Knowledge Management Challenges
To Assure Sustainable Development of Nuclear Energy Utilization[1]

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Thank you Mr. Chairman, ladies and gentlemen, this morning, I would like to talk about two challenges, the challenge the global nuclear community faces and the knowledge management challenge the Japanese nuclear community is confronted with in pursing its goal.

The first, the challenge the global nuclear community faces. As the world seeks to increase its energy supplies to sustain its continued economic growth, while responsibly addressing greenhouse gas emission, nuclear power will play a much greater and more significant role than ever, but still with substantial uncertainty.

At this juncture, the global nuclear community should energetically confront various challenges to secure public confidence in nuclear energy, as the public opinion is the key to start and or expand the utilization of nuclear energy in any country.

To do so, it is essential to foster mutual understanding with the public that nuclear energy has desirable characteristics in the three dimensions of sustainable development; economy, environment and society.

Important characteristics in the dimension of economy in this respect are competitive energy production cost and its stability of supply. Those in the dimension of environment are low human health impact, small volume of waste production and rarity of severe accidents that contaminate the land on a large scale; and those in the dimension of society are low neighbor disturbance, low risk of nuclear proliferation and long-term safety of radioactive waste disposal.

To foster such understanding, however, the global nuclear community should, a) actually demonstrate that nuclear power plants and its fuel cycle facilities have, as a system, the aforementioned characteristics, and b) sustain its competitive position among various energy technologies over time by incessantly promoting research and development of the technology.

Last but not-least, as the devil is in the details, it is important for each and every plant operator and organization of the global nuclear community to continue to operate plants and facilities as promised, maintain relevant infrastructure needed to have nuclear power program, and incessantly performing business risk assessment for the assurance

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of their commitment to the society, utilizing peer review processes provided by the IAEA, WANO, and others.

Needless to say, these actions should be promoted under strong integrated management, in which knowledge management has an important responsibility in diverse issues, ranging from human resource development to organizational development for innovation and learning to make a knowledgeable decision.

To do so is a challenge for organizations that promote nuclear energy utilization; it is a challenge for a nation that pursues nuclear energy utilization, and a challenge for the world that needs nuclear energy.

The Japan Atomic Energy Commission is keen to the above-mentioned challenges or three-tier structure of actions needed to secure public confidence in nuclear energy utilization. At the same time, the Commission recognizes it important to reflect into its nuclear energy policy strategy, the prospect of societal situation in the early part of this century, which will be different from the situation in the past. The points to be considered are, among others;

(1) In progress is an aging society with fewer children and a foreseeable decrease in population: The growth of demand for energy and electricity will decelerate and eventually stagnate, though the stagnation of electricity demand growth will come later:
(2) The retirement of a large number of skilled labors and engineers who were hired in the years of construction boom has started.
(3) Construction of nuclear power plants has become bare a few sites and major works have been moving to the operation and maintenance of the existing nuclear power plants;
(4) The public and private investment in research and development of nuclear energy has been declining in recent years due to the stagnated nuclear business environment in this country.
(5) The public fear and concern about exposures to hazards have increased along with a corresponding demand for information so that the public can have a sense of security.

The Commission aims at making the share of nuclear power in electricity generation after the year 2030 similar to or greater than the current level of 30 to 40 %, and asks the Government and industries to take actions across three different time frames; short-term, medium-term and long-term, to achieve this objective under the recognition of such prospect of business environment in the future.

The Commission recognizes that knowledge management is an important cross-cutting issue for these actions, and considers it knowledge management challenge at energy policy level to facilitate knowledge proliferation among the public for awareness and learning about nuclear energy, including risk and benefit of nuclear energy. As decisions affecting many people or the entire society should be made with public involvement as much as possible, we are asking the Government that energetic literacy of people should

be cultivated so that the public can make informed decisions on matters affect, or are affected by, energy.

Contributors to energetic literacy are formal education, informal education, and involvement of the public into decision making. As for formal education, the Commission is expecting that the Government agencies that set education policy would encourage the integration of energy content into curricula and instructional materials in various subject areas, at least introducing, where appropriate, the word “energy” into their titles and contents, and improve guidance for primary, middle, and senior schools, regarding energy including radiation and nuclear energy as appropriate., by requesting guidance in the sciences, history, social studies etc. to stress their connection with these subjects.

Informal settings for the public to learn about energy are diverse: they are museums; science and technology centers; meetings and seminars provided by universities, research centers, the Government, and non-profit organizations (NPOs); and materials in print, online, and in the broadcast media. Therefore the Commission is asking that the Government should fund science museums and nuclear research facilities to enrich opportunities for the public to learn about energy through experiences in these settings, and hold meetings and seminars as well as provide fund for NPOs to hold them with a view to increase opportunities for the public to learn about issues related to energy including nuclear energy.

Knowledge management challenges in the action to demonstrate the soundness of nuclear energy systems through their realization are diverse. Needless to say, research and development organizations and design, construction and operation organizations should incessantly make efforts to innovate the practices to identify, create, represent, and distribute knowledge for attaining their missions.

In addition, these organizations are required to sustain a world-class nuclear science and engineering research and development workforce in spite of the future social condition mentioned before. It was along this line of thinking that the AEC recommended the following actions to the organizations involved in the management of the research and development of fast reactor and its fuel cycle technologies:

(1) The Government and R&D organizations should consider and realize systems for knowledge management within the Government and industry, including knowledge and information infrastructures that make it possible to effectively transfer and utilize the knowledge and experience accumulated through R&D activities for the commercialization of the technologies.
(2) They should develop, in particular, a system for nurturing capability for plant engineering including that to compile performance and structure specifications of plants and their components, understanding that such capability will be developed to the levels that enable the industry to participate in the market, mainly through repetition of design and evaluation activities. Recent establishment of FBR development company MFBR is an action taken by the JAEA in response to this recommendation.

(3) International R&D cooperation programs should be proactively worked out and promoted as they could not only reduce R&D risks and costs but also bring opportunity to produce technologies of global-standard.

(4) As the FBR cycle technologies development program is a long-term one, they should organize personnel exchanges between industry, R&D organizations and universities in order to develop and secure manpower that will undertake these activities in the future.

Finally I would like to discuss the knowledge management challenge in operating organization. The first is human resource development. Generally speaking, staff entering the operating organization is to undergo in-house education and training beyond graduation, to improve their specific knowledge of operating systems. The challenges here are a) how to recruit highly motivated graduates of higher education systems, and b) how to maintain their motivation to make progress in something good for the organization.

Innovation of activities in the organization for higher education is a challenge in this category and nuclear engineering courses in universities have special roles of passing-on the nuclear science and engineering heritage to the young generation and sustaining the work force for these activities.

As for cultivating motivation, we think it essential that employees can feel that their activity is meaningful in some way. This is the reason why the Commission said in the Framework for Nuclear Energy Policy that it is crucial that the nuclear facility and work place be vigorous and engaging, realizing a system where new approaches can be tested on the premise of safety assurance, so as not to discourage creative efforts in the work place, in view of implementing activities on the basis of the most up-to-date knowledge.

Before closing, I would like to touch upon the knowledge management requirement for business risk management. Risk is unavoidable and every organization needs risk management activities to make sure that their business risk can be justified in comparison with a level which is tolerable.

In light of the public nature of nuclear energy-related business, the Commission considers it essential that the private sector enhances business risk management activities to control the damage from the occurrence of unexpected events, and lead the risk management strategy of the organization from the top and embed it in the normal working routines and activities of the organization.

The issue here is the leadership of the top management in grasping the extent to which the licensing basis remains valid and the adequacy of the arrangements that are in place to be able to continue the business in view of new development of science and technology as well as the claim that the island of Japan is going into a earthquake prone period and the destructive power of natural phenomena is increasing due to the progress in global warming, making realistic analysis of the present status and future prospect of plant and facilities and workforce.

In conclusion, the global nuclear community faces various challenges, including those to gain public support, maintain the competitive advantages and increase effectiveness of operation. The community should energetically confront these challenges, establishing and sustaining effective leaderships and management. There are a number of claims or motivations in the action plan for this purpose, leading to organizations undertaking a knowledge management effectively and efficiently. The Atomic Energy Commission of Japan will continue asking to promote quality work for accomplishing the strategic policy goal, paying due attention to the soundness of knowledge management activities of organizations involved from the viewpoint of emerging new social environment.