

Critical Importance of Human Resources for Nuclear Safety

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The March 2011 Fukushima Daiichi nuclear power station accident has highlighted anew that safety is the most important challenge for nuclear power generation. Nuclear safety is a key common challenge not only for Japan where the accident occurred but also for the entire world. It is important particularly for China, India, the Association of Southeast Asian Nations, the Middle East and other regions where new nuclear development projects are about to be implemented. Given some countries' efforts for introducing their first nuclear plants as well as large-scale nuclear plant construction programs in China and India, it may be needless to say that nuclear safety must be enhanced further on a worldwide basis.

The Fukushima accident has indicated that nuclear safety as the top priority is supported by various elements and requirements. Regarding nuclear safety, technological measures against tsunami waves and station blackout have tended to attract attention. In addition to these important measures, there are other key points regarding nuclear safety. They include safety standards that are sufficient from an international viewpoint, the establishment of safety management regulations and administrative arrangements based on safety standards, the diffusion of "safety culture" among all the stakeholders in nuclear power generation, and the creation of safety and crisis management measures based on the principle of defense in depth. There are many details of these key points. Nuclear safety thus consists of various layers including the technological layer (persistent efforts to use best present technologies and improve technologies), the regulatory and institutional layer (enhancing safety standards, securing the independence of regulators and developing precautionary disaster reduction measures) and the cultural layer (safety-oriented culture). In fact, however, there is one more important layer. That is the human resources layer linked commonly to all other layers.

Many experts and official reports in Japan have pointed to the importance of human resources for nuclear safety. For example, the Innovative Strategy for Energy and the Environment, released in September, emphasized that the maintenance and enhancement of human resources (and technology) for nuclear safety is important (http://www.npu.go.jp/en/policy/policy06/pdf/20121004/121004_en2.pdf). On October 16, discussions at the 45th regular meeting of the Atomic Energy Commission of Japan focused on human resources (<http://www.aec.go.jp/jicst/NC/iinkai/teirei/siryoy2012/siryoy45/index.htm>). Human resources are thus an important issue for nuclear safety, attracting attention from nuclear energy stakeholders.

The human resources issue also consists of various elements. Simply, however, it can be divided into short-term and medium-to-long-term problems. Medium-to-long-term human resources problems include those stemming from uncertainties about future of Japan's nuclear energy. As the

future course of nuclear energy is uncertain in Japan, nuclear plant makers and their parts suppliers have difficulties securing and training nuclear engineers. It is reported that there is a risk that nuclear engineers may be quitting electric power companies under the influence of the Fukushima accident. University and graduate school students shy away from studying or being experts on nuclear energy, making it difficult to secure nuclear experts. These problems are serious. The idea that Japan can secure human resources only for decommissioning nuclear reactors does not allow for addressing these medium-to-long-term human resources problems. This situation is quite challenging.

Short-term human resources problems are serious as well. In respect to the recent discussions at the Atomic Energy Commission of Japan, short-term human resources problems made more of an impression on me. At a time when it is uncertain whether offline nuclear reactors could be restarted in addition to the third and fourth units in operation at Kansai Electric Power Co.'s Ohi nuclear power station, how to maintain skilled human resources who have supported Japan's nuclear safety has become a serious problem. This is the problem emerging at present.

Engaging in the operation and management of nuclear power stations is not only relevant for electric power company employees but also for employees of nuclear-related firms other than electric utilities. These workers from non-utility firms number about five times as many as those from utilities. All these workers have cooperated in securing nuclear safety. The wide range of workers engaging in the operation and management of nuclear plants include many skilled engineers who have played great roles in operating nuclear plants safely. The nuclear industry structure is similar to Japan's overall industrial structure. Supporting Japan's international competitiveness are excellent, technologically capable and dedicated workers not only at large companies but also at small and medium-sized firms. At issue in the nuclear industry is the risk or problem of dissipating skilled human resources.

According to materials submitted to the Atomic Energy Commission, the number of regular maintenance operations at nuclear plants has declined substantially as nuclear reactors have remained offline throughout Japan for a long time in the absence of definite schedules for restarting them. Regular checkup operations are very important for non-utility companies engaging in operating and managing nuclear plants. The decline in such operations has seriously affected their earnings. Although construction operations are going on at nuclear plants for enhancing safety measures including those against tsunami waves, the impact of the decline in maintenance operations is grave. One electric power company has estimated that revenues at its nuclear plant contractors in fiscal 2012 would decline by 50% or more compared with fiscal 2010. If the situation is left unchanged, excellent and skilled human resources who have supported Japan's nuclear safety may flow out of the industry or dissipate. A large-scale outflow or dissipation of human resources may affect the safety of nuclear power reactors after their restart. Over a medium to long term, it may be growingly difficult to secure a wide range of human resources for nuclear power plants. Therefore, measures are urgently required to relieve nuclear plant-related companies, including official financial support for them.

As Japan's economic environment grows more severe, the nuclear industry human resources problem is very important for overall employment. The Federation of Electric Power

Companies of Japan has estimated that about 80,000 nuclear industry workers have taken charge of nuclear plants. Electric utility workers account for only 12,000 of the total. Most are from nuclear plant makers, construction firms and other relevant companies. Strong measures may be required to address the short-term nuclear industry human resources problem that affects local economies, employment and industrial operations. Whether Japan can secure and train human resources with internationally excellent technologies and skills is the key to securing and analyzing the nation's nuclear safety. We should also remember that Japanese nuclear industry human resources can play a role in Japan's contributions to and responsibility for securing nuclear safety in the world including Asia. Japan and the rest of the world are urgently required to focus on human resources for nuclear safety.

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