

Chairperson' Summary of the Senior Regulators' Meeting Session 1 on Strengthening the Implementation of Defence in Depth: The Role of the Regulatory Body

The defence in depth (DiD) approach, as defined in INSAG-10 and used as the basis for the IAEA Safety Standards and national regulations, continues to be valid but has to be complemented or extended

The Fukushima accident did not invalidate the DiD approach, but rather it highlighted issues in its implementation, for example issues relating to the design basis for external hazards for equipment required to operate at various levels of DiD. Although human and organizational factors, safety culture and institutional aspects, as addressed in some of the presentations, are not explicit levels of DiD, these aspects are all embedded in the five levels defined in the INSAG DiD approach. In fact, they are cross cutting issues that need to be carefully taken into account for effective implementation of DiD.

For effective implementation of DiD for new plants or to reinforce the safety of existing plants, it is important to achieve an adequate balance between preventive measures and mitigatory measures. It is also necessary to demonstrate that the safety provisions at different levels of DiD are sufficiently reliable and – to the extent possible – independent from each other.

Probabilistic safety assessment is a useful tool for assessing the reliability and balanced implementation of DiD provisions, but it has also limitations. We have insisted on the opportunity for multi-unit site PSA. DiD needs also to be maintained and improved throughout the lifetime of the plant, and regulators and licensees both play an important role in this. Periodic safety review is one of the mechanisms that can be used for comprehensive re-evaluation of the implementation of DiD. The question on the importance of carrying out inspections during operation in order to verify the constant application of DiD was raised.

Regulators reported that they are working together through the IAEA, the NEA and WENRA to harmonize the interpretation and implementation of some DiD aspects that have become more apparent since the Fukushima accident and also the reinforced design requirements and safety objectives for new reactors. Some of us insisted on the risk of overlapping work and on the necessity of good cooperation and complementary work. Some of the aspects highlighted at today's meeting were the consistent application of design basis and margins against external hazards, the consideration of design extension conditions (including complex sequences or multiple failures and severe accidents), the application of DiD to spent fuel storage and the demonstration that large or early releases can be practically eliminated by prevention and by mitigation measures.

After consensus has been reached, regulators may wish to establish guidance or regulations for the practical implementation of DiD and its oversight and the IAEA could use best practices as input into the revision of the Safety Standards.