

Expectations for advanced research and development

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The Japan Atomic Energy Agency (JAEA) has just inaugurated, as of this October, a radical reconstruction. Despite the current controversial situation, I will attempt to look objectively at the principal trends of nuclear research and development in this country. This must inevitably be a responsibility of the JAEA.

Regarding the current use of nuclear energy, light-water power reactor technology has just leapt into its third-generation. As a global trend, in spite of the stagnation among countries where nuclear energy is developed, developing countries have, for various reasons, been increasingly willing to usher nuclear energy into their countries. Turning to nuclear science and technology other than power generation, on the other hand, developments in the use of radiation and quantum beams are anticipated in various fields, especially in the medical sciences. These will be backed by advances in computing technology and the sophistication of science and technology in general. In the midst of the acute situation caused by the accident of the Fukushima Daiichi Nuclear Power Plant, Japan is, however, running against the tide of the world trend.

In such circumstances, the JAEA, as Japan's only comprehensive nuclear science research institute, must make a significant contribution. Operational and administrative inadequacies and problems have, however, prevented JAEA from fulfilling its potentialities.

There seems to be no other option than our commitment to a reconstruction that will remove the obstacles to our ability to act. I would therefore urge all staff of the JAEA to reaffirm the mission of the JAEA and to concentrate on its full realization. The mission of a research and development agency is to perceive, anticipate and prepare to tackle both identified and potential problems, ahead of any other sectors. True to its name, the JAEA should consistently fulfill its role in our society.

The Advanced Science Research Center (ASRC) is a world-class intellectual organization consisting of individuals familiar with potential issues, whose understanding includes how and why such challenges have arisen. They have the ability to find cutting-edge solutions and thereby respond to them on a worldwide scale. In implementing the mission assigned to the JAEA, the ASRC, bearing the most state-of-the-art activities in the institute, is expected to play a leading role.

While speaking of cutting-edge research and development, I immediately recall the preparation of the long-term plan for research and development and utilization of nuclear energy (Nuclear Energy Council) in the JFY* 1987.

"The frontier of the future nuclear research and development" was a primary theme at that time. Sectional meetings (The third sectional committees) were set up to discuss and build a constitutional approach to the theme, and I was appointed to the committee.

I proposed my view of "Research and development frontiers" as dynamic boundaries which lie between the "known" and the "unknown", and the "untouched" and the "developed". Research and development are, in other words, activities whose challenge is to expand the frontiers beyond currently developed area. Although it did not become a conclusion of the committee, I still hold to my policy. In that committee, four themes were decided as pillars for focused development; accelerator technology or quantum beam research, computing technology, materials science technology, and research on radiobiological effects.

I would like the ASRC to continue with its pioneering work. One thing I have pondered for a long time is that, despite the fact that "complexity" and "fractal" are two of the most intellectually attractive fields, I am afraid I have hardly heard of exciting challenges to the fields made by nuclear scientists. At the present time, I wonder what new frontiers we can explore.

*JFY=Japanese Fiscal Year