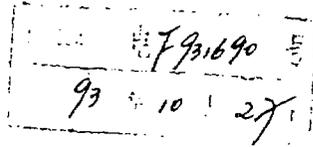


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INIS-mf--14301



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November 1, 1993

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Respected Mr. Chairman,
Ladies and Gentlemen,

I am very pleased to attend this Seminar with participants in nuclear community. Now I would like to take this opportunity, on behalf of the China National Nuclear Corporation and members of the Chinese delegation, to make an introduction on the development of nuclear energy and nuclear policy in China to offer you more information on China's nuclear undertakings.

1. Status of Nuclear Power Development

The idea of developing nuclear power in China has long been conceived. It was pointed out in the 12-Year-Outline for Atomic Energy Development Program put forward by the central government in 1955 that "Nuclear power, which ushers in a new era in the history of power development, has brilliant prospects. An integrated power supply system shall be taken shape in China within the coming 10 years, which includes primarily comprehensive exploitation of rivers and development of thermal and hydroelectric power as well as use of nuclear power depending on the practical conditions". On 8 February 1970, hearing the report on a shortage of electricity in Shanghai given by the municipality, the late Premier ZHOU Enlai said, "From a long-term point of view, nuclear power is the only solution for the shortage of electricity in Shanghai and the East China". China's first nuclear power plant project was therefore named "728 Project". From then on, the prelude to develop nuclear power was drawn aside in China.

The first concrete was poured on 20 March 1985 for China's first self-designed and self-constructed nuclear power plant—Qinshan Nuclear Power Plant (300 MWe PWR). And it was connected to the grid and started to generate

electricity on 15 December 1991 under the joint efforts of all the builders, and reached full power operation in July 1992. It has now entered the period of high-power trial operation.

The successful construction of Qinshan NPP, which results from both making full use of our achievements in science and technology over the past 30 years and absorbing the advanced experience of other countries thanks to the opening policy, is another significant breakthrough in peaceful uses of nuclear energy and nuclear technology. It marks an end of no nuclear power in China's mainland and initiation of a new epoch in peaceful uses of nuclear energy and nuclear technology.

Daya Bay NPP (2×900 MWe PWRs) has been one of the largest JV projects since China started the reform and opening policy. For the Unit 1, the first concrete was poured on 7 August 1987, and connection to the grid and generation of electricity, initiated on 31 August 1993, and commercial operation will be expected by the end of this year; For the Unit 2, the first concrete was poured on 7 April 1988. It is scheduled that the whole project will be finished by the end of June 1994.

The construction and operation of the Daya Bay NPP plays a major role in learning the foreign advanced techniques and management experience and in improving China's construction and management of nuclear power plant.

The second phase of Qinshan NPP Project (2×600 MWe NPPs) has been placed on the National Plan as one of the major items. The review of the preliminary design was fulfilled in November 1992. It is scheduled to pour the first concrete for the Unit 1 in May 1995. The connection to the grid and generation of electricity shall be initiated by the end of 2000, and for the Unit 2, one year after.

The recommendation for the second phase of the Guangdong NPP Project (2×900 MWe PWR Units) was approved and preparations are underway.

The feasibility study on construction of nuclear power plant is actively carried out in Liaoning Province and in the southeast coastal provinces such as Hainan, Shandong, Jiangsu, which are well developed in economy but short of coal and power resources.

2. Nuclear Policy and Nuclear Power Program

China's nuclear industry originated in 1955. Though possessing nuclear weapons, China consistently adheres to the principle of complete prohibition and thorough destruction of nuclear weapons and will neither advocate, encourage, and engage in nuclear proliferation, and will oppose nuclear proliferation, nor help other countries develop nuclear weapons. As first declared in the world, China will never be the first country to use nuclear weapons. China steadfastly remains conscientious and cautious in international cooperation for peaceful uses of nuclear energy and abides by the three principles for nuclear exports, i. e. exclusive use for peaceful purposes, acceptance of the IAEA safeguards, and non-transfer to any third countries without China's prior consent. China has pledged that all the imports are limited to peaceful uses.

In January 1984, China joined in the IAEA and acts as a designated member of the Board of Governors, taking an active part in activities of international nuclear cooperation. In November 1988, China concluded an agreement with the IAEA to voluntarily place some of its civilian nuclear facilities under the Agency's safeguards, and has accepted the Agency's inspectors to inspect the nuclear facilities in China. In January 1989, China acceded to Convention on the Physical Protection of Nuclear Material. In March 1992, China acceded to the Treaty of the Non-Proliferation of Nuclear Weapons. In February 1993, China gave the Agency a pledge to report on its import and export of nuclear material, which means China's support to the efforts made by the international community in non-proliferation of nuclear weapons.

Since 1990s, China has entered a period of rapid development of national economy, thus presenting a new challenge to the existing energy industry which can hardly meet the needs of the economic development. As estimated, there is a shortage of conventional energy resources amount to 0.1~0.2 billion tons of standard coal by 2000 and 1.2 billion tons of standard coal by 2050. The situation of energy shortage is more serious in southeast coastal areas with fairly developed economy, therefore alternative energy resources must be developed as early as possible so as to mitigate this gap.

30 years of experience in developing nuclear power in the world can fully witness that nuclear power possesses safe, clean, and economical features. The

development of nuclear power is the only way to optimize the national energy structure and ensure the power supply. In order to fit in with the objective needs of economic development, the general principle of developing nuclear power is "Developing mainly the thermal and hydroelectric power while the nuclear power as an auxiliary"; for the southeast coastal areas, the principle is "Developing the thermal, hydroelectric, and nuclear power in the light of local conditions". At the same time, nuclear power development strategy has been specified, taking into account the national conditions.

Firstly in technology, we shall conscientiously sum up the experience in construction and operation of Qinshan NPP and Daya Bay NPP. Through the construction of Qinshan NPP, we have mastered the techniques in design and construction of nuclear power plant with 300 MWe scale. 70 percent or more of the equipment used in the Plant were manufactured in China. Now China's nuclear power construction is climbing to a new level. Through the construction of the second phase of Qinshan Project, we will master the techniques in construction of PWR with 600 MWe scale. Internationally accepted 300 MWe standard circuit design will be employed for the 600 MWe nuclear power plant for the benefit of overall control of construction techniques for nuclear power unit with 1000 MWe scale when the second phase of Qinshan Project is completed.

Secondly, for the scale and pace of developing nuclear power, the needs for economic development shall be considered. At present, China only has Qinshan NPP (300 MWe), and Daya Bay NPP (2×900 MWe) to be completed. China is planning to construct a series of 300 MWe nuclear power plant. In this case, the design techniques and equipment manufacturing capacity we have already mastered can be brought into full play. The construction and operation of the Qinshan NPP has heightened our confidence in developing nuclear power and demonstrated the superiority of nuclear power as new energy resources. As a result, several provinces and municipalities have made applications for constructing 300 MWe nuclear power plant. Regarding 600 MWe nuclear power unit, in addition to the above-mentioned second phase of Qinshan Project, the third phase of Qinshan Project (2×600 MWe) will be started during the late period of the Eighth-Five-Year Plan, and the 600 MWe nuclear power unit is selected as a primary unit to be localized and it is expected to realize, step by step, self-design, equipment localization, technology

standardization and construction in batches.

The safety and reliability of nuclear power are much concerned by the public. The principle of "Safety First and Quality First" is consistently followed throughout the construction of nuclear power in China and specific measures are adopted accordingly:

- An authoritative organization for independent implementation of safety supervision to civilian nuclear facilities—China National Nuclear Safety Administration (NNSA) was established in 1984. On the basis of the IAEA NUSS documents, the NNSA has enacted and promulgated four nuclear safety codes relating to design, siting, operations, and quality assurance, and a series of standards and guidelines. As a competent body of nuclear safety, the CNNC has also promulgated a series of administrative rules relating to operation and radiological safety control, etc. and at the same time, it possesses a complete quality assurance system and special organizations and personnel to deal with research work and management for nuclear safety, and international cooperation in this field.
- From the very beginning of development of nuclear power, all the constructors are always instructed to have a strong sense in safety and quality, and also to have high professional morality to the State and the people.
- During design, construction, and operation of the nuclear power plant, the IAEA experts are invited to carry out safety review. And our work will be improved according to their comments.
- The operators of nuclear power plant shall be strictly trained and further trained. They are allowed to take their posts, only when they have obtained their licenses.
- PWR is selected, which is characterized by safe performance and extensive use in the world.

These measures will basically ensure the safety and reliability of nuclear power plants in China.

3. Nuclear Fuel Cycle System

Thanks to the unremitting efforts over the past 30 years, China has established

a complete system of nuclear fuel cycle, including the geological survey and exploration of uranium deposits, the mining and milling of uranium ore, the uranium isotope separation, the manufacture of nuclear fuel assemblies, the reprocessing of nuclear fuels, the radioactive waste treatment, etc., thus setting up the prerequisites for development of nuclear power industry.

China is rich in potential uranium reserves, sufficient for China's existing development program of nuclear power.

In respect of uranium mining and milling, solution-leaching technology has been further improved, the heap-leaching technology has been widely used, and the in-situ leaching technology has been further developed.

In respect of uranium isotope separation, gas diffusion process is being improved and reformed. In addition, efforts has been focused on research and development of centrifugal technology; and the micro separation test by means of atomic laser facility has been finished, which marks a new stage for the research of this technology in China.

In respect of nuclear fuel assembly manufacture, under the policy of "Self-supply of nuclear fuels", the fuel assemblies were provided for the first core of the Qinshan NPP, and the assemblies for the first refueling are being manufactured. The production line is now being reformed using foreign advanced technology. When reformed, this line will reach the world level of the late 1980s. The assemblies will be provided for refueling of Daya Bay NPP by the end of 1994, which marks the localization of nuclear fuel assemblies of large-scale commercial nuclear power reactors. By then, China will become a member of those countries in the world which can produce this kind of fuel assemblies.

The application for construction of a pilot plant for spent fuel reprocessing has been approved by the authorities concerned. This plant is being designed and constructed by stages and the whole plant will be put into operation by the end of this century.

4. Radioactive Waste Management

Safe disposal and effective management of radwastes are regarded not only as a major subject associated with human health and environmental safety, but also

as one of the restrictive factors in developing nuclear power. China, while developing the nuclear industry and nuclear power, has devoted considerable attention to the management of radwastes, and specific principles are as follows;

- a. All the nuclear facilities are required to minimize their production of radwastes;
- b. Radwaste producers are required to manage their own wastes;
- c. Facilities used for radwaste management shall be designed, constructed, and operated simultaneously with production facilities in the primary process;
- d. Radwastes shall be categorized in management;
- e. The national standards on releasing the radwastes into the environment shall be strictly implemented; and
- f. Using the latest technology, radwastes shall be transformed into various solidified products for appropriate disposal, subject to being monitored and managed under long-term control.

The control system for radioactive wastes is implemented by two levels—the State and the province; the NEPA as the top authorities carries out the overall supervision on various nuclear facilities.

Disposal principles for different radwastes are as follows;

- a. For low- and intermediate-level solidified wastes, in-situ temporary storage facilities and regional repositories are planned to be constructed in the north-west, southwest, east, and south of China. Following geological survey and feasibility study, the northwest repository will be constructed recently and put into operation in the mid 1990s with a disposal capacity of 60,000 m³ for the first phase of the project, and 200,000 m³, for the second phase of the project. Efforts are being made for preselection of the other three disposal sites.
- b. For high-level wastes, concentrated deep geological disposal is adopted and “Deep geological disposal program” has been prepared. At present, efforts are being focused on fundamental researches.

Since the principles for management of radwastes are clearly defined together with the effective measures, the safety of nuclear facilities is ensured and the general public gain confidence in the development of nuclear power in China,

creating a sound prerequisite for developing nuclear power undertakings.

5. International Cooperation and Peaceful Uses of Nuclear Energy

Promoting the peaceful uses of nuclear energy throughout the world for the benefit of mankind is one of the objectives set forth in the Statute of the IAEA. One of the major tasks in China's nuclear industry is extensively developing international cooperation to promote peaceful uses of nuclear energy and nuclear techniques.

Since 1980s, under the guidance of the reforming and opening policy, China has developed extensive cooperation with many countries. In the course of design and construction of the Qinshan NPP, advisory opinions were acquired from foreign experts and some of the major equipment, imported. Daya Bay NPP is constructed by joint venture with Hong Kong, importing foreign equipment and technology. The principle of "Relying mainly on our own efforts while cooperating with foreign countries" shall be followed in construction of the second phase of Qinshan Project, joint design for example. In manufacture of nuclear fuel assemblies, foreign technology shall be introduced to backfit the existing production line, etc. The cooperation inevitably benefits us to fully control of nuclear power technology and further promote the development of nuclear power construction.

In 1990s, the width and depth in international cooperation shall be greatly increased. Some of the untouched cooperative scope and forms before are now open for discussion, including construction of nuclear power plant by joint investment and joint development of new-type reactors and spent fuel reprocessing technology for power reactors. Under the circumstances the nuclear power industry will be developed steadily, which shall undoubtedly provide a broad prospect for cooperation in the field of nuclear technology.

While introducing foreign investment, equipment, and technology, improving its technic level and construction capability in nuclear power development, China is ready to play an active role in the world market for the sake of promoting peaceful uses of nuclear energy and nuclear technology in the world. Now China's nuclear industry, developed on the basis of self-reliance, is in a position to export nuclear power plant and research reactors. China's technology and experience fairly meet the needs of the developing countries;

following the principle of "Equality, mutual benefit and common development", China is willing to cooperate with the third world countries and regions in the field of nuclear energy and nuclear technology for peaceful purposes.

To date, China has concluded inter-governmental agreements with 12 countries on the cooperation of peaceful uses of nuclear energy, and has established relations of exchange and cooperation with many countries and regions. On the basis of independence, self-reliance, equality, and mutual benefit, China wishes to carry out active cooperation with foreign countries in science & technology, economy & trade, and continue to make its due contributions to the prosperity and development of nuclear undertakings in the world.

Thank you.