time experts. The NSC members will remain at five. On the same day, another plan was announced to increase the number of nuclear-related staff members: 60 for the Ministry of International Trade and Industry (MITI) and 23 for the STA. The increase at MITI includes 30 nuclear safety inspectors and 16 specialists on nuclear accident prevention. At STA an additional 16 safety inspectors and 7 specialists on accident prevention will be appointed.

This significant increase in staff by the Government was made possible by the criticality accident at JCO. But there are still some very fundamental questions remaining. Will an increase in staff members make Japan's nuclear safety administration, which has overlooked various accidents and incidents of data forging, more effective? Will the autonomy of the NSC really be secured?

Formal Contract Signed between KEDO and KEPCO

Construction work on the main body of the two pressurized water reactors (PWRs, 1050MW each), which the Korean Peninsula Energy Development Organization (KEDO) is planning to build in North Korea, is finally about to begin. The foundation work began in Aug. 1997, but construction has been delayed. The formal contract was signed on Dec.15, 1999, between KEDO and Korea Electric Power Corporation (KEPCO). KEPCO, the main contractor, also concluded project contracts with Mitsubishi Heavy Industries, Toshiba and Hitachi, which will take part in the construction.

The construction cost amounts to about \$4.6 billion: The South Korean side will apparently finance \$3.22 billion, Japan \$1 billion, and the U.S. is expected to take responsibility for raising funds domestically and from abroad for the remainder. Although Japan lifted sanctions against North Korea's launching of the Tepodon missile in Aug. 1998, and while the Diet approved the funding for the project in June 1999, South Korea has been having difficulty in raising funds. The exact costs to be covered by the U.S. has also not been decided. The future of this construction project thus remains unclear.

CORRECTIONS (NIT No.74)

p. = page P = paragraph L=line
p.3 P1 L1 Japan Atomic Energy Research Institute (JAERI) staff(f) -> Science and Technology Agency (STA) and JCO staff(t), p.5 Table of Terms L2 JkgE-1(f) -> J/kg(t), L3 Bequarel(f) -> Bequerel(t), p. 12 P4 L11 UP-8(f) -> UP-3(t), p.14 L8 later(f) -> larger(t)

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