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Securing and Developing Human Resources for Nuclear Utilization: Initiatives and Prospects

Yoshiaki Oka

Chairman

Japan Atomic Energy Commission



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1. Main initiatives of the Japan Atomic Energy Commission (JAEC)

(1) “Framework for Nuclear Energy Policy” (JAEC, October 11, 2005)

This describes the importance of developing and securing high-quality human resources, which are necessary for supporting efforts to pursue research and development and utilization of nuclear energy while ensuring its safety.

Content relating to human resources in the “Framework for Nuclear Energy Policy”

Chapter2, 2-1. Assurance of Safety

Chapter2, 2-4. Developing and Securing Human Resources

Chapter4, 4-3. Development of the Knowledge and Information Base

Chapter4, 4-4. Establishment of the Japan Atomic Energy Agency and Research and Development of Nuclear Energy

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1. Main initiatives of the Japan Atomic Energy Commission (JAEC)

(2) “Evaluation of Basic Concepts for Initiatives to Develop and Secure Human Resources as Defined in the Framework for Nuclear Energy Policy” (JAEC, August 17, 2010)

This document outlines the expectations of the activities of the “Japan Nuclear Human Resource Development Network” relating to human resource development and associated international cooperation in higher education, as well as the expected efforts of the concerned organizations, in the form of a recommendation. In pursuing these efforts, the concerned organizations are expected to continue to respect these basic concepts.

Recommendations in “Evaluation of Basic Concepts for Initiatives to Develop and Secure Human Resources as Defined in the Framework for Nuclear Energy Policy” (JAEC, August 17, 2010)

- 1) Improving workplace environments
- 2) Developing and securing human resources for the nuclear energy industry
- 3) Improving education in institutes of higher education
- 4) Developing and securing human resources to engage in research and development in universities and R&D institutes
- 5) Developing and securing human resources capable of working actively in international settings
- 6) International cooperation in human resource development
- 7) Developing and securing human resources to work in regulatory bodies
- 8) Thorough implementation of PDCA cycles

1. Main initiatives of the Japan Atomic Energy Commission (JAEC)

Viewpoints on nuclear human resource development

Shunsuke Kondo: At the inaugural meeting of the Japan Nuclear Human Resource Development Network (November 2010)

- Activities that contribute to the development of universal human resources that can work effectively in international settings
- Activities that are undertaken both domestically and internationally (i.e., not limited to Japan)
- All organizations are for learning and education. Incorporate mechanisms for training and educating people at all levels.
- Human resource development is not a problem that lies outside an organization; it is a challenge that is essential to the survival of an organization.

1. Main initiatives of the Japan Atomic Energy Commission (JAEC)

(3) “ Promotion of Measures to Secure and Develop Human Resources for Nuclear Energy (Statement) ” (JAEC, November 27, 2012)

This document summarizes important points for initiatives aimed at securing and developing human resources for the nuclear energy industry in light of the accident at TEPCO’s Fukushima Dai-ichi Nuclear Power Plant following the Great East Japan Earthquake, with expectations that all parties concerned will steadily pursue the necessary initiatives, paying close attention to these points.

Points to Note in the “Promotion of Measures to Secure and Develop Human Resources for Nuclear Energy (Statement)” (Japan Atomic Energy Commission, November 27, 2012)

- 1) Prospective analysis of demand-supply gaps of nuclear human resources
- 2) Nuclear education in educational institutes based on lessons learned from the accident at Fukushima Dai-ichi Nuclear Power Plant
- 3) Enhancing opportunities for nuclear education in educational institutes
- 4) Improving educational programs on Radiation
- 5) Providing new education opportunities for mid-career experts
- 6) Human resource development for nuclear safety, security and safeguards
- 7) Enhanced incentives for nuclear businesses
- 8) Education about radiation risk
- 9) Securing human resources for maintaining the operation of domestic nuclear power plants
- 10) Human resource development for the international deployment of nuclear energy and technology
- 11) Education about energy and environmental issues

1. Main initiatives of the Japan Atomic Energy Commission (JAEC)

(4) Review of “Basic Concepts for Nuclear Utilization”

The key characteristics of this document, which are also expected to involve human resource development, are enumerated below.

- Describes broad directions and goals for the medium to long term in Japan for nuclear energy R&D and use, radiation use, etc.
- Describes the directions of efforts by concerned organizations and serves as a foundation to enable the Japan Atomic Energy Commission to fulfill its duties. It also defines measures in sufficiently concrete terms for achieving these goals.
- Suggests future directions, while respecting the “Strategic Energy Plan” that serves as government policy and incorporating a broad vision of nuclear energy issues

2. Current understanding and future initiatives and prospects

- It is understood that each concerned organization is executing reviews and initiatives according to its role based on the recommendations of the Japan Atomic Energy Commission. In addition, five years have passed since the start of activities under the framework set up by the Japan Nuclear Human Resource Development Network (established in November 2010), and these activities are recognized to have been pursued actively in partnership and cooperation with each concerned organization.
- In addition to pursuing the initiatives conducted up to now more efficiently and effectively, based on a grasp of current conditions surrounding nuclear energy, efforts focused on the key goals of “university education,” “continuing education,” and “knowledge transfer” and efforts at “integration with R&D” are also vital.
- It is expected that each concerned organization will make effective use of the framework of the Japan Nuclear Human Resource Development Network, to consolidate efforts aimed at securing and developing human resources for the nuclear energy industry, in accordance to need.
- It is expected that each organization works for creating useful and effective products

2. Current understanding and future initiatives and prospects

○ **Securing high-quality human resources**

- Energy is an essential industry that enjoys stable demand. It is also a state-of-the-art field that utilizes nuclear science
- Canvassing at high schools and universities, offering career paths, creatively expressing the appeal of nuclear energy, creating and sharing posters
- Soliciting and securing high-quality human resources (government-funded overseas students, post-docs) from emerging countries and collaborating in various kinds of international activities

○ **Developing human resources with an understanding and mastery of the fundamentals**

- Emphasis on exercises and experiments, sufficient educational materials? It is necessary to provide research reactors and other facilities for practical training.
- What about incorporating education improvement mechanisms (in the United States, there are ABET accreditation, class assessments, and reaching out to teachers' reflections), JABEE?
- Internships both in Japan and overseas

○ **Human resource development, through raising the skills of hired personnel, continuing education, and work programs**

- Education of human resources with specialist skills, aim to be the best in the world, with international experience too
- Development of human resources with broad expertise and vision
- Development of human resources with management capabilities, ISO 9000 certification?
- Adopt 10-step continuing education program up to chairman level in private companies
- Improve specialist and comprehensive capabilities by creating reports and explanations, preparing R&D plans, etc.

2. Current understanding and future initiatives and prospects

○ Knowledge and experience transfer

- On-the-job training (OJT): Transfer of experience with handling long power outages, and designing, manufacturing, and building nuclear power plants
- Addressing the need to transfer the knowledge of engineers. The issue of the decline in the birth rate and popularization of higher education in Japan also needs to be taken into account.
- Utilizing skilled senior personnel; accumulating and sharing good practices for knowledge transfer

○ Acquiring and certifying qualifications, collaborating on continuing education, collaborating with international organizations

- Addressing Japanese qualifications (e.g., Chief Engineer, Professional Engineer) and international qualifications
- Developing human resources who can work in international organizations: Accumulation of knowledge and experience and personal networks
- Collaborating and sharing information with international organizations (e.g., IAEA), especially on management

○ Trying to keep in mind the product (results to be acquired) for competitive funding for human resource development

- Clarifying effectiveness and value of results and the requirements that a graduate should acquire
- Should not focus excessively on events
- Can a human resource development infrastructure be set up?

○ It is necessary to set up infrastructure for R&D and human resource development. Addressing the need.

○ It is impossible to achieve effective human resource development in the short term

2. Current understanding and future initiatives and prospects

Examples of initiatives at “Integration with R&D”

- Research for undergraduate, Master’s and Doctoral theses [Integration with University Research and Education]
- Human resource development and skill learning through R&D [Education Function of Research Labs]
- Effectiveness of human resource development through competitive funding for R&D

References

- United States Department of Energy: (1) Nuclear Energy University Program (NEUP, 68 projects, 31 million USD): Graduate students participate in research; (2) Infrastructure development (Research reactors at 9 universities, 3.5 million USD), etc.
- European Community: Human resource development within the HORIZON 2020 program, operating on a created platform [SNETP, 6 fields, of which 8 themes on NUGENIA [2nd and 3rd generation reactors], open to participation from outside the EU
- Also supporting collaboration work [platform] through competitive funding
- Taking in foreign human resources and offering them career paths, and sending Japanese researchers overseas
- In relation to radiation, it is necessary to develop cross-disciplinary applications and human resources with outside nuclear industry.

Thank you for your attention

