

Summary of Session 2 – Nuclear Safety and Reliability through International Cooperation

Moderator: M Weightman

Speakers: V. Asmolov, J. Regaldo, N. Sekimura, H. Mattli, J. Yu, K. Svinicki.

This session focused on the continuous improvement and reliability of nuclear power plants, international and national perspectives on this subject, and measures to strengthen nuclear safety, including in countries with rapidly expanding nuclear power programmes, and the synergy between safety and security.

Professor Asmolov described the great efforts and expenditure of the Russian nuclear operators over the years to increase levels of safety and reliability. This had led to increased lifetimes, a reduction in the number of events reported, a very low rate of unplanned reactor scrams and, enhanced reliability and generating capacities. Further improvements to nuclear safety had come from a review of the lessons learned from the Fukushima accident including, in the short term, additional mobile equipment deployed to site and enhanced emergency exercises. The accident had re-emphasised: the need for proper implementation of the IAEA Fundamental Safety Principles; the need for equal priority to be given to accident prevention and mitigation; that the primary responsibility of safety resting with the operating organisation (and hence the need to take immediate measures for accident management); and that plant operators should be provided with adequate plant design features to respond effectively to an accident in the required timescale.

Professor Sekimura described some of the technical lessons learned from the Fukushima accident with particular emphasis on those related to establishing the basis for external event protection. There is a great deal of uncertainty in the estimation of rare external hazards which should be considered in the elimination of “cliff edge” effects where a small increase in the size of the event causes a massive increase in the consequences. The effectiveness of safety measures could be evaluated using a Probabilistic Risk Assessment approach. There is a need for the involvement of a wide range of experts such that nuclear safety is seen as a multi-disciplinary topic involving high levels of international co-operation. The multitude of disciplines could be considered in terms of a hardware system, human system, environmental system and social system. Time dependent changes also needed to be evaluated together with the interactions between them. Finally, the concept of resilience engineering for such complex systems was proposed.

Mr Regaldo described the work of WANO to drive continuous safety and performance improvement through its four main programmes: peer reviews, operating experience feedback, professional and technical development, and technical support and exchange. Particular emphasis was placed on the Peer Review programme. WANO has reviewed lessons from the Fukushima accident and its work has evolved, expanding its scope to look more into such areas as design

(and how it must be subject to a continuous improvement process), emergency preparedness, and spent fuel storage. In terms of organisations, it was increasing its role for new entrants recognising that the landscape was changing with new plants, companies and countries becoming involved in the nuclear power industry. The need for co-operation between international organisations was emphasised as was having an open mind to maximise learning from each other. This was required to ensure that operators had a questioning attitude and an untiring pursuit of the world's highest levels of safety. Operators should not become self centered in seeking safety improvements but must be prepared to listen and learn from different perspectives. We rely on each other to improve safety.

Mr Mattli noted that the European Nuclear Security Regulator's Association had recognised that the world in relation to nuclear security had changed. It had become much more dynamic with obvious threats. This has led to introducing mechanisms for national nuclear security experts to share information and enhance cooperation to further improve national security arrangements. Whilst there were differences between safety and security, there were also many synergies.

Commissioner Svinicki stressed that the role of a regulator, such as NRC, was to provide reasonable assurance of adequate protection of the public health and safety recognising that the use of nuclear technology will always involve some degree of risk. Regulation is the public's business, and it must be transacted publicly and candidly. The public must be informed about, and have the opportunity to participate in, the regulatory process. There was a move to normalise Japan lesson learned activities at the national, bilateral, and multinational levels into existing regulatory frameworks and practices to better utilise resources and ensure that new insights are sustainable. NRC was continuing to evaluate proposed further enhancement to regulations where appropriate and in response to any new lessons learned from the Fukushima accident, as well as from other operating experience. It will also continue to strengthen its close co-operation with international partners, in this and other areas.

China's rapidly expanding nuclear programme required a focus on five key areas: obeying the fundamental rules of the nuclear industry including adhering to a principle of safety first, quality first; making efforts to promote safety culture through fostering prudent, rigorous, questioning and conservative attitude and ethics; learning from the Fukushima accident to further enhance the safety of nuclear power plant; and, building an open regulatory regime to strengthen nuclear safety regulation and enhance transparency to the public.

The delegate from Benin asked what assistance was available to countries considering including nuclear power in their energy mix. The panel explained that there were many bilateral and multilateral mechanisms to assist such countries. The publications and services of the IAEA were particularly noted as mechanisms for facilitating the sharing of knowledge and experience.

The delegate from Uganda questioned the effectiveness of peer reviews and the need to improve such processes, under the IAEA Action Plan on Nuclear Safety in light of the accident in Japan. The panel agreed that an important lesson from Fukushima was to review the scope and effectiveness of peer reviews in line with the IAEA Action Plan on Nuclear Safety and the concept of continuous improvement. It was also noted that the effectiveness of peer reviews was dependent upon the willingness of recipients of such reviews to take on board the lessons and to take effective action in response to them. The delegate also asked about the impact of national culture upon safety culture. The panel responded that it was important for any national culture to reinforce a safety culture, through looking at the synergies between them.

The Iranian delegate queried the term 'no safety – no benefits' used by one of the panellists. The panel emphasised the safety first - quality first concept and stressed that without the highest levels of safety there could be no assured benefits.

The delegate from Libya asked questions about the German national policy and the assurance of energy supplies, their contribution to research and assistance in developing nuclear infrastructures in newcomer countries. It was noted that this topic was the subject of session 1 and the German delegation would be best placed to provide further details in bilateral discussions.