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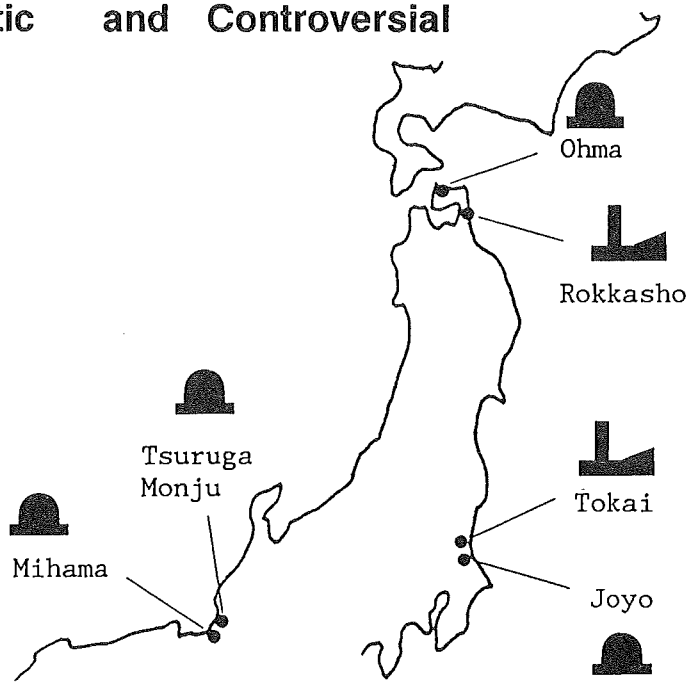
AEC's Ambitious Plutonium Program: Unrealistic and Controversial



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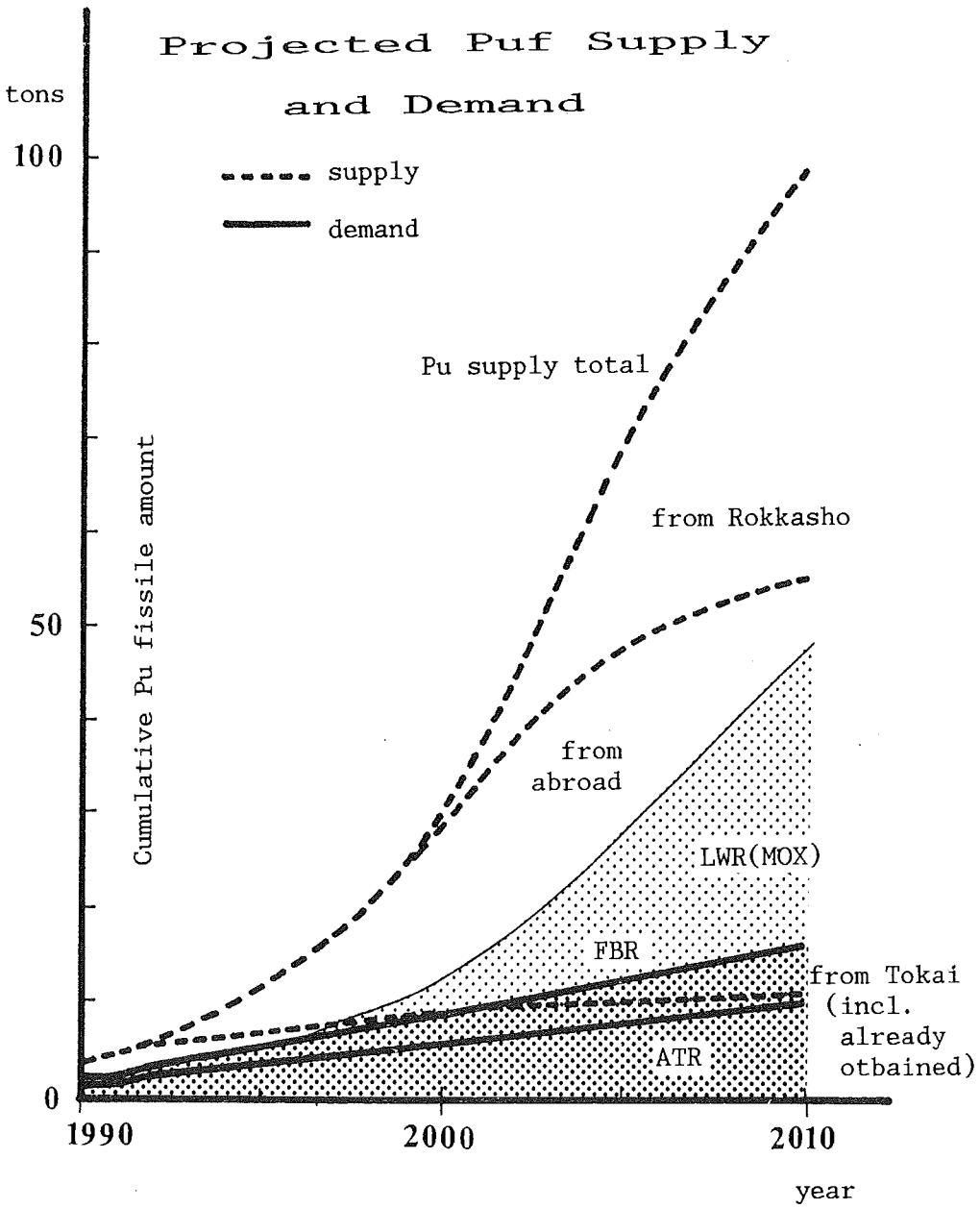
On August 2 AEC Japan's Nuclear Fuel Recycling Committee published a report on Japan's plutonium supply and demand up to the year 2010. The report reveals an ambitious plutonium consumption program designed to avert world-wide concern and the criticism that Japan is going to have a large stockpile of surplus plutonium. But the new program is controversial in many respects and may give rise to even more concern.

The Table lists existing plutonium utilization projects and the new plans proposed by the AEC. The most conspicuous feature of the new government policy is its "no stockpile policy" which implies that all plutonium extracted from spent fuel will be burned in various kinds of reactors to avoid any surplus.

AEC projects that about 85 tons of plutonium (figures for plutonium are all for fissile plutonium) will be supplied and 80-90 tons consumed by the year 2010, making the accounts balance. But it quickly becomes apparent that this balancing is just an armchair exercise and when we look into the details of the program, it is easy to see that most of it will be difficult to realize in the form planned by the AEC.

The most controversial part of the program is the extensive MOX (mixed



oxides of uranium and plutonium) fuel burning in LWRs (light water reactors). As shown in the Table, the AEC plans to start burning MOX in LWRs in the mid-90s and consume as much as 50 tons of plutonium by 2010 by increasing stepwise the number of reactors fueled with MOX. But this plan is far from realistic in the light of the present status of MOX use in LWRs in Japan. At present only two fuel assemblies in a BWR (Tsuruga 1) and four in a PWR (Mihama 1) are being subjected to low burn-up test irradiation. Replacement of one third core of a BWR and PWR each by 2010 seems to them to be a practicable plan.

In relation to this MOX use in LWRs, it is worth noting that the AEC admits for the first time in the new report the possibility of overseas MOX fuel fabrication. Indeed if MOX is to be used on a large scale in Japanese LWRs, a substantial amount of MOX fuel will have to be fabricated in Europe due to the limited capacity in Japan. But there has still been no discussion of the amount of plutonium to be fabricated abroad, the plants involved, or the timetable.

Since the AEC's projection of plutonium supply and demand seems to us very unrealistic, we have made an independent supply and demand analysis for high and low demand cases. For high demand, we have assumed all the AEC's projects are highly unlikely by 2010 except the demonstration FBR and we have excluded plutonium demand for this project from our analysis. For low demand, we have assumed a more realistic plutonium program which can be predicted from the present status of Japan's R&D on plutonium. The results are:

Cumulative supply by 2010: 100 tons
Cumulative demand by 2010
high case: 46 tons
low case: 23 tons.

Contrary to the assertion of the AEC, our analysis shows that a plutonium surplus of as much as 77 tons is most likely to result by the year 2010, giving rise to various problems including potential accident hazard during storage and possible nuclear proliferation and terrorism.

Jinzaburo TAKAGI

Table. Japan's Plutonium Utilization Program (AEC, Aug. 1991)

Reactor type	Operation	Under construction (year of planned start)	Planned (year of planned start)
ATR	Prototype: Fugen (165MW)	-	Demonstration: Ohma (600MW) (1999)
FBR	Experimental: Joyo (100MWt)	Prototype: Monju (280MW) (1993)	Demonstration: (in 2000s)
LWR	Under testing: 2 assemblies in a BWR 4 assemblies in a PWR		Mid '90s: (800MW×1/4)×2* By 2000: (1000MW×1/3)×4 By 2010: (1000MW×1/3)×12

* Indicates MOX use in one fourth core of two 800 MW reactors.

Japan Offers "Support" to USSR and East Europe

Japanese government ministries and utility companies are seeking international cooperation and offering "support" on nuclear energy to the Soviet Union and East Europe. Ministries submitted budget proposals for fiscal 1992 at the end of August and several of them sought international cooperation on energy and environmental issues.

MITI (Ministry of International Trade and Industry) proposed to accept 1,000 overseas nuclear trainees over the next 10 years, at the rate of 100 each year, to receive instruction in operation and maintenance at Japanese nuclear power plants.

The Agency of Natural Resources and Energy proposed a "Green Aid Plan" that will make available renewable energy, energy efficiency and pollution reduction technology. The agency also plans to meet with officials from the Soviet Union once the conflict between the Republics and the Kremlin is resolved. The Minister of International Trade and Industry, Eiichi Nakao has met with Ruslan Khasbulatov, visiting chairman of the parliament of the Russian Republic and close economic adviser to Russian President Boris Yeltsin. The Minister presented a plan for missions to USSR to investigate petroleum production conditions, nuclear facilities and nuclear safety management. The nuclear mission would likely be sent next year. There are also plans to provide support and assistance to the troubled Kozloduy nuclear plant in Bulgaria. The Tokyo Center of WANO (World Association of Nuclear Operators) will send a specialist to Kozloduy shortly, while the Paris and Moscow Centers have already sent several specialists to Bulgaria for periods of two to three months.

The Agency of Natural Resources and Energy plans to support the IAEA in its efforts to investigate safety measures at East European and Soviet power plants. The Agency will offer the IAEA 40 million yen (about $300,000) to help finance the investigation. It hopes the IAEA will utilize the money for Kozloduy.

Meanwhile, utility companies also announced on Sep. 18 that they would support the MITI plan for international cooperation and support for East European and Soviet reactors. They will receive three engineers from Kozloduy, who are to be taken to Fukushima I and instructed in operational supervision in case of emergency.

Nuke Cooperation Expected in Asia

In March last year the Atomic Energy Commission (Japan) convened the first conference to promote cooperation in nuclear development in Asia. At the second conference this March, it was agreed that before next year's conference there would be meetings for experts to exchange information in four fields: use of research reactors, medical use of radiation, agricultural use of radiation and public acceptance.

The first of these meetings on research reactors will be held from the end of this month to the beginning of October in Jakarta, Indonesia. The second, on medical use, is to be held in November in Sydney, Australia, and the third and the fourth in December in Tokyo.

The First UF6 Shipment Brought into Rokkasho-mura amid Protest

On the morning of September 26, the first shipment of uranium hexafluoride for the uranium enrichment plant at Rokkasho-mura in Aomori was brought into Tokyo Bay. Protesters were barred by the police from going into the dock where the fifteen containers were unloaded. By midnight, when the containers had been loaded on to fifteen trailers and were ready to leave the dock, about 150 people were staging a protest. But while the protesters were at the main gate the trailers sneaked out by a different gate behind a police escort. TV cameras and newspaper writers were also there to document the scene.

A dozen protesters, along with a couple of journalists, followed the trailers in three cars all the way to Rokkasho, some 800km north of Tokyo. They checked the level of radiation by placing a survey meter near the trailers while they were stepped at a service area on the freeway.

In Rokkasho-mura a group of women had started a peace camp in the middle of September to voice their protest at the start-up of the enrichment plant. They spent several days before the arrival of the first shipment doing non-violent training, singing and sharing experiences.

On September 27 a group of about 20 women left the camp at 10 o'clock in the morning and joined a couple of men who had camped overnight at the gate of the plant. The women sang and danced with flowers in their hands while a rock band played music and Buddhist monks chanted.

More people started to arrive until around 3 o'clock, shortly before the trailers were expected, when the women spread hundreds of flowers on the ground and made a circle, joining hands and singing as they had planned. At this point the scene became tense. The police started to remove the women one by one, despite their cries and protests, and occupied the gate.

There was now no way the protesters could continue to stage a sit-in at the gate, so they started to walk back to the village to give the impression they had given up. Then the trailers pulled in immediately about fifty people, including the group of women, sat down in front of the trailers and continued to do so after repeatedly being removed by the police. Police intervention then escalated, with kicking and physical harassment, and the scene became increasingly chaotic. Two men were arrested although they had not come into physical contact with the police. One of them was probably picked up because the police considered him a "leader" of the protest. Finally around 5 p.m. the trailers found their way to the gate and drove in.

Citizens' Energy Forum Held

A Citizens' Energy Forum was held from August 23 to 25 in a cottage in the Izu Peninsula, just west of Tokyo. The forum provided an opportunity for concerned people to get together, share their experiences and seek saner ways of producing and consuming energy. A total of 100 people showed up over the three day period, far more than the organizers expected. This probably reflects the keen interest people are now showing in the energy issue.

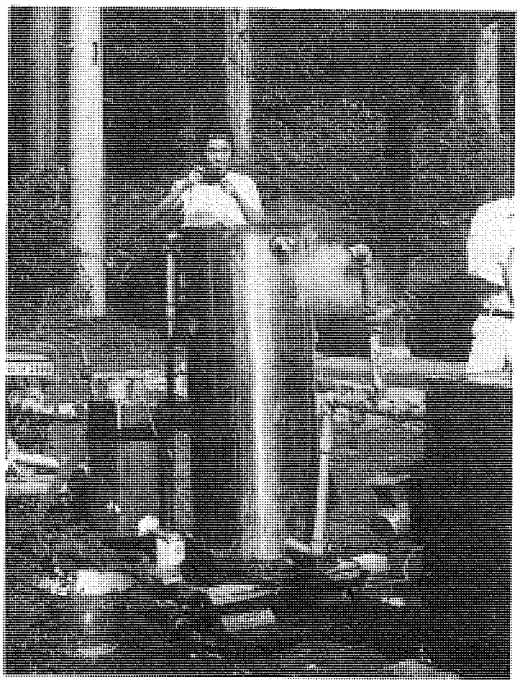
The first session dealt with "the current situation and concerns of solar power," and was chaired by Mr. Fukumoto of the Toyonakamura Energy Cooperative (See NIT No.20). Fukumoto is conducting research into photovoltaic generation at Osaka University. He gave a brief lecture on the photovoltaic system and then a couple of reports were read by people actually using the system. These included the owners of the Maruki Museum, famous for the masterpiece entitled "The Hiroshima Panels" and Mr. Sakurai who has installed photovoltaic panels on the roof of his Tokyo home.

The second session focussed on "Energy and eco-housing." This was chaired by Mr. Tsuneto who is experimenting with an eco-housing project in the Izu area, and circulates a newsletter on it. He read a report on his own project and on the passive solar housing project of the cottage where the Forum was held.

The third session covered "appropriate energy sources - wind and biomass." Chairpeople were Mr. Ida from the Decentralized Energy Research Group, who has visited various wind power sights in different countries, and Mr. Mine, who runs a biomass generation project down in Kyushu. There was also a report on wind power generation by private individuals.

The fourth session considered "energy from water and wood." This was chaired by Mr. Nakajima of the Decentralized Energy Research Group, and reports were read on small scale water power and wood chip gas generation.

On the last day there was a discussion and quite a few people asked for practical information on setting up renewable energy systems in their homes. If we hope to build a society without nuclear power, then the research, development, and utilization of renewable energy sources are crucial. There has been tremendous technical improvement and the cost is now competitive with fossil fuels. What is needed in Japan is an amendment of the Electric Utility Industry Law to promote the development of renewable energy and permit the sale of privately produced electricity. That was one thing all the participants were agreed on by the end of the Forum.



Anti-Nuke Who's Who

Makoto Tsukamoto of Suzu

In the Noto Peninsula on the Japan Sea there is a small town called Suzu where Kansai and Chubu Electric Companies are planning to build a nuclear power station. The actual site is in Takaya, a village of only 75 households most of which subsist on farming and fishing. Makoto Tsukamoto is a monk at Takaya's only temple. Both as a monk and as a resident of the planned site he is strongly opposed to nuclear power.

The residents were first informed of the plan to build a nuclear power station in Takaya in 1975. Immediately a group was formed to resist it, but Makoto didn't join right away. He needed to learn what nuclear power really was. He started to read books on the subject, listened to what other people had to say, and visited places where nuclear power stations had already been built.

As a result, he became determined never to accept nuclear power, which as a Buddhist monk, he saw as a threat to all living things, and to prevent the Takaya power station from being built. Since then he has become a leading figure in the anti-nuclear groups in Suzu city as well as in Takaya.

Kansai Electric Company has used dirty tactics in Takaya, using money to tear apart the traditionally close ties among relatives and friends, and leaving honest local people distrusting each other. Now the gap is widening between those for and against nuclear power. And Kansai continues to try and crush anti-nuclear sentiment. In spite of the pressure from Kansai, there is strong solidarity among the anti-nuclear people. Trust has been building strongly and Makoto has played an important role in this.

In the fall of 1989 Makoto and his colleagues set up a fund for the joint purchase of the planned site. Kansai cannot build the plant unless it obtains the land. So keeping the planned site is crucial. However, it is hard for individual land owners to keep fighting big corporations like Kansai on their own. So they set up a scheme for joint purchase of the planned site to prevent any of it being sold to Kansai. Makoto became the secretary and asked anti-nuclear people throughout Japan to contribute to the fund. Now more than thirty lots on the planned site have been purchased and the scheme has been quite successful in stalling Kansai's plans.

Makoto also worked hard in the prefectural and municipal elections held this spring and helped several anti-nuclear members to be elected. He worked from dawn to dusk, organizing people, collecting funds, and coordinating the office staff.

The Jodo-shin sect that Makoto belongs to aims to create a society where all living things are respected. It is not an abstract teaching. Monks in the sect are expected to work towards the realization of such a society, and Makoto contributes to this work through his involvement in the anti-nuclear movement.

DATA: Workers' Exposure in 1990

Japan now has 40 nuclear plants and one ATR (Advanced Thermal Reactor) in operation with a total capacity of 32,220MW. Only 10% of power plant workers are directly employed by the utility companies. The remainder are subcontracted workers. The total annual dose received by workers in the industry now stands at around 90 person·Sv, 95% of which is received by subcontracted workers. One in every three or four of these subcontracted workers works at more than one reactor, employed for inspections or repair work. Hence, while the average exposure level is under 2 mSv, workers who work at 4 or 5 different reactors are exposed to about three times this level.

During fiscal 1990 the total annual dose was lower than the previous year. However, there was an increase in the number of workers exposed to more than 15 mSv. Workers with high doses have suffered various health problems and some have died of cancer. However, no-one has yet been able to establish a cause and effect relationship and neither the deaths nor the illnesses have been acknowledged as work-related. There has only been one court case demanding compensation, but it has been lost at the local and high court levels and is now before the supreme court.

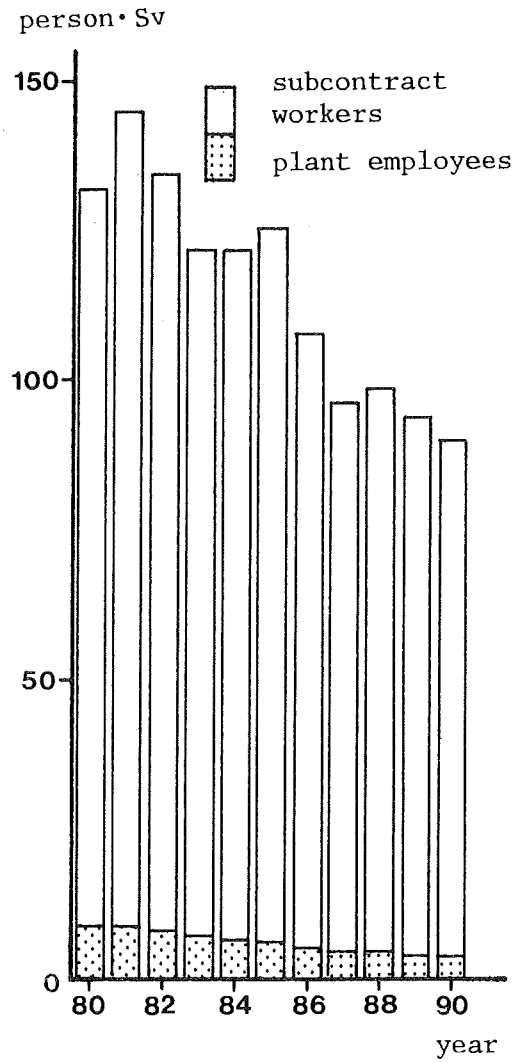


TABLE: Number of workers at different exposure levels

year	kind of workers	< 5mSv	5-15mSv	15-25mSv	25-30mSv	total
1989	plant employee	5,977	63	0	0	6,040
	subcontract	44,894	5,338	642	28	50,902
	total	50,871	5,401	642	28	56,942
1990	plant employee	6,224	58	0	0	6,282
	subcontract	44,037	4,822	748	32	49,639
	total	50,261	4,880	748	32	55,921

NEWS WATCH

Japan to do feasibility study for Indonesia

A Japanese company has received an order for a feasibility study for the Indonesian nuclear power program. NEWJEC (New Japan Engineering Consultant Incorporation), signed a final contract on August 23 with its Indonesian counterpart BATAN (Badan Tenga Atom Nashional = Atomic Energy Agency). The study will cost about 1,500,000,000 yen and take four and a half years. When it is completed in 1995, international bids will be sought for construction.

NEWJEC is 70% owned by Kansai Electric Power Co. (Correction: On page 4 of our last issue "100%" should have read "70%.") Another major investor is Mitsubishi Corporation. The consortium Mitsubishi Heavy Industries, Ltd. - WH (USA) - ANSALDO (Italy) is likely to receive the order for construction and if so, it will be the first time a Japanese company has been the main contractor for an overseas nuclear project.

"Other firms possible" Kansai Chairman

Chairman Shoichiro Kobayashi of Kansai Electric Power Co. stated at a press conference on August 22 that the company "might commission KWU (German) or FRAMATOME (French)" to construct a PWR in Japan. PWR construction has until now been monopolized by the Mitsubishi Group based on its license agreement with Westinghouse of the United States. Kobayashi's statement has become the talk of the nuclear industry: some say he meant to censure Mitsubishi Heavy Industries for its safety management system since Mitsubishi was responsible for the Mihama 2 accident; others say Kansai Electric is seriously thinking of importing PWRs.

Tomari 2 also had cracks

During the July inspection of Hokkaido Electric Power Co.'s Tomari 2 reactor, (PWR, 579MW) a total of 589 cracks were found in the stationary blades of the generator's low-pressure turbines. This comes after 617 cracks were found in Tomari 1 in April. Hokkaido Electric, however, resumed operation after the most makeshift of repairs just as they did with Tomari 1. They say they will replace the blades at the next regular inspection.

FRAMATOME receives Chinese order

It was reported in August that the Chinese government was going to order the basic design of Chinese reactors Qinshan 2 and 3 (PWR, 600MW each) from the French company FRAMATOME. This was another defeat for WH in USA and Mitsubishi Heavy Industries, Ltd. in Japan,

who had made a joint bid for the order. FRAMATOME also won the competition for Guandong 1 and 2, which are now under construction. But WH and Mitsubishi have not lost hope of receiving orders for the construction of reactors in China. They intend to put in a bid for the detailed design and manufacture of Qinshan 2 and 3, probably in Spring 1992 or later.

Lawsuit to demand suspension of Takahama 2

A law suit now being prepared will demand that Kansai Electric Power Co. suspend operation of its Takahama 2 reactor (PWR, 826MW). The suit is being filed by about 100 people, some from around Fukui prefecture where the reactor is located and some from Tokyo and Osaka. A plaintiffs' group was formed on August 17 and they plan to bring the case to court in October.

Takahama 2 has 10,164 steam generator tubes, of which 46% have been found to be damaged. Seventeen percent of the tubes are now plugged and out of use. Kansai Electric plans to replace the whole steam generator in three years' time.

High-level radon gas found in residual soil

From the late 1950s to early 1960s PNC (Power Reactor and Nuclear Fuel Development Corp.) conducted exploratory drilling for uranium at Ningyo Toge (pass) on the border between Tottori and Okayama prefectures.

This August a local citizens' group published the results of their measurement survey of radon 222 around the site in Tottori prefecture where residual soil from the drilling had been dumped. According to their report, the atmospheric radon density reached 35,000 Bq in one cubic meter in a corner of the dump site, 280 Bq in a nearby field and 34 Bq inside a private house in the neighborhood. For reference, the average atmospheric radon density in Japan is 3-7 Bq outdoors and 7-30 Bq indoors.

A local town council in the district where the dump site is located signed an agreement with PNC in August 1990 to remove the residual soil. But this has not yet been done, partly because the governor of Okayama prefecture, where the soil is to be brought, has refused to accept it.

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NUKE INFO TOKYO is a bi-monthly newsletter which aims to provide foreign friends with up-to-date information on the Japanese nuclear industry, as well as on the movements against this industry in Japan. Please write to us for a subscription (subscription rate: supporting subscriber $40/year or 5,000 ¥/year, subscriber $20/year or 3,000 ¥/year). The subscription fee should be remitted from a post office to our post office account No:Tokyo 6-185799, HANGENPATU-NEWS by postal money order. We would also appreciate receiving information and newsletters from groups abroad in exchange for this newsletter.

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