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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

(FOUO 3/81)



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JAPAN

HITACHI DEVELOPING NUCLEAR REACTORS FOR EXPORT

OW170900 Tokyo MAINICHI DAILY NEWS in English 15 Jan 81 p 1

[Text] Hitachi, Ltd disclosed Tuesday that it has begun developing a 200,000-kilo-watt boiling water type nuclear reactor (BWR) for export. Hitachi started the development of BWR's last fall at its energy laboratory and plants in Hitachi City, Ibaraki Prefecture, for export to Southeast Asian countries, including Singapore, in the near future. Hitachi is the first Japanese manufacturer of nuclear reactors to have begun developing a model for export. So far, the international nuclear reactor market has been exclusively controlled by American and European reactor manufacturers. Hitachi embarked upon the project to overcome the domestic economic situation now in the doldrums.

The Ministry of International Trade and Industry (MITI) and the Foreign Ministry are readying themselves to fully back up Hitachi's new export efforts from the standpoint of promoting economic cooperation.

Hitachi has been manufacturing BWR's for domestic power companies, such as Tokyo Electric Power Co, under license from General Electric Co (GE) of the United States. The Three Mile Island nuclear power plant accident in March 1979 has stalled the construction of nuclear power plants in Japan.

There has only been one other export attempt by Japanese manufacturers of nuclear equipment. Mitsubishi Heavy Industries and Toshiba Corp tried a few years back to export equipment forming the secondary system of a nuclear power plant for the Republic of Korea. However, the Japanese firms were beaten out by Westinghouse, the other major American developer of nuclear reactors. The secondary system does not directly involve power generation itself.

Hitachi's efforts are remarkably significant in that Japanese reactor manufacturers have accumulated technology and expertise to design and develop nuclear reactors quite independent from the licensors. The export reactor model is rather small in output but is believed to be the most appropriate for the Southeast Asian countries in terms of power demand. It is also a compact reactor.

MITI on the other hand has been calling on Japanese manufacturers to produce 200,000-400,000 kw reactors for a faster distribution of nuclear power plants in Japan. The ministry previously promoted the construction of larger nuclear reactors. In support of the project, the ministry is making a preliminary review of regulations relating to the export of Japanese-made reactors as well as relevant regulations abroad.

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The prospective export destinations under consideration are Singapore and other Southeast Asian countries, China, and Latin American countries. Singapore is currently planning to introduce a nuclear power plant in the island nation.

When the announcement is official, Hitachi intends to submit a tender competing against such giants and forerunners as GE, Westinghouse, KWU of West Germany, and ASEATOM of Sweden. Hitachi said its reactor will have the edge in price as well as in technology.

A possible bottleneck is the stance of the United States, which has been pushing for nonproliferation of nuclear materials.

Hitachi's move may trigger other reactor manufacturers like Toshiba and Mitsubishi to step up their export efforts.

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JAPAN

'MINIREACTORS' DEVELOPMENT TO BE INITIATED

OW161423 Tokyo YOMIURI SHIMBUN in Japanese 15 Jan 81 Morning Edition p 1

[Excerpt] The Agency of Natural Resources and Energy under the Ministry of International Trade and Industry [MITI] disclosed 14 January that beginning this spring it will develop miniatomic powerplants and a system whereby the steam generated by these minipowerplants can be used for air-conditioning and other purposes in locations they serve. Existing atomic powerplants, whose large size requires vast sites, entail locationing problems. However, minipowerplants using small atomic reactors will not require such limitations, making much easier to locate these miniatomic powerplants.

In addition, these powerplants can be used for local air-conditioning and many other purposes, thus accelerating liberation from dependence on oil. Minister Tanaka and other top MITI officials have expressed the hope that Japan will be able to export miniatomic powerplants technology to both energy-short, nonoil-producing developing countries and to oil-producing countries in the Middle East by expediting the practical use of miniatomic powerplants.

The MITI plan now being considered calls for development of a medium-or small-size light-water reactor with a generating capacity of 50,000 - 300,000 kilowatts. Reactors of this kind will serve as the nuclei of local energy supply, not only supplying electricity but using steam generated from powerplants for air-conditioning purposes in their respective locales. They will also supply steam and thermal energy to local chemical and other factories.

As far as light-water reactor technology is concerned, Japan is among the most advanced. Nowhere in the world is there an atomic reactor of the size contemplated by the MITI, for such reactors are not economical. However, given Japan's technology, it is highly feasible to develop an economical reactor of the size under consideration and to put it into practical use.

Beginning this spring, the MITI will study various technical and economic aspects of the plan, such as: 1) What is an appropriate generating capacity? 2) What should be done to cut down on operation costs and simplify maintenance checks without impairing safety?

It will also make a full study of potential uses for the miniatomic reactors, and on the basis of this study will work out conceptual designs for its construction and utilization.

If everything goes smoothly, by 1988 of 1989 we will see some areas being served by a miniatomic powerplant which, under an integrated system, not only supplies electricity and heat to enterprises but provides air conditioning to homes and factories in the whole area.

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TAIWAN

NUCLEAR POWER GENERATOR IN PROGRESS

OW191439 Tokyo JIJI in English 1350 GMT 19 Jan 81

[Text] Tokyo, 19 Jan (JIJI PRESS)--Taiwan Power Company (Taipower) has started the test run of the first generator in its second nuclear power plant, according to a PANA report from Taipei. In the meantime, the company has secured Japanese investment to help carry out the construction of its third nuclear power plant.

Chu Shu-ling, president of Taipower, said the test run began on Jan 1, about three months ahead of schedule. "To reduce the heavy dependence on oil as fuel for power generation," he said, "we have to speed up the operation of the second nuclear power plant." Chu said the test run will take about six months to complete. When the commercial operation starts on July 1, the generator will provide 985,000 kilowatts of power by its installed capacity.

Chu reported that Taiwan now has a total installed capacity of power at 8,183,000 kw, of which 1,272,000 kw is supplied by the two generators operating in the first nuclear power plant, accounting for about 16 percent of the total. Taipower is now building the second and third nuclear power plants as one of the government's 12 new major construction projects, following the completion of the ten before. The second nuclear plant has two generators, each with an installed capacity of 985,000 kw, and the third plant, also two generators, each with 951,000 kw.

Taipower reported that for construction of its third nuclear power plant, it has recently entered into a joint venture agreement with Mitsubishi Heavy Industries, Co of Japan for organization of an engineering firm to handle the installation of nuclear reactors at its third plant. The engineering firm is called East Asia Electrical and Mechanical Engineering Co to be jointly set up by Taiwan Electrical and Mechanical Engineering Service, a subsidiary of Taipower, and Nippon Construction Co, a subsidiary of Mitsubishi. The new company will have a capitalization of U.S. \$40 million, of which 51 percent is put up by Taiwan and the rest by Nippon. Cooperation period will last for 15 years. When the cooperation ends, Nippon will have completed its technical transfer to Taiwan

The third nuclear power plant, now under construction in the south of Taiwan, is equipped with two light-water pressurized reactors being supplied by Westinghouse Electric Co of the United States. Engineering design for the plant has been provided by Overseas Bechtel Inc, also of the U.S. The first generator of this plant is scheduled for fuel loading in November 1983 and commercial operation in May 1984. The schedule for the second generator is November 1984 for fuel loading and May 1985 for commercial operation.

Taipower said that for supplying more power without the use of oil as fuel, it is going to build a fourth nuclear power plant. For the operation of this plant, Taipower said, the U.S. Government has promised to offer uranium fuel enrichment service.

Taiwan has recently achieved a breakthrough in extracting uranium from phosphoric acid. The Institute of Nuclear Energy Research under the direct supervision of the Executive Yuan (Cabinet) has built a plant for this purpose. According to the institute, the plant completed in June 1980 is capable of producing 10 tons of uranium a year together with 2.7 tons of monazite. Monazite is produced from an ore called monazite sand which is available in Taiwan and contains thorium, a chemical element of similar function as uranium, it said.

Taipower said three turbine power generators at a thermal power plant in northern Taiwan, each with an installed capacity of 300,000 kw, will become operational in February. The generators use coal as their fuel.

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FRANCE

BRIEFS

LE PELLERIN NUCLEAR POWER--The first French-conceived nuclear power plant is to be constructed at Le Pellerin [Loire-Atlantique Department]. The go-ahead has been given by the nuclear installations security service for EdF's M.4 project which will see the replacement of the Westinghouse units, the license for which expires at the end of the year. The French pressurized water reactor system is made up of four units, each producing 1,500 megawatts, as opposed to the 1,300 megawatts produced by the Westinghouse units. One of the originators of the project, Bernard Esteve, says: "It is more a question of perfecting than of revolutionizing." But the plant was conceived to save energy, and lessons have been learned from the accident at Three-Mile Island. The cost [of the new power plant will be] 16 billion [francs]. [Text] [Paris L'EXPRESS in French 17 Jan 81 p 94]

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ITALY

MODIFICATIONS OF GARIGLIANO NUCLEAR POWER PLANT REPORTED

Rome ATOMO E INDUSTRIA in Italian 1 Nov 80 p 9

[Article: "The Modification Work Under Way at the Power Plant and the 'Monster Calves' of Garigliano"]

[Text] As is known, the Garigliano nuclear electric-power plant has been shut down since August 1978 for modifications of the primary system required to eliminate damage to a secondary steam generator (development of cracks in the water tanks), as well as for completion of installation of the new emergency cooling systems and other improvement work.

On 8 August 1978, during a "routine" inspection round by the shift personnel, a very slight loss of steam from an apparatus forming part of the reactor's primary water-steam circuit was noted. This leak, although absolutely negligible in terms of its magnitude, nevertheless affected the structure of a secondary steam generator--that is, a component the repair of which was indispensable for continuation of operation.

The real problem that ENEL [National Electric Power Agency] faced was to identify the best procedural method, providing not only for simple repair of the breakdown but also for modification in the direction of safety improvements to the part of the installation concerned. For this purpose, with ENEL providing full information to the competent overseeing authorities, the CNEN [National Nuclear Energy Commission] in particular, studies and calculation checks have been carried out.

The primary-system modifications presently in progress will entail a slight reduction in operating power because of removal from operation of the two secondary steam generators, whose place will be taken by two bypass lines.

Extensive inspections of an extraordinary character have been carried out, supplementing the ordinary inspections and checks which, in accordance with the most recent norms, are conducted with every fuel recharging so as to ensure the necessary guarantees of satisfactory conservation of the primary-circuit components, and this has been a factor in the prolongation of the shutdown period.

Examination of the results has not revealed any defects; nevertheless, the international developments in the techniques of materials-testing and the results obtained on installations in operation in other countries have been monitored.

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Other work under way at the power plant is the upgrading of several emergency systems, of the system for detection of leaks inside the containment vessel, and of the system for filtration of the gaseous effluents; replacement of a heat exchanger of the primary circuit's water-purification system is also planned.

The authorization procedures for upgrading the core emergency systems and the emergency electric-power supply systems had already been initiated with the CNEN some time ago, and the work that could be carried forward with the power plant in service, subject to obtaining the prescribed authorizations, was partly carried out before the power plant was shut down.

The new emergency cooling systems, integrated with the other systems of the installation, will make it possible, in the case of a coolant-leak incident, to cool the core while keeping the superheating of it below the levels permitted for the reactors of the new generations and will maintain their own performance characteristics even in case of breakdown of an active component and loss of external electric-power supply. This last point has entailed substantial modifications of the emergency electric-power supply systems and has required the installation of two new diesel sets of adequate power.

It should be emphasized that nuclear incidents have never occurred in the more than 15 years of service of the Garigliano power plant; instead, there have been breakdowns and service outages of components and systems which, in some cases, have involved parts relating to security purposes and health protection. In all cases, the environmental measurements immediately made and the checks carried out also, in conformity with the norms in force (DPR [Decree by the President of the Republic] No 185), have demonstrated that the radioactivity released has always been lower than the limits established by the competent authorities and therefore such as not to entail appreciable radiation doses for the population.

With a view to extending to the other two first-generation Italian nuclear power plants, as well, several considerations relative to the impact on the environment and the population, it should be kept in mind that, with the limits fixed by law for the maximum values permitted for doses to the populations surrounding the installations remaining practically unchanged, there has gradually been a tendency, in Italy as elsewhere, to reduce, as much as reasonably possible, the doses effectively absorbed by the population, bringing them down to fractions of those deriving from radiation owing to natural causes, to which all living beings are subject.

For each power plant, therefore, extremely cautious operational limits have been fixed for discharges of radioactive effluents during operation--limits that have involved the carrying-out of detailed and far-reaching research on the particular characteristics of each individual site, so as to identify the critical paths of diffusion of the radioisotopes into the environment and the critical groups of the local population, as well as implementation of a complex of improvements to the systems for processing of the radioactive effluents--both liquid and gaseous-- from the power plants.

Exposure of the local populations to radiation in consequence of the discharges made has proven on the average, for the most heavily exposed individuals in the local population, to be a few percent of the natural background.

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As regards the safety of the personnel working at the installation, the results can be considered exceptionally satisfactory. In all three power plants, the exposure of the personnel to radiation has always been, on the whole, lower than the corresponding exposures of the average for the European and American power plants of the same type.

In conclusion, we cannot help but refer to the recent press campaign, fanned by some ill-prepared persons, with regard especially to the Garigliano power plant. We repeat, as forcefully as we can, that in the zone neighboring the power plant, the dose increase due to the power plant itself, vis-a-vis the natural background dose, is a few percent of the background dose and is less than the seasonal variations of dose.

The power plant, therefore, is certainly not responsible--in view of the fact that radiobiology permits no doubt in this regard--for what it is desired to attribute to it, such as the birth of monster calves, chicks with three feet, lambs without snouts, deformed vegetables and what else have you.

One must wonder whether those who assert these things are really in good faith, speaking out of simple ignorance of the reality, or not. All the more so in that if one wanted to attribute to radiation certain malformations of nature, which, unfortunately, there have always been, one would have to conclude that since the average level of the natural background in Val d'Aosta is less than a third of the average level for Campania, the incidence of malformations in Campania is more than three times higher than that of Val d'Aosta.

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