

**32nd Meeting of the Fukushima Prefecture
Energy Policy Review Committee**

(Summary)

Venue: Fukushima Prefecture, Japan

INTRODUCTION

The moderator opened the 32nd meeting of the Energy Policy Review Commission and introduced Mr. Michael Sailer, the lecturer for the day.

Mr. Sailer was born in Germany, studied technical chemistry at Darmstadt University of Technology, and since 1975 he has been involved in nuclear power generation issues. Since 1980 he has been working in the Institute for Applied Ecology (Öko-Institut) in Darmstadt and was instrumental in establishing the Nuclear Engineering and Plant Safety Division, of which he has been the director since its inception. Mr. Sailer has been Deputy Director of the Institute and a member of the Reactor Safety Commission of the German Ministry for the Environment (BMU) since 1999, and became its Chairman in March 2002.

Mr. Sailer had come to the meeting as Deputy Director of the Institute for Applied Ecology accompanied by the Director of the Institute for Sustainable Energy Policies , Mr. Iida.

The Treasurer of the Committee, Mr. Muroi, took over as moderator of the meeting and asked the Governor of Fukushima Prefecture, Mr. Eisaku Sato, to give the opening remarks.

OPENING REMARKS

Governor Sato first thanked Mr. Sailer and Mr. Iida for coming to Fukushima Prefecture and pointed out that this was the 32nd meeting of the Committee to exchange views with prominent lecturers.

The interim report compiled in September 2002 suggested that, concerning the nuclear fuel cycle initiatives, pause should be taken to gather adequate information by comparing the idea of reprocessing with other options, including direct disposal, so as to refer the decision for the future to the public. Due partly to the recommendations by Fukushima Prefecture in its efforts to update its long-term plan on nuclear energy, the national government has been reviewing its policy on the nuclear fuel cycle since June 2004 and set forth its intention to maintain its conventional position to pursue reprocessing on November 1. Although experts had expressed various views on the nuclear fuel cycle, the government made a quite hasty decision on the future direction without taking time to verify and discuss carefully.

Furthermore, it cannot be said that adequate public debate has been conducted. Given such circumstances, it is quite opportune to be able to have Mr. Sailer share his perspective and the rationale behind Germany's policy shift from reprocessing to direct disposal.

LECTURE

Mr. Sailer thanked the governor and attendants for inviting him to speak on the newest developments leading to Germany's decision to suspend reprocessing and its relevance to arguments for Japan's energy policy.

In order to understand the situation in Germany, it is necessary to look at both the reasons for Germany's change in its nuclear fuel policy and also the resulting situation. Looking back on the decision, it came about as a result of ongoing debate in the past 20-30 years and five main items had driven the discussion before 1998.

First, in the late 1970s and throughout the 1980s, Germany planned to construct a reprocessing plant in industrial size in Wackersdorf. Although there had been many interventions in the licensing procedure, a permit was given out and the first stages of construction began. However, in 1998, the electric utilities suspended the project due to high costs, as officially stated as a reason, but also due to technical and safety questions related to the design as well as strong resistance by the local people. With 800,000-900,000 people intervening in the project, it was the highest number in Germany. Therefore, a mixture of these three factors led to the suspension decision. Nevertheless, the utilities continued reprocessing at plants in La Hague in France and Sellafield in the UK.

Second, there were safety problems in the MOX production facility in Hanau. Several incidents that occurred at the pilot production facility in 1991 led to the decision to close down that facility as well as the second facility in industrial size, which was 95% complete at that time. The utilities again decided it was too expensive and that neither was necessary.

Third, in addition to these decisions by the electric utilities, a lot of nuclear fuel and vitrified waste has been transported to the Gorleben interim storage. It incited big political debate every year as the state had to bear the huge costs for policing the mass demonstrations against the transports by people from all over Germany. It was in the

interest of the state and federal government interest to avoid such situations.

Fourth, before 1998 the electric utilities had problems with rising growing costs of reprocessing, at the defunct Wackersdorf project as well as in France and England. However, in accordance with legislation on the operation of nuclear power plants to demonstrate in advance for six years what it will do with its spent fuel, contracts had been concluded with reprocessing facilities.

Fifth, these cases spurred ongoing political debate on safety issues of fuel cycle facilities.

Then, in 1998, when the federal elections in which the government of the Christian Democratic Union and Liberal Democratic Party was replaced by a coalition of the Social Democratic Party and the Green Party, now in its second term after the 2002 elections, there was a change in policy.

There are a number of reasons for the shift in policy, mainly the higher costs of reprocessing. This high cost arises, first, from the difficulty of the technical process. The chemical treatment of the spent fuel to separate out the radioactive materials requires a very complicated facility, in which there are various problems of repairing, of access and with controlling the processes. This is why the construction as well as operational costs are so high.

A second factor is to take into account the MOX fuel production following the reprocessing. Although, some view plutonium in MOX fuel as valuable, the experience in Europe is that it is more expensive to fabricate than uranium, even more so in reactors. As an example, if a smaller utility has plutonium, rather than selling that plutonium, the situation is such that it would have to pay the utilities take it from them.

A third factor is that the kind of final disposal facility determines the way in which the waste from reprocessing is conditioned. This was very relevant in Germany because the final disposal facility is still undefined. According to reprocessing treaties, conditioning is specifically regulated for the waste and creates a big uncertainty.

One final factor is the cost for the decommissioning of the reprocessing plant. There is one pilot reprocessing plant in Germany that was operational from 1971 to 1990, which

still has not been completely decommissioned, but the estimated costs are as high as the construction costs.

A second main argument for the policy change is the problem of the complicated level of transport. Transport involves different types of materials and wastes to different locations. In Germany, public demonstrations and political debates caused great problems for the politicians in charge.

Another argument is the technical safety problems, including higher radioactive emissions during reprocessing than in any other nuclear plant. This could go up to tenfold or higher. Moreover, the possibility of accidents and radioactive leakage at a reprocessing plant is increased given the high concentration of highly radioactive material at various locations. There are also specific problems dealing with separated plutonium and with storing it as it could become targets of terrorists.

The related question of whether separated plutonium can be recycled. The argument in Germany was that though separated plutonium is more dangerous than plutonium in MOX fuel, there need to be adequate opportunities to use MOX fuel; otherwise, leftover plutonium would amass. Furthermore, MOX fuel affects the nuclear behavior of the reactor core, leading to specific problems of controlling the safety.

Two final points deal with the question of waste streams. The fuel cycle is such that a nuclear power plant produces spent fuel that is transported to a storage facility until reprocessing into different materials, of which only the plutonium can be recycled. All others have to be disposed, either as low-level waste, medium-level waste (with and without heat release) and high-level waste. This requires additional interim storage facilities since waste has to be stored for up to 40 years before final disposal. Comparing this with direct final disposal without reprocessing where spent fuel is transported straight to the final disposal site, it is simpler technically as storage and conditioning are less difficult than reprocessing. Furthermore, direct disposal is less expensive and avoids the dangers of reprocessing.

Broad discussion was conducted on these arguments in Germany in the media, among politicians, in the utilities, and the public. After the 1998 elections, the coalition treaty between the SPD and the Green Party stated the political decision to give up reprocessing. Then, the federal government negotiated with the electric utilities before

reaching a compromise. The formal political agreement reached in 2002 was ratified in 2003 and solidified as an amendment of the German Atomic Law from July 2002.

To sum, four of the most important points of the policy decision are: first, the phasing out of nuclear power plants in about 32 years. Second, periodical state-of-the-art safety reviews of each nuclear power plant were introduced. Third, a compromise was made not to stop reprocessing at once, but to stop all transports to reprocessing plants after 30 June 2005. Fourth, power plants with operation permits beyond 2005 must apply for transport permits to interim storage facilities. It is not that all four must be necessarily combined; they can be practiced independently, as is normal practice elsewhere, e.g. a lot of countries operate nuclear power reactors but do not reprocess.

The current situation in Germany is that there are 18 nuclear reactors at 13 sites in operation; the next one will shut down operations in 2005 and the last in 2022. Two plants (Mühlheim-Kärlich and Stade) have closed down as a result of the agreement between the utilities and the government.

For interim storage, licensing procedures have been conducted at each plant, yet thousands of people still intervened because they did not believe that the waste would indeed be moved at the end of 40 years since there is no final disposal site in Germany. Terrorist attacks of 11.9.2001 at the same time also increased concern over storage facility security. Most recently, in the licensing procedures it has been demonstrated that the interim storage facilities are proof against terrorist attacks even by airplane crash.

Similar to Japan, waste is currently being stored in France and England from previous processing, which Germany will have to take back according to the treaties. In view of this, legally stopping reprocessing does not eliminate the problems of transporting and storing waste. In addition, problems have resulted from mistrust between the utilities and the government over the licenses and transport problems with specific kinds of waste. Additionally, it is difficult to deal with the separated plutonium, which utilities will try to use as fuel until the phase out.

Finally, on final disposal, the decision in Germany was to search for a final disposal site through an open process. Government appointed advisory group, Arbeitskreis Auswahlverfahren Endlagerstandort (AkEnd), has proposed geologic and technical selection criteria, which are in the process of formalization. The government will also have to

consider economic development and politics in the areas. A final decision will have to be made by 2020 in order to construct the site in time for the scheduled begin of operation in the year 2030. However, up to now no other country has a final disposal site for high level waste or spent fuel. To conclude, the decision on a final disposal site would be important to convince the public that waste is being moved from interim storage sites.

QUESTIONS AND ANSWERS SESSION

In the first question, the speaker asked about the policy change, specifically which branch of the government made the decision, who would pay for the cost incurred by the policy change, and why the German public had been so aware and involved in the debate. To this, Mr. Sailer answered first by describing the legislative process in Germany, distinguishing between federal and state government and parliament and government. He specified that the federal government negotiated with the utilities, after which, under the leadership of the Federal Ministry for the Environment, the new law was proposed, and parliament voted on the amendment to the Atomic Law. Mr. Sailer added that the utilities were bearing the main costs, but as of yet there had been no decision about who would pay for the decision process for the final disposal site. Finally, he said that the public debate revolved around many issues, not only concerns about transport, but also civil rights issues, and this was why it involved people from all circles in society, including experts, politicians and especially the media.

In comparing reprocessing and final disposal, the question was raised whether a greater area was needed for the final repository since reprocessing produced more waste and additionally whether retrievability was feasible. Mr. Sailer responded that there was really no difference in the disposal area needed for the two different processes. He explained that it was not the volume of waste that was the limiting factor, but rather the heat generated by the respective wastes, which was nearly the same for both processes. He also noted that the area varied by type of underground formation (clay, granite, salt) and that low-level waste from reprocessing had a longer life and therefore needed a deeper repository. As for retrievability, he asserted that taking into account the safety concerns, the consensus in Germany was that it did not make sense to consider it.

The next speaker commented that in Japan, the argument for reprocessing was that it was environmentally-friendly as it saved on resources and asked about the factors contributing to environmental protection. In response, Mr. Sailer reiterated that reprocessing was not the same as recycling since only the plutonium was used and that the benefits had to be weighed against the costs. He added that it made no sense if the costs were high and did not conserve

much nuclear fuel, but decreased safety. On the second question of the speaker on whether the authorities to promote nuclear energy should be in the same or a separate organization as the authority governing safety, Mr. Sailer responded in a general sense that the authorities had been split into two agencies in most countries, including the US, France, and Germany.

The moderator asked Mr. Sailer to clarify why the utilities and not the federal government paid most of the cost of reprocessing, to which he replied that the agreement was to split the burden between industry and the federal government, since the government would be responsible for the final disposal.

CLOSING

Governor Sato then gave the closing address, in which he thanked Mr. Sailer for his clear presentation of the historical process of the decision in Germany and its results. He also expressed his gratitude to Mr. Sailer for coming to Fukushima. With that, the moderator formally concluded the 32nd Energy Study Committee.