

No. S-14-94

REMARKS BY IVAN SELIN
CHAIRMAN, U.S. NUCLEAR REGULATORY COMMISSION
BEFORE THE
AMERICAN CHAMBER OF COMMERCE
TOKYO, JAPAN
JULY 26, 1994

INTERNATIONAL NUCLEAR SAFETY

INTRODUCTION

I am very pleased to be here today to discuss with you nuclear safety in the rapidly developing Pacific Rim countries. Asia, as one of the fastest-growing markets for energy, will increasingly determine the shape and size of world energy demand. Energy demand in many of these countries is expected to triple over the next 30 years, fueling a worldwide increase of energy consumption of almost 100%. By 2010, the share of total energy consumption accounted for by developing countries will have climbed from 27% to 40%, while the share of rich countries will have fallen below 50% for the first time in the industrial era. Over the next 25 years, it is estimated that more electrical generating capacity will be built world-wide than was built during the previous century.

Not only is the world's overall electricity production increasing at a tremendous rate, but nuclear power's share of the total is also expected to edge up. Given the rapid pace of economic and energy development in this part of the world, a large share of the world's nuclear development will occur right here in the Pacific Rim.

As many of Japan's neighbors begin or expand nuclear energy programs, it is vital that they look to the mature nuclear societies not only for commercial support, but for regulatory support as well. The international community has a clear responsibility to cooperate with these countries to ensure that nuclear power is developed safely from the start. The world has learned from the Three Mile Island and the Chernobyl accidents that it is both cheaper and safer to build the necessary safety infrastructure from the beginning. And by furthering a nuclear culture in which safety is a high priority in the decision-making

process, mature nuclear societies can greatly impact the safety of nuclear power in developing countries.

My visit this month will be my fourth to the Pacific Rim as U.S. Nuclear Regulatory Commission (NRC) Chairman. With each visit, I am more impressed with the swift economic development that I see in places such as China, Korea, Indonesia, and Taiwan, to name just a few. And this growth will require energy to sustain its pace.

THE U.S. NUCLEAR PROGRAM

I'd like to stress that the U.S. has not abandoned nuclear power as a viable option for future energy needs, as some would suggest. On the contrary, the U.S. nuclear program is alive and well. Nuclear power now generates about 22% of our domestic electricity -- more than double the contribution from nuclear power in 1975. The U.S. produces more nuclear-generated electricity than anyone else -- in fact, almost one-third of the world's nuclear electricity. And with 2,000 reactor-years of experience, the U.S. has more nuclear experience than any other country. New plant construction is relatively quiet in the U.S. while new construction in other parts of the world is quite active, precisely because we have already undergone this growth within the past few decades and do not yet have an increased need for baseload power. And it appears that our plant life extension program, which will help the U.S. continue to reap the full benefit of existing nuclear plants past the original 40-year licensing period, will be a success.

As for new reactors, the U.S. NRC has issued the design approval for one evolutionary standard reactor design -- the General Electric Advanced Boiling Water Reactor -- and is about to issue another -- for the ABB-Combustion Engineering System 80+. Our review of the even newer generation of nuclear power plants is also well along. These novel designs employ passive safety features and modular construction. These features should make the reactors easier to construct and to operate, while retaining economic competitiveness. The NRC-certified designs for the passive reactors, achieved after an exhaustive analytic and experimental review process, should be available later in this decade, well in time for programs which are considering using these designs.

As for nuclear power in the U.S., the overall outlook depends primarily on timing of future baseload demand and on the economic competitiveness of nuclear power, not on government action. In other words, the issue is one essentially of economics -- there are no insuperable safety, regulatory, political, or environmental obstacles to new nuclear power plants

in the U.S. We believe that this is as it should be -- that economics should determine the choices.

JAPANESE NUCLEAR POWER PROGRAM

Japan's nuclear power program is one of the best in the world. I know that most of you are very familiar with Japan's program, but I think it is worth mentioning some of the ingredients that have made the program so successful. Key factors contributing to Japan's success can be broken down to basically five elements: Japan's long-term national commitment to nuclear power, large investments in research and development, creation and support of academic programs to provide trained personnel, aggressive international cooperation and information exchange, and a favorable operating environment for utilities. These elements have resulted in an excellent nuclear program with 48 reactors operating at 17 sites, providing over 30% of the nation's electricity. And although Japan is grappling with an issue that all mature nuclear nations must deal with, that is, the location of new sites, Japan still plans to almost double its nuclear generating capacity by 2010. What I'd like to point out is that the steps that Japan took to make nuclear power successful are the same steps that any country developing nuclear power must take. There are no shortcuts. That might not always be a welcome message in developing countries, but it is an essential message nonetheless.

COOPERATION NOT COMPETITION

I'd like to expand on one of the elements that has made Japan's nuclear program so successful: international cooperation. Nuclear technology is no longer produced by autocratic and separate national industries, it has evolved into almost a single international network of science and technology, with national variations. Even the manufacture of nuclear plants is not a purely national matter. The two American bids on the Lungmen project in Taiwan, one with a Japanese subcontractor and one with a British subcontractor, vividly illustrates this point. Another illustration is the contribution that U.S. technology has made to Japan's nuclear industry. Japan has benefitted greatly by this technology transfer; in fact, all of Japan's LWRs are built based on designs originally licensed in the U.S. And it is important that we continue this tradition of cooperation, and guard against chauvinism and protectionism. Respecting differences in our nation's nuclear strategies and cooperating where there is common ground will serve to benefit everyone. Only then will attention be focused in areas in which we can mutually gain, benefitting not only our individual countries, but the international nuclear community as well.

U.S. COOPERATION WITH JAPAN

Japan is one of NRC's most active partners in nuclear safety cooperation, which includes cooperative research as well as information exchanges on regulatory programs, exchanges of personnel, and training. Because nuclear regulatory responsibilities are split between two Japanese government agencies, NRC has regulatory information exchange agreements with both the Ministry of International Trade and Industry (MITI) and the Science and Technology Agency (STA). Since 1982, there has been the exchange of regulatory personnel between NRC, MITI, and STA which has contributed to daily dialog on safety matters. NRC also has extensive research agreements with several Japanese agencies [ANRE, NUPEC, and JAERI]. In fact, Japanese research institutions are playing a significant role in conducting confirmation research for NRC on passive-safety system performance.

INTERNATIONAL REGULATORY COOPERATION

In addition to cooperating in science and technology, it is even more important that all the nuclear economies of the world cooperate in regulatory and safety matters. As nuclear energy takes hold in developing countries around the world, we can not afford to let the history of nuclear development in the Former Soviet Union and Eastern Europe repeat itself.

One of the lessons the world has learned is that the safe use of nuclear energy depends on many factors. Economic, scientific, industrial, institutional and legal elements must all be integrated to achieve high levels of safety. One of the most important of these elements is a nuclear safety culture derived from certain fundamental principles that are applicable worldwide. To prove this point, one only has to compare safety history in the OECD countries with corollary developments in the Former Soviet Union and Eastern Europe. This comparison will show that one key difference is the role a strong, independent regulatory authority has been able to play in monitoring the nuclear industry's commitment to safety.

With specific regard to the regulatory dimension, four principles are especially important in establishing and maintaining an adequate nuclear safety culture.

First, every nuclear nation must provide a firm legal foundation for a strong and independent regulatory authority to monitor and enforce high levels of safety. Where regulators do not have the independence or political authority to carry out their job effectively, when there is no effective oversight body with the power to close down nuclear power plants for safety violations, there will be a tendency to cut corners to produce needed power as cheaply as possible.

Second, no amount of regulatory authority is going to be effective if the regulator does not have the necessary resources at its disposal. This means a well-trained and adequately paid staff to perform on-site inspections, review plants at all stages from design to decommissioning, and analyze errors to improve operations in the future. And, as Japan is well aware, it also means a confirmatory research capability.

Third, both the industry and the regulators must apply rigorous nuclear standards such as the principles developed for the International Nuclear Safety Convention, which is expected to be signed in September of this year. And for the Convention to be effective, it is important that we encourage newly developing countries and nations with weaker regulatory systems to participate fully and openly.

Fourth, by national law or international commitment, a state must put into place legal and financial protection arrangements to provide adequate compensation for damage in the event of a nuclear accident, while setting appropriate limits on third party liability. Such protection holds both the nation and the power plant operators accountable for protecting the public health and safety.

Where these principles have been adhered to, a culture of safety has permeated both operations and management, and this has produced a successful nuclear industry. Where these principles have *not* been followed, the goal of electricity production has led operators to override safety objectives when the two came into conflict.

NUCLEAR POWER IN CHINA

Given Japan's proximity to the Peoples Republic of China, I'm sure that China's nuclear program is being watched closely. During the past two years, China has placed three nuclear power plants into operation -- two 900-MW PWRs of French design at Daya Bay, and one 300-MW PWR unit of indigenous design at Qinshan -- and is already planning several additional reactors, including four 600-MW PWRs at Qinshan, and four additional 900 MWe units for the Daya Bay area. There are even discussions underway with Russia for construction of two VVER-1000 units. And China's plans for the future are ambitious. By 2000, China expects to have 10,000 megawatts operational or under construction and China plans to install 150,000 megawatts of nuclear power by 2050. China's plans, if followed through, would result in one of the largest nuclear programs on earth.

China is well aware that extensive foreign capital is necessary for almost any large-scale expansion of electricity in a developing country. Since foreigners will not invest in the

industry if safety isn't well established, a strong regulatory program is important for the sake of attracting capital as well as for safety. And China is clearly taking nuclear safety very seriously.

At China's invitation, the IAEA recently conducted a review of nuclear regulatory system. The review team found that China's regulatory system corresponds to those in use worldwide and that its program meets international guidelines. This is very encouraging. As the production side of China's nuclear program expands, however, China will need to ensure that its regulatory capability does not lag behind. As China's nuclear program matures, there are four issues that I see becoming increasingly important: regulatory resources and authority, design standardization, transparency, and coordination of emergency preparedness.

Resources and Authority One key resource in any regulatory program is an adequate number of well trained and highly competent staff. As the number of nuclear plants multiplies, China's National Nuclear Safety Administration (NNSA) will need greater numbers of personnel to be able to keep up in any meaningful way. One very critical element affecting the NNSA's ability to attract and retain talented staff is salary. To ensure retention of competent staff, it is crucial that China set salary levels for its regulatory staff at a level comparable to industry salaries. Otherwise, NNSA will not be able to retain the type of experience and talent so necessary to any effective regulatory program. Another key issue affecting NNSA's ability to carry out its mandate of nuclear safety is the amount of independence and authority it is granted. If NNSA does not have the final authority on whether to license a nuclear reactor or to close a reactor for safety violations, its effectiveness will be severely limited.

Standard Reactor Designs Another lesson learned by the U.S. is the efficiency that can be achieved by limiting the construction of nuclear plants to a few standard reactor designs. As a nation with 41 nuclear utility companies and 109 individual reactor designs, the U.S. knows first-hand the resources required to regulate effectively a large number of reactor types. For China to be able to maintain an adequate base of knowledge and confirmatory research capability, it is imperative that it limit plant construction to just a few standard reactor designs. Otherwise, the technical difficulty and expense required to regulate the industry effectively will be unnecessarily increased, severely undercutting the productiveness of its regulatory program.

Transparency A third issue central to nuclear safety, commonly referred to as transparency, is the reporting of all

nuclear incidents to the appropriate international oversight organizations. The number of incidents, even minor, is one of the best objective indicators of the state of a nation's nuclear safety. Without such data, there is no way to objectively gauge the level of safety performance of the reactors. Not only is the public entitled to this information, but investors need this information to help determine if their investment is safe and secure.

Emergency Preparedness And lastly, coordination of emergency preparedness is critical to any serious nuclear safety program. Emergency planning and response during the early phase of an accident are particularly important for plants in highly populated areas and for plants near international borders. The IAEA review team did note that China needs to strengthen its emergency preparedness program and stressed that the NNSA should play a more active role in the decision-making process. This is clearly an area that China will need to devote additional attention and resources to.

Chinese authorities are well aware of these considerations; in fact they have actively sought help from the NRC and from Japan's Ministry of International Trade and Industry (MITI) to meet these issues straight on.

U.S. COOPERATION WITH CHINA

Recognizing the increasingly significant role that nuclear power is playing in China's energy mix, the NRC has been very active in furthering nuclear safety there. The U.S. and China have a strong history of cooperation in the nuclear safety area. In January 1993 I visited the People's Republic and renewed the NRC-Chinese NNSA Protocol on Nuclear Safety Matters which was signed in 1981 and renewed in 1986. Through this protocol, NRC and the NNSA exchange nuclear safety information on the design, construction, and operation of nuclear power plants. This renewal was particularly timely for China's first nuclear power plant, the 300 MW(e) PWR at Qinshan commissioned in December 1991. NRC has provided technical lectures on power reactor, radiation protection, and nuclear material safety, and safety advice to NNSA to assist in their safety reviews and evaluation of the Qinshan and Daya Bay nuclear power stations. In 1993 there were two high level Chinese visits to U.S. nuclear power plants, with a particular focus on emergency preparedness techniques and procedures. In addition to my own visit in 1993, other NRC Commissioners have visited China for in-depth reviews of China's nuclear power program. And I will be returning to Guangzhou and Beijing in just a few days to meet with top energy officials. The NRC is strongly committed to working with our Chinese regulatory counterparts to develop a strong, independent, adequately staffed and funded regulatory regime.

CONCLUSION

In conclusion, I wish to emphasize that international nuclear safety will be achieved not through competition, but through cooperation. Competition needs to be confined to where it legitimately belongs: an unbiased comparison of available nuclear designs and products. Competition through unfavorable comparisons of various national nuclear programs, however, will only serve to bring out prejudices against nuclear energy and ultimately undermine confidence in nuclear power. In the end, this is a tremendous disservice which benefits no one. Only through cooperation can the mature nuclear economies achieve what we all are striving for: a healthy international nuclear economy and safety culture which fosters the safe development of nuclear power.