

Leading the Way into the “FBR Cycle” Age

Interview with New JAEA President Toshio Okazaki

— *The Japan Atomic Energy Agency (JAEA) is a nuclear R&D organization whose comprehensive work ranges from the applications of radiation to nuclear fusion. This year will see the curtain raised on the realization of the nuclear fuel cycle, marking the start of a new epoch in the use of nuclear energy. Could you please comment on that?*



JAEA Pres. Okazaki

Okazaki: Under the leadership of former President Yuichi Tonozuka, JAEA got off to a strong start three and a half years ago. During that time, energy and environmental issues have caused the world to take a fresh look at the roles and

responsibilities of nuclear power, resulting in a new, positive understanding. As a result, we are witnessing a global nuclear renaissance – a new age, so to speak. Japan, specifically, has clearly outlined a national policy in which nuclear energy is to be a major power source throughout this century, accounting for at least 30-40% of total power generation.

From now on, the establishment of the nuclear fuel cycle will be an issue of utmost importance. In January, I visited the Rokkasho Reprocessing Plant of Japan Nuclear Fuel Ltd. (JNFL), which will begin start operation later this year. Among other things, that will be a major step forward in establishing the light water reactor (LWR) cycle, focused on spent fuel reprocessing and the program to use the plutonium-uranium mixed oxide (MOX) fuel. JAEA is cooperating and wants to make any contribution it can.

That alone, however, does not mark the final completion of the fuel cycle, as the fast breeder reactor (FBR) cycle – the ultimate use of nuclear energy – still lies ahead. Not only is commercialization of that technology a clear commitment in the Fundamental Principles for the Nuclear Policy Program and the official “Plan to Make Japan a Nuclear Energy Powerhouse,” but FBRs have also been identified as a key national technology – i.e., one of the important technologies affecting the survival of the nation – in the Third-phase Science and Technology Basic Plan. JAEA will play the central role in the realization and smooth transition from the LWR cycle to the FBR cycle.

— *Tell us, please, about the outlook and key points toward realizing the FBR cycle.*

Okazaki: One point toward realizing the FBR cycle is to resume operations at the prototype FBR reactor “Monju,” the operation of which has been suspended for more than a decade following a trouble, and establish the sodium-use technology, which can then be presented to society so as to gain the confidence and support of the people. Fortunately, the refurbishing and updating work at Monju, once it began, has made good progress. Taking the utmost care – with safety first – we are hoping to be able to resume operations as early as next year. At the same time, JAEA has, with the cooperation of the electric power companies and manufacturers, been investigating and researching a strategy for commercializing the FBR cycle, and will start technological development this year toward such commercialization.

That represents a significant move forward from the original target of 2050 for a

commercial system. To make it possible, a demonstration facility should be built by 2025 at the earliest. Establishing the technology to commercialize the FBR cycle will be the biggest task for JAEA in the coming five to ten years. At the end of 2006, the so-called five-party conference on a smooth shift to the FBR cycle demonstration process decided on a system of responsibility. In that system, a nucleus manufacturer will be designated and/or created, and the results of all other investigations and research to date will be combined and integrated at that manufacturer, enabling the other manufacturers responsible for the actual working sites to proceed steadily toward commercialization, just as R&D organizations will. We at JAEA are now working on selecting such a manufacturer, and want to realize the system in FY2007 (starting April 1, 2007), if possible. In doing so, we must understand that FBR cycle development will not be achieved unless the electric power utilities, manufacturers, the Ministry of Economy, Trade and Industry (METI), and the Ministry of Education, Culture, Sports, Science and Technology (MEXT) are united in their devotion and commitment of effort. JAEA will play the central role in promoting that understanding.

When the Atomic Energy Basic Law was enacted 50 years ago and Japan commenced R&D on the peaceful uses of nuclear power, the three pillars of industry, government and academia were perfectly unified as one, and made an enthusiastic start. Their shared awareness declined, however, as time went on, and distance grew between the parties. That is what we should reflect on and rectify now. As we approach the new age of the fuel cycle, we must draw ourselves together again, and meet the challenges as a nation. In the face of looming international competition, there can be no future for nuclear technology without cooperation among those three pillars. I expect the Japan Atomic Industrial Forum (JAIF) to be the cornerstone of that cooperation.

— Would you explain about international efforts for FBR cycle development, and the role of JAEA as a Center of Excellence (COE)?

Okazaki: FBR development has been on the front burner for the past few years, not only in Japan, but as an international cooperative project. The Generation IV International Forum (GIF), an organization set up to develop the next generation of nuclear energy systems, is a typical example in its focus on FBR development. Last year, France - the main force behind GIF - announced a policy of promoting FBR development. Even the United States, after abandoning reprocessing and FBR development for almost 30 years, has clearly set out a new policy direction with the Global Nuclear Energy Partnership (GNEP). The future FBR system that Japan is now working on is consistent with the direction of various international efforts. Our country is proceeding with the awareness that it should, in cooperation with the U.S., France and so on, take the lead in international nuclear development based on its accumulated knowledge, technology and experience, and in that way make an important contribution.

Beyond the fact that the aims of Japan and of the international community in terms of FBR development are consistent, the development of technology to commercialize the FBR is extremely expensive and requires vast human resources. From that point of view, overall efficiency in R&D will eventually be improved if Japan were to cooperate internationally and share costs as much as possible. Accordingly, JAEA would be willing to cooperate and participate in GNEP. It expressed that intention and made concrete proposals last September. Last year, MEXT Minister Ibuki visited the U.S, and, at the beginning of this year, METI Minister Amari did so as well, meeting the U.S. Secretary of Energy, and proposing that Japan prepare an action plan for GNEP before April. We will be happy if our proposals are used at that time.

Interviewer: Hidemasa Naka