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INTERNATIONAL NUCLEAR CONFERENCE INC '97
A New Era in Nuclear Science and Technology - The Challenge of the 21st Century

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The Honorable Datuk Law Hieng Ding, Dr. Rashid, distinguished representatives from Japan and other countries, ladies and gentlemen. I am very please to be here as a representative of the American Nuclear Society and participate in this important conference. I bring you the best wishes of ANS President Stanley Hatcher and the officers and members of of our Society and we thank you, the Malaysian Nuclear Society, and MINT for inviting us to this event.

The American Nuclear Society is an international, not-for-profit, scientific, and educational society. Its more than 13,000 members are specialist in nuclear science and technology and include scientists, engineers, physicians, economists, policy makers, and educators. Our headquarters is in Chicago, Illinois and we have more than 50 local sections and student branches in the U.S. and 9 international sections. For more than 40 years we have supported the application of nuclear science and technology for the generation of electric power as well as for medical treatment and diagnosis, food irradiation, industrial measurements, and a myriad of other application. The United States is recognized as one of the leaders in developing this technology and through ANS, we have openly shared our experiences and successes with countries all over the world. It is an honor and a pleasure to be co-sponsor of this conference with the Malaysian Nuclear Society and the Institute for Nuclear Technology Research.

It is particularly fitting this conference has the dual title: New Era in Science and Technology: The Challenge of the 21st Century. Indeed it is in this part of the world that nuclear technology is making the most rapid and effective progress and will dramatically contribute to a new era of social progress and increased standards of living. Nuclear technology can offer the world limitless amounts of clean, economical, environmentally-benign electricity. It can also offer methods for medical diagnoses and treatments to save lives; provide a way to preserve our food supply and prevent foodborne diseases; provide accurate industrial measurements, leak detectors , and corrosion measurements; and literally hundreds of other applications. The challenge is to use this technology wisely and make sure the public understands that, while there are problems and difficulties commensurate with this technology (as there would be with any other technology), these problems can be solved and enormous benefits to humanity accrue when they are solved. It is worth the effort and one must have the courage and wisdom to proceed.

After a rapid start, the United States has experienced a serious downturn in the construction of nuclear power plants. The reasons for this have been extensively reviewed by economists and scientists throughout the world and I will not go into that subject at this time. There is now a perception among many people that nuclear technology in general has been a failure and should be phased out. Quick judgements are made by the media and the public who exploit the negative aspects. When the media reports on other technologies, the lead sentences convey hope and promise, but with nuclear technology, it is usually fear and concern. The fact that a nuclear power plant has operated successfully for more than 25 years in over-shadowed by disagreement on where to store its waste. The remarkable success of nuclear medicine is lost in the argument as to how to dispose of the carton an isotope was packaged in. Efforts to encourage the use of ionizing radiation to protect our food supply have been stymied because of lack of public understanding and government support. This is the challenge that must be faced by those countries entering the era of new technology. It is also an opportunity to avoid mistakes made in the United States and Europe in the implementation of nuclear technology applications. It is an opportunity for countries needed before embarking on major activities. Never underestimate the need for advance explanations. It is easier for the public to understand what this technology is all about at the beginning rather than after a major program has begun.

Although there are no new orders for plants, the nuclear electric power program in the United States was certainly not a failure. We have 109 operating nuclear power plants, representing about 23 percent of the Nation's electricity production. This incidentally is almost exactly equal to the amount of electricity produced by oil-fired plants prior to 1960. So even if we can only point to the fact that we have displaced oil in the generation of electricity, that alone is a success. Our nuclear power plants are among the safest in the world. There has been only one major accident in the United States and that caused no loss of life or private property. The plants operating today are continuously improving in efficiency and reliability and perhaps more importantly, making a significant contribution to reducing CO₂ released into the atmosphere. This is extremely important since later this year representatives from most of the industrialized nations will meet in Japan to discuss global warming. Some have suggested we reduce our energy consumption to halt the introduction of CO₂. All studies done by responsible bodies worldwide indicate the world of the future will need every available energy source to meet burgeoning energy demands caused by population growth and societal progress. The United States has a number of options from which to choose and at present there is an ample supply of natural gas to provide fuel for electric power generation. This is not true in other parts of the world and will not always be true in the United States. ANS believes it is important to maintain nuclear power as an option for electric power generation and preserve nuclear technology and its many applications.

In the absence of a major nuclear power program in the United States, ANS is concentrating on many of its applications. It is very clear nuclear technology, in addition to its very important humanitarian benefits, also contributes significantly to the U.S. economy. In 1992 radioactive materials in the United States were responsible for almost \$300 billion in total industry sales, 3.7 million jobs, and \$11 billion in corporate profits -- not counting the billions in tax revenues to state and local governments. An analysis made by the Nuclear Energy Institute in Washington, DC has shown that the use of radioactive materials in industry are increasing almost exponentially and contributing to public safety, increased productivity, and social welfare. Some examples of industrial uses are: detecting pipe leaks, determining corrosion wear, precise measuring, thickness gauges, density gauges, smoke detection, runway and exit markers, and rubber and plastics manufacture. In the medical field the use of radioactive materials to save lives is commonplace and 15 million nuclear medicine procedures are done annually. Diagnosing illness and disease with radioactive tracers not only eliminates most surgery, but reduces medical costs and hospital stays. Medical and surgical products are irradiated to insure absolute sterility, including such items as in-vitro transfer capsules. In agriculture, radioactive materials can be used to reduce the need for chemicals for weed control, speed the cross-breeding of improved crops, and help develop optimum watering paths. Insect and pesticide control by irradiation is far less damaging to the environment than using chemicals. In fact, the use of radioactive materials in pollution abatement and environmental research is increasing rapidly. They are also used in animal husbandry to improve body weight and reproductive cycles. An area, which I am particularly interested in, is food irradiation. This technology not only can increase the world's food supply by preventing spoilage, but will also help ensure the safety of our food and reduce foodborne illness and death. Later in this conference I will present a paper on the status of food irradiation in the U.S., but it is sufficient to say at this point that is an extremely important application of nuclear technology, and one whose time has come.

Despite this, we face a dual problem in the U.S. that will need the cooperation and help from the rest of the world to solve. The demise of nuclear power has led to a serious reduction in federal funding for nuclear education. Many universities and higher learning institutions no longer offer nuclear courses as part of their curricula and research in this field is no longer funded. Large corporations that once supported employee education in the nuclear field, no longer can afford such activities. Where the U.S. traditionally led in the advancement of nuclear science, we may now have to rely on the rest of the world. At a recent meeting in Washington, DC, the Honorable Koji Omi, ranking member of the Commerce Committee of Japan's National Diet, gave a presentation of his country's future plans for the development of science and technology. He indicated that because so many of Japan's population are living longer and leaving the productive work force, technical innovations will be the only way to support continued high living standards. He stated that Japan is unequivocally dedicated to using nuclear

technology and they are beginning to increase research and development in that area. Other countries, especially those of the Pacific Rim, are reaching the same conclusion that efforts to utilize the power of the atom are entirely worthwhile and will bear fruit for many years in the future. This is good news, for it will require worldwide effort to bring this technology to its fullest potential.

We in the United States will continue to work on advancing nuclear technology through research and development, and we will observe with great interest progress in nuclear power throughout the world. We are very much occupied with the important task of cleaning up the various sites and facilities used for weapons production in the 1940s and 50s. We are working diligently in the construction of permanent spent fuel storage facilities and associated transportation and handling facilities. We are also investigating ways and means of converting plutonium to commercial reactor fuel. These are all necessary and important tasks, but in order to provide enough energy to meet the needs of an ever increasing world population, nuclear power must remain a viable option.

In conclusion, my compliments on this excellent conference and I wish you success in your endeavors to meet the challenges of the 21st century. Thank you!