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Citizens' Nuclear Information Center

No. 56

1-59-14-302, Higashi-nakano, Nakano-ku, Tokyo 164, Japan

Phone:81-3-5330-9520, Fax:81-3-5330-9530, e-mail:cnic-jp@po.iijnet.or.jp

CNIC Holds IMA Conference in Kyoto



The Public Meeting, "Assessing MOX." (photo by CNIC)

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As reported in previous issues of Nuke Info Tokyo, CNIC is presently conducting a two-year study on the use of mixed oxide (MOX) fuel in light water reactors (LWRs). Known as the International MOX Assessment (IMA) Project and headed by Jinzaburo Takagi, the Executive Director of CNIC, the study was started in November 1995. CNIC brought together a group of internationally renowned experts to investigate the dangers of MOX use in LWRs. The IMA project takes a broad

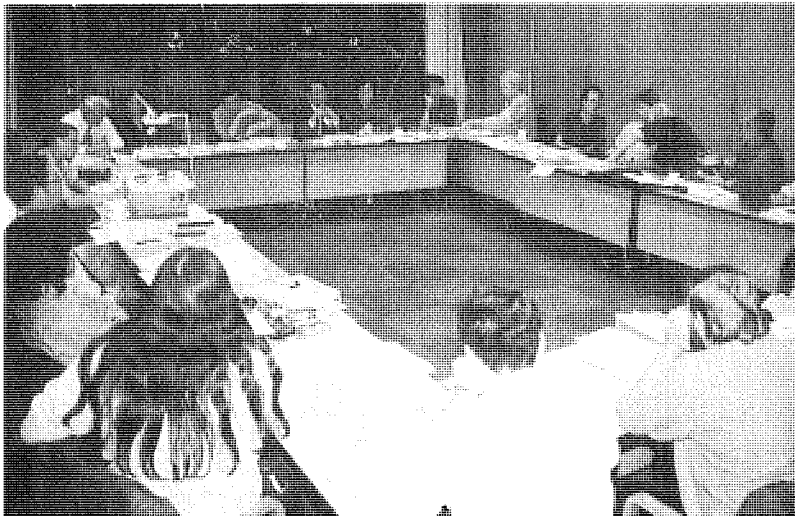
perspective that includes social, legal, economic as well as scientific aspects. This October, at the study's half way mark, CNIC held the IMA Interim Report Conference in Kyoto.

The purpose of the conference was to discuss the findings of the IMA researchers and decide how the project should proceed. To make best use of this gathering of experts and to help publicize the project, CNIC also decided to hold a public meeting as part of the conference, entitled "Assessing MOX." The conference lasted for three days, from 24-26 October. The first two days were given over to the workshops to discuss the researcher's findings.

The following are some of the experts that attended the conference; Michael Sailer of the Oko Institut in Germany, Mycle Schneider of World Information Service on Energy-Paris (WISE-Paris) in France, Frank Barnaby, a former Director at the Stockholm International Peace Research Institute, Paul Leventhal and Edwin Lyman of the Nuclear Control Institute (NCI) in the U.S.A., Alexander Rossnagel, a Professor of Law at Kassel University in Germany, Lydia Popova of the Socio-Ecological Union in Russia, Alexander Dmitriev, a Vice-Chairman of GOSATOMNADZOR in Russia, Keiji Kobayashi of Kyoto University's Research Reactor Institute and Michiaki Furukawa of Nagoya University both of whom conducted research into the Monju accident, J. Takagi and Baku Nishio of CNIC in Japan, among others.

Hot Issues Discussed at the Workshops

The workshops, held on 24 and 25 October, were for interim discussions of the IMA co-



Hot discussions at the workshops. (photo by R. Takagi)

researchers' main reports and advisors' contributions and to decide the direction of the report in its second year. The discussions were deep and wide ranging, and thirty specialists from abroad and around Japan gathered together. Subjects covered were not limited only to the main subjects of the project such as the trend in international LWR-MOX issues, safety, nuclear proliferation, economics, human rights, back-end policy, etc., but also covered the disposition of dismantled plutonium from U.S. and Russian nuclear warheads and the transport of MOX fuel.

The papers on those issue were distributed previously to each participant, and there were about 160 pages in English including those from co-researchers and contributors. For CNIC, it was a pleasure to be able to bring together so many meaningful reports especially at this interim point. It also showed the height of everyone's interest in the IMA project.

It is not the main theme of the project, but one of the hot issues at the workshops was the disposition of plutonium from dismantled nuclear warheads. Since Alexander Dmitriev of Russian GOSATOMNADZOR participated as an observer in the workshops, it was all the more interesting. It was very meaningful that we, including A. Dmitriev, could reach an agreement after the arguments that dismantled plutonium, as a material with negative value,

should be abandoned and not to be seen as an energy resource. But there were some differences of opinions among participants how it should be handled as a waste. As the stance of the IMA project, the researchers are all against the MOX option which proposes using dismantled plutonium as MOX fuel in LWRs. We think the MOX option is not only unfavorable from the points of view of economics, proliferation and physical protection, but it also provides the way to the civil use of MOX. There were, however, different views whether the vitrification option which vitrifies plutonium mixed with radioactive waste, is the best technical option or not. There would also remain a problem how society would handle the plutonium surplus and remaining spent nuclear fuel after stopping the civil use of plutonium. We should continue our discussions further.

(from J. Takagi's Memo)

Details of Discussions held at the IMA Conference

On 26 October, CNIC held the public meeting. The meeting was well attended with some 250 people from all backgrounds crowding the hall. Representatives of local governments came, particularly from regions and towns with nuclear facilities. Members of the public attended, both those actively involved in nuclear issues and concerned citizens who wanted to learn more about the issue.

J. Takagi spoke first at the meeting, giving an overview of the issues and problems of the use of MOX fuel and the direction the IMA project has taken. After his lecture, M. Schneider of WISE-Paris reported the various MOX utilization plans presently under way world-wide. In the report he explained that the four reprocessing plants that presently are operational

are producing several tens of tonnes of plutonium per year, however, the technology to use plutonium is not progressing well. The industrial plutonium using world has to reconsider the spent fuel reprocessing contracts because of the many technological, legal, economical and other problems that have arisen. Because of these problems the stock of plutonium is increasing and this trend will continue. The electric power companies have found themselves in a dilemma they cannot seem to escape from. Reconsidering whether or not to use plutonium has become an important issue, politically.

The next speaker was F. Barnaby from the U.K. He reported about the security aspects of MOX use. He explained that at the large plutonium handling facilities, there is an 2% uncertainty in even the best measuring techniques used for stock management. In the THORP reprocessing plant in Sellafield, U.K. where some 7,000 kg of plutonium is separated every year, this uncertainty means that about 140 kg of plutonium will not be reliably accountable for. This is sufficient plutonium to produce about twenty nuclear weapons every year. He also explained the problems ensuring the physical protection of plutonium and touched on the incompatibility of the plutonium economy and the democratic process, an issue discussed later, in more detail, by A. Rossnagel.

B. Nishio of CNIC spoke next on the economics of MOX use. He compared the cost



1st row, R to L, A. Rossnagel, M. Sailer.
2nd row, left, M. Schneider.
(photo by CNIC)



The participants take questions from the audience. (Standing) Christian Kueppers, Oko Institut, Germany. (photo by R. Takagi)

operating a 1GW LWR with one third of its core fueled with MOX and the same type of reactor fueled with the usual uranium-oxide fuel. For the reactor fueled with MOX he then considered two scenarios. In the first, the plutonium is considered to be free with the rationale that the spent fuel would, in any case, be reprocessed. In the second, the cost of reprocessing the plutonium is included. His report concluded that, in the economic realities of Japan today, the cost of fueling an LWR with MOX would be three times the cost of fueling it with normal uranium-oxide fuel, if the plutonium is not considered to be free. These calculations did not include the social and development costs of materials protection that reprocessing would require, therefore the costs would be higher still.

M. Sailer of the Oko-Institut, Germany, talked about the back-end policy. He explained that the reprocessing process for spent fuel must needs be, much more complex than the direct disposal of spent fuel at some form of repository. This complex system will involve high risk, high cost and increased international tension due to increased overseas transportation of dangerous nuclear material.

On the subject of the impact of MOX use on society, A. Rossnagel of Kassel University lectured on the theme of MOX and civil liberties. When a society uses plutonium as an energy source by necessity, the security measures to safeguard against terrorism and other risks have to intensify. This cannot avoid jeop-

ardizing civil liberties. In this situation a constitution cannot do anything against the violation of civil liberties. In safeguarding the well-being of the people every security measure always becomes constitutional. He concluded that to avoid this, plutonium must not be used as an energy source and the policy to do so must be

stopped now before it starts.

The next two speakers, P. Leventhal of the NCI, U.S.A. and A. Dmitriev of GOSATOMNADZOR, Russia, gave special lectures about the present and future plutonium disposal conditions in both the U.S. and Russia for plutonium from dismantled nuclear arms. Mr. Dmitriev took part in the meeting in his private capacity as a nuclear expert.

After lunch, the first lectures were from representatives of the Science and Technology Agency (STA) and the Tokyo Electric Power Co. (TEPCO). There was also some time given to debating their contributions.

The first speaker was Shinichiro Izumi, a Director of STA's Nuclear Fuel Division, explained the plutonium policy of the Long Term Nuclear Energy Plan. Morio Makiguchi, a Deputy General Manager of the Nuclear Power Plant Management Department of TEPCO reported the comparisons of MOX fuel and uranium, saying that they have many different properties, chemically and physically, in the reactor, however these are not so different that safety problems could arise, given they are controlled well. There were many comments and questions from participants in response to these speeches but the answers were not so clear and satisfactory. Here are some sample questions and answers:

Q: Is not the burning of plutonium, which is considered to be an important future energy source, in LWRs a waste of energy and incon-

*The enthusiastic audience asked many questions.
(photo by R. Takagi)*

sistent with the Long Term Energy Plan which considers fast breeder reactors (FBRs) as the central pillar of that plan?

A: (from STA) We think that MOX use in LWRs and the plan to use plutonium in FBRs can co-exist for a period until the technological backbone for FBRs is established.

Q: Due to the difficulties of handling spent MOX fuel it should be considered as waste. How and where are you planning to store these dangerous wastes?

A: (from TEPCO) We will store these for burning in FBRs in the future. Right now, we are developing the techniques for reprocessing them.

Q: The Atomic Energy Commission of Japan said that it is trying to get greater public understanding and agreement for using plutonium in LWRs, does this mean that the plan to use plutonium in LWRs will continue and they are trying to make the public agree to it or does it mean the plan will be stopped until there is public agreement?

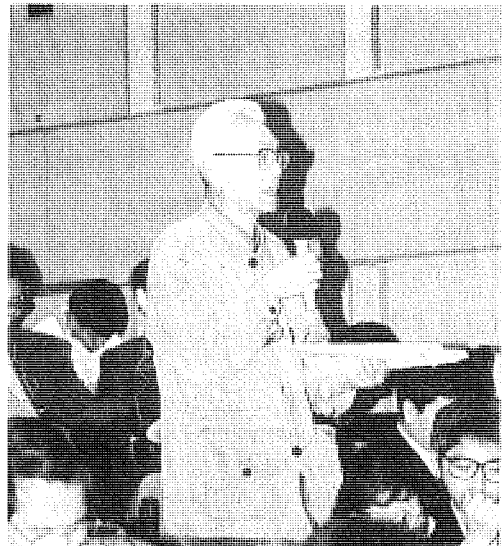
A: (from STA) For MOX use public agreement and understanding is the most important thing. The whole plan is still being debated by the Commission. However we will try to get public understanding and agreement for the content of the plan.

Q: Where and how will you dispose of the low-level, medium-level and trans-uranic wastes which will be returned from overseas?

A: (from STA) It has not been decided yet, we have not heard any final word on the matter.

We could not get any clear answers from either representative, however the researchers in the IMA project decided to ask them to send us some written answers to our questions.

In the second session of the afternoon, Hiraku Takebe of Kyoto University gave a special lecture entitled, "Radiation and the Human Body." J. Takagi reported, in the form of a comment on H. Takebe's lecture, on the safety aspects of MOX use in LWRs and the



damage to civilians that could result from a reactor accident. Also E. Lyman of NCI warned of the risks involved in the transportation of nuclear materials, especially the inadequate transportation containers.

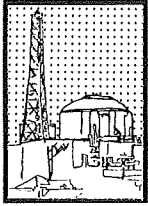
Next M. Furukawa of Nagoya University and H. Yoshioka of Kyushu University, who are members of the Committee for the General Evaluation of the Monju Accident (CGEMA), presented the committee's interim report. After that, D. Lowry of the U.K. reported on the accident at the Dounreay nuclear fuel facility in North Scotland.

In the last session, all the participants and audience debated the discussions held during the public meeting.

The amount of press coverage that the conference generated was particularly gratifying. It was widely covered in the Japanese press as well as on the television networks. It is an indication of the increased public awareness of the implications of MOX use in LWRs. This heightened awareness can only increase the influence of the final report.

The English version of the summary of speeches of the public meeting, "Assessing MOX" is available from CNIC at \$15 including postal and handling fee.

A Year on from the Monju Accident- **What has changed?**



Monju Restart Impossible with Cause of Accident Still Unclear

A year has passed since 8 December 1995 when the fast breeder reactor Monju had the sodium leak and fire accident, which triggered an outburst of dissatisfaction with the government's handling of nuclear power development. This is apparent from the proposal by the Governors of Fukui, Fukushima, and Niigata Prefectures, and by the resolutions of local government assemblies calling for, either the decommissioning of Monju or a reassessment of its development plan. As of 13 November, such resolutions had been adopted by 206 prefecture, city, town, and village assemblies.

To deal with this situation the Science and Technology Agency (STA) is trying to gain the citizens' understanding for nuclear power development by holding roundtable discussions and by showing more willingness to release information to the public. Of course STA is not releasing all the information requested by citizens, but there is more access now than before the accident.

On 20 September, the Power Reactor and Nuclear Fuel Development Corporation (PNC) completed its fourth report and delivered it to Fukui Prefecture. This tome of over 400 pages releases the results made public, visuals, tables, and other material from tests carried out to determine what caused the temperature gauge sleeve to break, but provides no raw data. Another event on 29 October was the release of materials documenting the discussions of its first fifteen meetings by an internal STA taskforce. The stack of papers is about 40cm thick, but

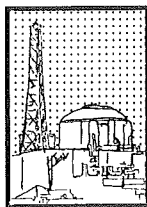
it's doubtful if the papers have any details. The documents include the interim reports on studies commissioned by STA from the National Research Institute for Metals and the Japan Atomic Energy Research Institute. Until now only the results of those studies had been released, and in STA's name.

On the same day that PNC delivered its fourth report, the Nuclear Safety Commission (NSC) released its "Report on Studies Concerning the Monju Secondary Coolant System's Sodium Leak Accident." It's mere 50 pages constitute a review of what the taskforce discussed. In brief, it says that the taskforce did a reasonably good job. In fact, the NSC had said that it would perform an independent study of the accident, but its work is nothing but a rehash of the STA's report.

Up to now, PNC's four reports, STA's May interim report, and NSC's September report have been released. They all agree that the accident was caused by a breakage of the thermometer well, which happened because of high-frequency vibration fatigue caused by sodium flow. STA and PNC will probably begin a overall inspection of Monju with the purpose of restarting it. Indeed, on 11 October, STA created a "Monju Overall Safety Inspection Team." It remains to be seen what the team will inspect, and how.

It would seem, however, restarting Monju will be difficult in the extreme. Nothing has changed, essentially. Nobody is happy with the way PNC and the government has dealt with the accident. Around 8 December, meetings will be held throughout the country to demand that Monju be decommissioned. Also planned is an 8 December national meeting in Fukui Prefecture, where Monju is located.

(Hideyuki Ban)



Nuclear Energy Roundtable Concedes Some Access to Information

At the end of the 11 meetings of the first-series of Nuclear Energy Policy Roundtable Talks, the Atomic Energy Commission of Japan (AEC) issued two statements. The first, on 25 September, was about the public access to information and the second, on 11 October, was about the future nuclear energy policy based on the arguments of the talks and the proposal done jointly by the moderators as a summary of the talks. The following are brief summaries of the important parts of the AEC decisions.

(1) Public access to information and popular decision making

AEC recognizes the principle of freedom of information and will accordingly open AEC-sponsored committees to the public with possible exceptions of meetings related to proliferation, physical protection, diplomatic negotiations etc. In order to reflect public opinion more effectively in government decision-making, the committees of AEC, in deciding important policies, will first publish a draft report to solicit opinions from the public and adopt them when judged relevant.

The rejected opinions will be published in the final report along with the reasons for their rejection.

(2) Future nuclear energy policy

a. Nuclear fuel cycle: AEC believes that the development of the nuclear fuel cycle, based on reprocessing of spent fuel and reuse of recovered materials, is important in view of Japan's limited natural resources and also from the environment

point of view. It will proceed with this policy along the following lines, but a review of the current Long Term Nuclear Energy Policy may also be considered when necessary.

(i) Clarifying urgent measures for dealing with the spent fuel, taking into consideration the long term prospect (original Japanese wording is very vague but this is thought to hint at a long term spent fuel storage option).

(ii) Making efforts to make clear the aims and actual plans for the use of MOX in LWRs and to reach national consensus.

(iii) Setting up an "FBR Advisory Committee" to discuss future FBR programs from a wide perspective (meaning that opponents will also be invited).

b. Nuclear energy policy roundtable: A new series of roundtable talks will be set up in order to achieve an improved transparency and accountability of the nuclear energy policy.

The first decision is more important because it can be interpreted as the first recognition by the government of the necessity of popular participation in the decision making process and the disclosure of information vital to decision making. Though the AEC's wording is still vague, this is just the point that CNIC has been demanding from the government for years and which I stressed during the course of the Roundtable Talks.

Except for the decision to set up a new committee to discuss the wisdom of the FBR program, the second AEC decision is mostly nothing but a repetition of the policy stated in the current Long Term Program, indicating the Roundtable Talks could do very little to change the policy in one way or the other. As proposed, another series of similar talks may not make much sense.

(Jinzaburo Takagi)

Japan Exports N-plants to Taiwan

by Hiroo Komura

Department of Technology, Shizuoka University

If the situation continues as it is, exportation of a nuclear power plant to Taiwan from Japan may finally become a reality.

The General Electric Co. (GE) of the U.S. agreed a contract with the Taiwanese Government to act as the main contractor for the plants' construction. The sub-contractors, the Toshiba-Hitachi partnership, agreed to supply two Advanced Boiling Water Reactors (ABWRs). Initially Advanced Pressurized Water Reactors (APWRs) were proposed for the fourth Taiwanese nuclear power plant but this plan was changed. The plan has attracted worldwide attention as marking the beginning of a trend towards Japan's plant construction in Asia.

At present Kashiwazaki-Kariwa 6 is the world's only commercial ABWR and it began commercial operation in November (see "News Watch"). Because of this contract, the construction of ABWRs might get a boost and these will be the main reactors used in future Japanese plants. It has already been decided that the construction of the reactors will be done by the Toshiba-Hitachi partnership and both of them have already started to talk over the technical specifications.

According to the contract, the total cost of two ABWRs will be US \$ 1.8 billion, and the whole plant cost will be US \$ 6.7 billion. Two of the reactors will start operations from 2003 AD and 2004 AD respectively. This contract was decided this May. Then in October there was another tender for the reactors' turbines. The Mitsubishi Heavy Industry, also of Japan, got this contract for US \$ 120 million. Thus far Taiwan always contracts with different competitive makers for a reactor and its turbines.

In May, along with the tender for the reactors, the Taiwanese Parliament was

deliberating over the retraction bill of the fourth nuclear power plant construction plan. This bill was unexpectedly approved by the Parliament. It was like a bolt from the blue to the nuclear proponents (the ruling party).

After the approval, matters became confused. The President of Taiwan exercised his power of veto and forced the bill back for redeliberation. The opposition parties (anti-nuclear side) could not turn the veto down, because there must be two-thirds majority in the Parliament to reject the veto and the opposition could not collect enough votes. So the bill was returned for redeliberation. However, there was no discussion of the bill, just a re-vote. The plant proponents steamrolled the re-vote on the night of 18 October. The opposition tried to stop it and refused to vote. They resisted to the bitter end. But the withdrawal of the plant retraction bill was approved by a vote of 83 to ZERO out of a total of 161.

On the day of the vote, the Parliament was chaotic inside and out. One of the opposition parties was prepared to use physical force to block the vote. The floor was thrown into disorder. About 4000 members of anti-nuclear groups including those from Kun-ryao where the plant will be constructed, were gathered. It was just a peaceful assembly during the daytime. But after the withdrawal of the bill was approved that night, angry students and many citizens broke through the barricade around the Parliament and forced their way onto the floor. Many of them were wounded fighting with the police force. The disturbance continued until midnight and the compulsory expulsion by the special police units was so cruel and merciless that many participants censured them as "Barbarians!"

NEWS WATCH

The Tokyo Meeting of the Asia Nuclear Safety Congress Held

The Tokyo Meeting of the Asia Nuclear Safety Congress was held on 5 November under the auspices of the Japanese government, in an international conference hall in the Foreign Ministry. The meeting was proposed by Japan's Prime Minister Ryutaro Hashimoto during the nuclear safety summit held in April in Moscow.

Nine countries officially participated: Vietnam, Thailand, Malaysia, China, South Korea, the Philippines, Indonesia, Australia and Japan. North Korea did not participate and Taiwan was not invited. India and Pakistan, who were not recognized as official participants as they are not members of NPT, attended as observers. They requested that they be allowed to officially participate at the next meeting.

During the meeting it was first confirmed that each government bears a major responsibility for securing safety in the use of nuclear power and then views were exchanged on how to cooperate in various safety fields.

South Korea offered to sponsor the next meeting and the other countries welcomed it.

ABWR Begins Commercial Operation

Kashiwazaki-Kariwa 6, the world's first advanced boiling water reactor, (ABWR 1,356 MW) began commercial operation in Niigata Prefecture on 7 November. Kashiwazaki-Kariwa 7 also reached criticality on 1

November. Its commercial operation is scheduled to begin in July 1997.

Since it reached criticality on 18 December, 1995, the reactor 6 has been manually stopped twice with trouble: the first was when one of its internal pump anomalously stopped on 22 February 1996, and the other was when it experienced trouble with a pin hole in a fuel rod on 24 August. The ABWR was jointly developed by Tokyo Electric Power Co. (TEPCO), Toshiba, Hitachi and General Electric (GE) of the United States. These ABWRs were constructed by the Toshiba-Hitachi-GE consortium, with Toshiba for the 6th and Hitachi for the 7th as main contractors.

"One Tsubo" Landowner Movement to Block the Ohma N-Plant

In order to block the construction of the Ohma nuclear plant (ABWR, 1,383 MW) which Electric Power Development Co., Ltd. (EPDC) has been planning in Aomori Prefecture, the Peace Labor Union Congress in the Prefecture launched a so-called "one-tsubo landowner movement" (One tsubo is about 3.3 square meters.) This is an attempt to prevent the landowners of the planned construction site from selling the land by purchasing a part of it, dividing it into small pieces and distribute them among anti-nuclear activists inside and outside of the Prefecture. On 24 October they purchased two lots of land within 100 meters of where a reactor core is planned to be built. They plan to increase their purchase to block the nuclear project.

JT-60 Meet Conditions for Critical Plasma State

Japan Atomic Energy Research Institute on 6 November announced that after analyzing the data of the experiments they conducted, from 31 October to 1 November, at the Institute's critical plasma test facility, JT-60 in Naka-cho, Ibaragi Prefecture, it was found that JT-60 had reached critical plasma conditions for the first time. Deuterium was used for the experiment. The Institute says that if tritium were substituted for half of the deuterium, the amount of energy generated would be 105% of the amount of energy input.

This is the world's second case of critical plasma conditions being achieved, the first was achieved at JET (Joint European Torus), a European joint experimental facility.

MITI Plans Off-Site Interim Spent Fuel Storage

Based on the discussion at the Ministry of International Trade and Industry's (MITI) Advisory Committee for Energy on 18 Nov., the Agency for Natural Resources and Energy (ANRE) decided to plan a new central interim storage facility for spent nuclear fuel. This is Japan's first off-site spent fuel storage plan and MITI's decision is regarded as a shift of policy from all reprocessing to a more "flexible" spent fuel management policy in the wake of the local governments' distrust of the government fuel cycle policy. The details have yet to be discussed.

Japan May Cooperate with Russian Dismantled Pu

According to some Japanese newspapers on 12 November 1996, Japan will cooperate with other countries in an on going project to dispose of dismantled plutonium from Russian nuclear warheads. The project is being carried out by COGEMA in France, SIEMENS in Germany and MINATOM in Russia.

The newspapers said that Japan will cooperate with the construction of a plant which would mix ex-weapon plutonium with uranium to produce MOX fuel for use in LWRs, and the Power Reactor and Nuclear Fuel Development Corp. would be involved in conducting the project. The plant will be sited in Russia. They will start the construction at the end of this century, and aim to start its operation at the beginning of the next century.

The Japanese government has not disclose the details of the plan, but at the PNC's 2nd Nuclear Non-proliferation Forum on 18 and 19 Nov., there were many voices of encouragement for Japanese cooperation, saying "we should contribute to disarmament as Japan is one of leaders in the field of a technology for the peaceful use of plutonium."

The project is related with on going decision making by the U.S. government on how to dispose of dismantled U.S. plutonium, but the Japanese government's most fundamental nuclear policy is "Civil Use", and it will be very controversial if the government steps forward into the field of "Military Use" without national consensus for the use of Plutonium.

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