JPRS L/9573

26 February 1981

... FBIS 40TH YEAR 1941-81 ...

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

(FOUO 4/81)

FBIS FOREIGN BROADCAST INFORMATION SERVICE

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APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000300080056-9

FOREIGN BROADCAST INFORMATION SERVICE
P. O. Box 2604
Washington, D. C. 20013

26 February 1981

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On behalf of all of us in FBIS I wish to express appreciation to our readers who have guided our efforts throughout the years.

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WORLDWIDE AFFAIRS

SAUDI ARABIA OFFERS PAKISTAN FINANCING TO BUILD NUCLEAR BOMB

LD181816 London SUNDAY TIMES in English 18 Jan 81 p 1

[Article by Edith Lenart: "Saudi Offer To Help Zia Build H-Bomb"]

[Text] Saudi Arabia has offered Pakistan $800 million (about 330 million pounds) to help make an H-bomb, on condition that the nuclear technology does not get into the hands of Iraq.

An agreement to this effect, which is about to be signed, will also effectively exclude Libya's Colonel al-Qadhdhafi from the project. Al-Qadhdhafi had supported Pakistan's secret bid for an H-bomb with funds and uranate (uranium cake) until his friend, former Prime Minister Ali Bhutto, was executed by General Zia in April 1979.

But Pakistan was upset by al-Qadhdhafi's insistence on his own nuclear experts being allowed access to their research programme, and they looked elsewhere for funds. Last autumn Pakistan turned to the Saudi Government for help. The proposal for an Islamic bomb was made direct to Crown Prince Fahd, the prime minister.

He instructed his deputy minister for defence and aviation, Prince Turki al-Faisal, and the minister for petroleum and mineral resources, Ahmad Yamani, to start talks.

The Pakistani negotiators included the foreign minister, Agha Shahi, the nuclear research director, Abdul Qadir Khan, and the chief of the Pakistan Atomic Energy Commission, Munir Ahmed Khan. They said that Pakistan's atomic programme had reached the stage where they could start developing a nuclear device but that the cost had outstripped the country's resources.

The alternative the Pakistanis said was to drop the project or to invite the Iraqi Government to finance the whole scheme in return for sharing Pakistani know-how.

The Saudis told the Pakistanis that Iraqi President Saddam Husayn wanted his country to have a nuclear device which would enable him to exercise a dominant role in the Middle East, even without directly making use of the bomb. The Saudis said Middle East politics prevented them from openly opposing Saddam, but they were determined to block Iraq's nuclear ambitions through diplomatic channels.

The first Saudi offer of $250 million was made personally last October by Sheikh Yamani to Pakistan's foreign minister but was rejected by the Pakistanis.

The result came at a secret meeting in Europe, some weeks ago, when the Saudis increased their offer to $800 million, which both sides regard as "acceptable."

CSO: 5100

JAPAN

MIXED FEELINGS OVER NUCLEAR POWER

Tokyo MAINICHI DAILY NEWS in English 2 Feb 81 p 1

[Text]

Nearly half of those surveyed in a national poll think nuclear power will be the principal energy source for the future, but at the same time, more than half are worried about nuclear safety.

The survey was conducted by the Prime Minister's Office last November to find out how conscious people are of the need for energy conservation and nuclear energy.

Eighty-two percent of the 5,000 males and females aged 20 or over picked throughout the country responded.

According to their replies released Saturday, 47 percent think nuclear energy will be the principal source of energy in the future.

Eighteen percent of the respondents cited solar energy as the primary future alternate power source.

Asked if they thought the amount of nuclear power in the entire power output (now 13 percent) should be raised, 38 percent of the pollees replied in the affirmative.

Only 5 percent answered it should be lowered, while 28 percent wanted the present level maintained.

However, 56 percent of the people monitored said they felt concern over nuclear power.

As concrete targets of concern, 30 percent cited radioactivity from nuclear power plants, 16 percent potential accidents, 7 percent safeness of nuclear reactors and 5 percent vulnerability to tremors or other natural disasters.

There was no major gap in the extent of such concern between pollees in prefectures where nuclear facilities are located and those where there are none, the office noted.

Twenty-nine percent answered correctly that nuclear power stations eradiate radiation constantly.

As many as 44 percent answered incorrectly.

Only 4 percent knew that the eradiation amounts to less than 10 millirems, or one-tenth of the exposure of a chest X-ray.

Three out of every four knew about the Three Mile Island radiation leak in the United States two years ago, but the maximum exposure to local residents — some 100 millirems — was known by only 3 percent.

The poll also revealed that 44 percent want to know about the potential effects of radiation on the human body and the environment.

Thirty-six percent wanted to learn more about safety measures against possible nuclear accidents while 29 percent wanted information on the means of disposing of nuclear waste.

CSO: 4120

LEAKAGE DETECTION BY ACOUSTIC EMISSION AT NUCLEAR POWER PLANTS

Tokyo TECHNOCRAT in English Vol 13, No 11, Nov 80 p 59

[Text]

The Central Research Institute of the Electric Power Industry has been studying feasibility of a leakage detection technique that utilizes sound created when a liquid or gas leaks, in order to check the failure of piping systems in nuclear power stations. The following is a summary and results of their investigations.

In the case when a crack in a piping system develops and expands to cause leakage, the liquid or gas will blow out violently due to the pressure difference between inside and outside of the piping. At this point sounds being a broad-band frequency are generated and travel along the solid portion of the pipe in both directions. Consequently, sound detectors properly spaced on the piping theoretically can detect the failure, and moreover by taking advange of the sound decrease during propagation, can approximate the location of the leakage by the dampening ratio.

The findings of the experiments are as follows:

(1) Characteristics of leakage sounds: For the most part LWR piping in use conveys high-temperature, high-pressure water and steam. The experiment showed that the sound intensity of a leak of saturated steam or high-temperature high-pressure water increases with the increase of the amount leaking. In addition, the sound spectrum ranges over 1MHz.

(2) Propagation of a leak's sound: The dampening of a leak's sound differs from place to place; the amount per unit length in the neighborhood of point of leakage is greater than for the rest of the pipe. Further, the amount becomes even greater in the higher frequency range, and the pipe containing liquid dampens more sound than in the case of a gas.

(3) Attachment of conducting rods to the piping: Acoustic properties of conducting rods are that the dampening difference in the different length of rods is negligible, whereas the diameter affects the property rather greatly, resulting in a sudden dampening increase as the diameter becomes less.

To connect conducting rods, although welding is the easiest where avilable, a high-temperature adhesive has been developed for the zones in which welding heat is too severe to permit. The sound propagation performance of the adhesive proved in the test to be almost equivalent to that of the welding method.

(4) Leakage monitoring system: For monitoring leakage signals in experimental equipment, detectors are not required to be under constant or simultaneous surveillance since the signals are continuous. Instead, it is considered perferable that devices are sampled and analyzed at certain intervals, and then the results are compared with standards (a background noise without leakage) so as to obtain any deviation which could evaluate possible leakage as well as its size.

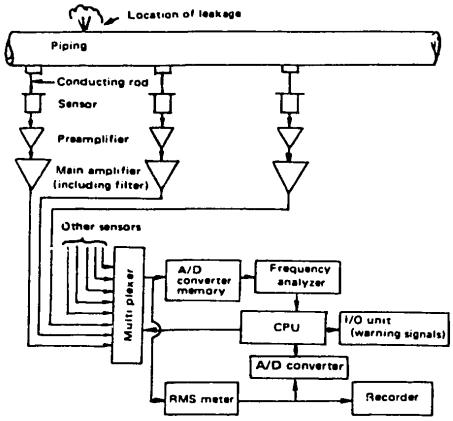

Fig. 1. Leakage Monitoring System (an Example)

CSO: 5100

JAPAN

NEW SEMICONDUCTOR RADIATION DETECTOR PREPARED

Tokyo TECHNOCRAT in English Vol 13 No 11, Nov 80 p 59

[Text]

Toshiba Corp. has succeeded in preparing a low-cost, highly-sensitive, non-bias semiconductor radiation detector that can be used at normal temperatures.

Semiconductor detectors employing silicon or germanium have high resolving power so that they are widely in use for activation analysis, X-ray fluorometry, and nuclear structure studies etc., being referred to as typical radiation detectors. However, conventional semiconductor detectors all require a high bias voltage, but the worse drawback is that they require cooling in liquid nitrogen, which presents difficulties if used for X-ray therapeutic equipment such as radiography and X-ray CT.

The newly-developed instrument utilizes high-purity silicon with an impurity concentration of about 1/10,000 of that used for conventional IC's, in order to provide a surface-barrier type detector that builds a non-bias, cooling-free element. This has enabled its application for X-ray therapy.

The new device is shown in the figure. a high-purity silicon surface with a specific resistance of 2.5kΩ•cm is deposited with a thin silicon oxide film in the order of 50Å and further with gold on the film to form a surface barrier.

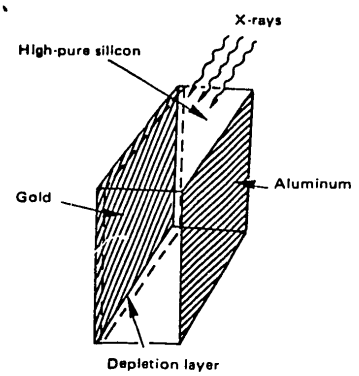

Fig. 1. Schematic Diagram of New Non-Bias, Semiconductor Radiation Detector

CSO: 5100

JAPAN

NUCLEAR POWER DEVELOPMENT DECREASE SAID TEMPORARY

Tokyo MAINICHI DAILY NEWS in English 31 Jan 81 p 5

[Text] Japanese expenditure on atomic power development decreased for the first time in fiscal 1979 ending last March, following the United States' Three Mile Island disaster of according to a survey released Thursday.

However, the Japan Atomic Industrial Forum, Inc., which conducted the survey, said the drop was only temporary and did not alter the overall growth trend in expenditure on atomic power development.

Based on questionnaires returned by about 900 firms in industries related to atomic power, the survey found their total expenditure in atomic power-related areas for 1979 was 1,420 billion yen.

This meant a drop of two percent from the previous year, compared with an annual increase of from 12 to 170 percent during the previous eight years.

It was the first time expenditure on atomic power development had decreased, the survey said, and reflected delays to Japan's atomic electric power projects following the United States' Three Mile Island disaster of March 1979.

However, the future was bright, the survey said.

It found the balance of contracts in hand in the manufacturing and mining industry related to atomic power was 2,100 billion yen, up 13 percent over the previous year.

Investment in production facilities had also increased six percent.

Imports related to atomic power in 1979 totaled 510 billion yen, the survey showed, compared with 21 billion yen for exports, indicating that Japan's atomic power industry was still very dependent on overseas technology.

CSO: 4120

JAPAN

MHI SEEKS BECHTEL TIE ON NUCLEAR POWER PLANT

Tokyo THE JAPAN ECONOMIC JOURNAL in English 20 Jan 81 p 6

[Text]

Mitsubishi Heavy Industries, Ltd. has decided to roll back its still inferior domestic nuclear power plant market position against two major local rivals by seeking full-scale technological cooperation of Bechtel Corp. of San Francisco, the world's top N-plant engineering firm.

Japan's domestic N-power plant market has so far been divided into two kinds of such plant, the BWR (boiling water reactor) and the PWR (pressurized water reactor).

The BWR types have been built and supplied to Japanese electric utility companies by two rival makers, Toshiba Corp. and Hitachi, Ltd., both local licensees of General Electric Co., the original American developer. The PWR type, originally developed by Westinghouse Electric Corp. of the U.S., has been produced and supplied by MHI under Westinghouse's license.

The Japanese market has been dominated by the BWR types because of GE's close business and technological alliance with Tokyo Electric Power Co.

MHI so far has been obtaining Bechtel's similar cooperation in basic designing and blueprinting of its PWR type of N-power plants whenever the need arose, just as Toshiba and Hitachi have done concerning their BWR types.

MHI has decided to sign a new contract with Bechtel to seek the latter's constant cooperative instructions as to numerous aspects of its N-power plant planning, designing.

MHI's prospective full-fledged tieup with Bechtel, to follow up Hitachi's similar step realized last August, has been motivated by a recent resurgence of Japan's N-power plant construction drive after a long lag since the Three Mile Island mishap.

CSO: 4120

JAPAN

ESTABLISHMENT OF RULE ON SPENT NUCLEAR FUEL REPROCESSING SOUGHT

Tokyo THE JAPAN ECONOMIC JOURNAL in English 20 Jan 81 p 4

[Text]

The Japanese Government intends shortly to enter into talks successively with Australia, Canada and the U.S. for establishing a common international rule on reprocessing of spent nuclear fuel, based on a relaxation of current restrictions on such reprocessing.

For enabling an easing of present reprocessing regulations, the Government hopes to secure international consent on the following points:

—Abolish the present individual approval formula under which nations exporting uranium or enriched uranium require the country importing to secure their screening and approval in advance for every reprocessing of spent nuclear fuel sought by their nuclear power generation stations.

—Apply, instead, a procedure requiring the importing nation to submit its plan on reprocessing or comprehensive information to the exporting nation, and have the latter sanction reprocessing within such a framework.

Atomic power generation throughout the world greatly has slowed down as a sequel to the Carter Administration's stringent anti-nuclear proliferation policy and the untoward Three Mile Island incident.

CSO: 4120

AUSTRALIA ASKED FOR STABLE SUPPLY OF URANIUM

Tokyo THE JAPAN TIMES in English 23 Jan 81 p 5

[Text] International Trade and Industry Minister Rokusuke Tanaka Thursday asked Australia for a stable supply of uranium ore. In this connection, he offered Japanese cooperation in prospecting for uranium ore.

Tanaka made the request when he met Doug Anthony, deputy prime minister and minister for trade and resources, Phillip Lynch, minister for industry and commerce, and John Carrick, minister for national development of energy all of whom came here to attend the Japan-Australia Ministerial Conference.

Anthony welcomed the Japanese offer.

Anthony, however, urged Japan to promote negotiations on the revision of the bilateral nuclear agreement, so as to enable his country to export uranium to Japan.

Tanaka also promised Japanese contribution to the development of Australian coal resources and related infrastructural facilities.

Tanaka noted the necessity of bilateral industry-level discussion on the amounts and prices of coal imports from Australia in the future.

Anthony told Tanaka that it was necessary to set coal prices at an appropriate level in order to facilitate more investments in his country's coal development.

Tanaka said Japan would import 22 million tons of coal in 1985 and 53.5 million tons in 1990.

Tanaka and the Australian officials agreed to promote bilateral development of coal liquefaction technique and oil shale.

Carrick told Tanaka that his country would consider favorably the exports of liquefied coal and oil shale to Japan in the future.

On trade, Tanaka asked the Australian officials to lift import restrictions their country is imposing on industrial products like textiles and cars.

Lynch told Tanaka that import restrictions were necessary for a short period time but added that the Australian market is open wider than the Japanese market.

CSO: 4120

BRIEFS

ZIRCONIUM FUEL CLADDING--In producing zirconium used as fuel cladding for nuclear power reactors, a new, creative process has been developed. Mitsui & Co., Ltd. in cooperation with Ishizaka Kenkyusho Co. has perfected the method, which can yield high-quality zirconium at half the cost of existing producers, in addition to eliminating the needs for environmentally controversial solvents and acids, and other advantages. The new process is referred to as a distillation method. It excels conventional extraction methods employing organic solvents by reducing the extraction process to only two stages, chloridization and distillation. This system is capable of reducing the price by half, to 3.3 dollars/lb. Present processes, in order to separate hafnium in the ore, first extract zirconium by chloridization with a large amount of organic solvents and acids, requiring additional complicated procedures such as precipitation and calcination. The new method features: (1) simple preparation procedures with half the construction expenses; (2) a high-quality products yielded by distillation; (3) a pollution-free system which does not use solvents and acids; (4) separated hafnium useful for hard metals or control rods. The element is also promising as a titanium substitute because of its greatly reduced cost. [Text] [Tokyo TECHNOCRAT in English Vol 13, No 11, Nov 80 p 58]

FUEL PRODUCTION PLANT--The Power Reactor and Nuclear Fuel Development Corporation (PNC) has revealed that it will commence construction in 1981 F.Y. of a fully automatic FBR plutonium fuel production plant reportedly the world's first, with a 5 tons/year capacity. The plant is to produce MOX fuels for the FBR prototype, "Monju" (electric output: 300MW), which will reach criticality in 1987. Expected to initiate full-fledged operation in 1986, the facility is designed to secure lowered radiation exposure to operators as well as labor saving and cost reduction. At the same time, it not only produces prototype reactor fuels but is characterized as a precursor plant for future practical reactor fuels. In Japan plutonium for FBRs is obtained by reprocessing spent nuclear fuels of light-water reactors (LWR); since the product thus extracted is strongly radioactive level plutonium, remote-controlled operation is indispensable in avoiding excessive doses. By contrast, European nations treat spent fuels from gas reactor to provide raw plutonium which has less intense radioactivity than that of the LWR's, so that FBR fuel manufacturing factories, they maintain, can be dependent upon manual operation. However, LWR-made plutonium will also have to be used even in Europe in the near future, so the entirely-automated fabrication plant which the PNC is now about to build is understandably attracting great interest. [Text] [Tokyo TECHNOCRAT in English Vol 13, No 11, Nov 80 p 58]

UNDERWATER DEACTIVATION POWER REACTORS--The Ministry of International Trade and Industry as well as electric power companies is proceeding with the study on the technical feasibility of decommissioning nuclear power reactors, and Tokyo Electric Power Co. has announced plans to dismantle used reactors through underwater cutting techniques. According to the company, highly radioactive, aged reactors can be dismembered under water for storage in casks by means of plasma arc, water jet, and other welding methods. Such underwater dismantling technology is being developed in the U.S., West Germany and Japan, with apparent promise for practical use. The immersed cutting operation is intended to prevent workers' exposure; after dismantling, chunks are placed in the cask for storage or burial. The MITI will conduct reliability tests on reactor dismantling treatment in next fiscal year, in order to probe its feasibility. [Text] [Tokyo TECHNOCRAT in English Vol 13, No 11, Nov 80 p 58]

EXPERIMENTAL MULTIPURPOSE HTGR--The Japan Atomic Energy Research Institute (JAERI), in an effort to establish a public-private setup for developing a multi-purpose, high-temperature gas reactor, has ordered the detailed designing for the experimental reactor (thermal output: 50,000 kW) which they hope will reach criticality in fiscal 1987, from the four nuclear industry groups consisting of Fuji Electric, Hitachi, Mitsubishi Heavy Industries and the Nippon Atomic Industry Group, designating Fuji Electric as a representative. The multi-purpose HTGR is said to be the last resort in order to shift the non-electric power sector, which consumes more than two-thirds of the primary energy supply, from petroleum to nuclear heat. Consequently, the Science and Technology Agency, in light of national security, hereafter will work vigorously at allocating an increased R&D budget for the JAERI, in order to achieve immediate realization. When it receives these resources the JAERI will tackle the detailed design task in the 3-year project at a total cost of about ¥4 billion, the construction of the reactor will begin in mid-1983 F.Y., eventually spending as much as ¥150 billion, with criticality expected in 1987. [Text] [Tokyo TECHNOCRAT in English Vol 13, No 11, Nov 80 p 58]

MODIFIED BWR TO KARIWA PLANT--The Advanced Engineering Team (AET) formed by G.E. (U.S.) and other five BWR manufacturers is developing an improved BWR which Tokyo Electric Power Co. is considering introducing into the Kariwa nuclear power station. Unit 3 reactor (1100MW) in Kashiwazaki, scheduled for start-up around 1990. The modified-type reactor has allegedly undergone the following drastic design changes in contrast to existing models: (1) a circulation pump built in the reactor container; (2) load-follow operation is possible; (3) easier routine inspection has been provided for. At present, commercialization efforts are being made. AET is an organ of international cooperation launched by five BWR makers of G.E., Hitachi, Toshiba, Asea Atom (Sweden), Ansaldo Mecanico-Nuclear SpA (Italy). The modified reactor features substantial improvements, such as lower exposure doses and easier operation, over conventional types. Moreover, it is said to have incorporated the results of reactor modification & standardization research now being carried on by the MITI, thereby being tailored to the needs of the Japanese industry. [Text] [Tokyo TECHNOCRAT in English Vol 13, No 11, Nov 80 p 58]

CSO: 5100

ALGERIA

BRIEFS

NUCLEAR RESEARCH CENTER--With the aid of the French atomic energy commission Algeria is going to set up a nuclear research center at Ain Oussera. When President Chadli Bendjedid visits France, after the presidential election, the acquisition of such a center will be on his agenda. [Text] [Paris L'EXPRESS in French 24 Jan 81 p 93]

CSO: 5100

FEDERAL REPUBLIC OF GERMANY

SCHMIDT SUPPORTS INCREASE IN NUCLEAR POWER PLANTS

Hamburg STERN in German 17 Dec 80 p 146

[Text] Helmut Schmidt intends to step up the construction of nuclear power plants. Therefore the use of oil and gas in the generation of electricity is supposed to be restricted even further.

In the coalition negotiations with the FDP, Chancellor Helmut Schmidt surprised his partners with an unexpected demand. He insisted on including in the coalition paper the commitment to progressively cut back on the power plants' use of oil and gas for energy production. Even Economics Minister Otto Graf Lambsdorff--already an opponent of government intervention in economic processes--could not dissuade the chancellor.

The chancellor's undertaking evoked surprise, for in the approximately 1,000 West German power plants (yearly energy production: 299 billion kilowatt hours) barely 5 percent of the electricity is generated by burning fuel oil. Ten years ago it exceeded 10 percent.

Ulf Lantzke, director of the International Energy Agency in Paris, praises the reduction of oil consumption: "If the public utilities in other countries conducted themselves as those in West Germany, we would have 25 percent fewer worries."

Experts however do not consider further reduction of oil consumption possible. For many power plants, on account of their location in the vicinity of refineries, can be most easily supplied with heavy fuel oil. Finally, the oil-fired power plants are also needed as a stop-gap during shutdown of nuclear power plants, according to the opinion of experts, because they can be turned on and off quickly without great technical effort.

In gas consumption also, Schmidt's economizing plans make no sense on the face of it. Twenty percent of the West German energy is obtained from natural gas (22 billion cubic meters). Shortages in supply which would require a forced retrenchment are not in sight. On the contrary: Only recently the Federal Ministry for Economics feared that the gas quantities from Holland, Norway and the Soviet Union guaranteed in future contracts "would only be disposed of with difficulty in the market." West German companies are now even negotiating further deliveries from the Soviet Union from 1985 onwards. The contractually agreed upon amounts must be purchased.

Moreover, the gas-fired power plants also have the advantage that one can convert them in a short time to other energy carriers, for example, oil. In contrast to coal-fired power plants, they do not foul the air with dangerous sulfur dioxide. On the other hand, the market sees to it that the burning of natural gas for energy production does not increase further. The times are gone when natural gas was substantially cheaper than oil. Electricity producer Horst Magerl, director of the Association of German Electric Power Plants (VDEW): "Natural gas will also therefore be cut back in the production of electricity. Government intervention here is neither necessary nor useful."

Nevertheless, as incomprehensible as the chancellor's plans appear at first, there is a system to them: Schmidt wants to make the unpopular expansion of nuclear energy unavoidable through compulsion. The chancellor in his government statement: "The federal government considers further expansion of nuclear energy justifiably safe technically and--for the foreseeable future--necessary for energy policy." Schmidt's reckoning will be correct if oil and gas largely cease to be used for electricity production. For electricity demand is no longer to be met by additional coal-fired power plants alone.

Schmidt also wants to check with the laender as quickly as possible as to how nuclear power plant certification can be speeded up without loss of safety. The electricity producers one again computed, precisely at the time of the government statement, how many nuclear power plants must be built by 1990: at least 10. Bavaria alone, according to the Munich Economic Ministry, would have to build two additional nuclear reactors with the elimination of oil in electricity production.

Horst Magerl of the Association of German Electric Power Plants (VDEW) cannot yet believe that Helmut Schmidt now wants to fulfill his (Magerl's) wishes: "That is too good to be true."

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CSO: 5100

END