

OECD/NEA activities on the safety of new reactors

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The Nuclear Energy Agency, a member of the OECD family, has as mission, in line with the overall aim of the OECD, to assist Agency's member countries in maintaining and further developing through international cooperation, the scientific, technological and legal bases for a safe, environmentally friendly and economic use of nuclear energy for peaceful purposes. Our members include very advanced nuclear countries and represent a big part of the world's nuclear capacity. In addition, we have a well established and formal relationship with the Russian Federation and the IAEA. Two years ago, the NEA celebrated its 50th anniversary of providing assistance to its member countries in supporting the safe use of nuclear power. Nuclear power will remain a key part of the energy mix for many decades to come and, as such, the NEA looks forward to continuing its value-adding work in the field of nuclear power. Korea joined the NEA in 24 May, 1993.

While the NEA is satisfied that we have in place an effective process of work, we are always looking for ways to improve. This is the reason why we have since 1999 a series of strategic plans in order to better focus on the objectives that member countries assign to the Agency for meeting the economical, environmental and societal challenges of the coming years. The important changes that have occurred in the energy and nuclear landscapes, as well as in the OECD framework, are the basis for these revisions insofar as they influence the NEA's role and activities. We are now completing the process for the new Strategic Plan which will apply from 2011 to 2017. Nuclear safety and regulation is and will continue to be the first priority of the Agency. The NEA will assist member countries to continue sharing information, best practices and lessons learned to enhance nuclear safety worldwide.

Safety of new reactors

Based on the regulatory actions underway or being considered in different member countries concerning the design and construction of advanced nuclear power plants, the NEA's Committee on Nuclear Regulatory Activities decided in 2007 to establish a working group to address the regulatory issues of the siting, licensing and regulatory oversight of generation III+ and generation IV nuclear reactors. The new working group on the regulation of new reactors (WGRNR) constitutes a forum of experts for the licensing of new and advanced commercial nuclear power reactors and should facilitate a cooperative approach to identify key

regulatory issues and promote a common resolution. KINS is strongly supporting the activities of the working group.

The main purpose of this group is to improve regulatory reviews by comparing practices in member countries; improve the licensing process of new reactors by learning from best practices; ensure that construction inspection issues and construction experience is shared; and as a result, enhance the effectiveness and efficiency of the regulatory process.

The group has established an initial programme of work including the collection of construction experience and the assessing of the information collected in order to share the lessons learned and good practices; the review of regulatory practices concerning the regulation of nuclear sites selection and preparation; and the review of recent regulatory experience concerning the licensing structure of regulatory staff and regulatory licensing process.

Multinational Design Evaluation Programme (MDEP)

This is a unique multinational initiative that looks to leverage the expertise of the involved regulators to cooperate on new reactor design reviews as well as to work towards harmonization and standardization of regulatory requirements and practices. The work to date already includes input from industry standards development organizations, and vendors and licensees worldwide. In summary, to increase efficiency, effectiveness and predictability of licensing of new reactors while maintaining the appropriate focus on safety

The activity is managed by a Policy Group, composed of the top regulators of ten countries: Canada, China, Finland, France, Japan, Korea, Russia, South Africa, United Kingdom and the United States. Dr. Yun is member of the Policy group. There are design working groups and issue specific working groups. Currently we are addressing EPR and AP-1000 designs and I&C, vendor inspection and codes and standards for pressure boundary components. We have started negotiations to establish a new working group on APR-1400 design. The NEA sees the work with MDEP to have a significant goal – how regulators, in dialogue with the industry, are ensuring through harmonization efforts, the safe, secure, and environmentally friendly use of nuclear energy to produce electricity.

Safety of ageing reactors

Ageing effects, especially material degradation, have been experienced worldwide since the start of nuclear power plant operation. Material degradation is expected to continue as plants age and operating licenses are extended. It is clear that unanticipated and unmanaged structural degradation could result, if no appropriate action is taken, in significant loss of safety margins, undermining public confidence and straining the resources of both regulatory authorities and the operators. For regulatory authorities, it is also important to verify the adequacy of the ageing management methods applied by the licensees, based on reliable technical evidence.

The NEA has completed a project to address the safety of ageing reactors. Two subject areas: stress corrosion cracking (SCC) and degradation of cables, were selected as the focus of the SCC and Cable Ageing Project (SCAP) due to their relevance for plant ageing assessments and their implication on nuclear safety. Fourteen NEA member countries, including Korea, agreed to contribute to the project. The two areas were developed through two working groups and they have completed two databases to document and share the historic knowledge acquired through the past few decades of operating experience. The databases, together with the knowledge bases and the commendable practices, will remain as an investment to provide a tool for assisting the nuclear industry for preventing stress corrosion cracking and unexpected cable failures, monitoring the condition of pipes and cables for operating reactors, selecting suitable material for new reactors and preparing for mitigating actions and replacements.

Safety research

Limited resources for nuclear safety research have prompted the NEA/CSNI to investigate in detail research strategies, needs, and priorities, and to identify facilities with potential to sponsor international safety research projects. This activity has been ongoing for the last twenty years and internationally funded projects have been arranged in the area of fuel safety, thermal-hydraulics, severe accidents, and fire safety. Other forms of co-operation in safety research are being identified, in particular for the new designs being considered for advanced reactors, like gas cooled or sodium fast reactors. KAERI is actively participating in this programme and one of the international projects is being carried out in the SERENA facility.

The NEA is aware of the strategic importance of safety research, and has established a robust programme

which today includes 18 safety research projects. This programme is facilitating at the same time joining resources to achieve common goals and preserving research facilities, which are unique and costly to maintain.