

International Experts Meeting on Human and Organizational Factors in Nuclear Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant

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Opening Remarks by: **Denis Flory**, Deputy Director General
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Good afternoon ladies and gentlemen and welcome to the fifth International Experts' Meeting dedicated to Human and Organizational Factors in Nuclear Safety in the light of the Fukushima Daiichi accident. This meeting is organized in the framework of the IAEA Action Plan on Nuclear Safety.

I am pleased to see the high level of attendance here this afternoon which is a reflection of the importance you all attach to this topic. 165 experts from 45 Member States have registered for this meeting from operating organizations, regulatory bodies, technical support organizations, vendors and other national and international organizations.

Let me start by looking back at the three nuclear power plant accidents that have taken place in our recent history: Three Mile Island, Chernobyl and Fukushima Daiichi. Three unexpected accidents – three avoidable accidents. They occurred in three technologically advanced countries; the US, the Soviet Union and Japan. All three accidents had a strong element of complacency – a basic assumption of “it will not happen here” and revealed that it is not solely the technology that fails. The malfunction can be found in the dynamic system where human or ‘individual’, technical and organizational factors interact, often referred to as ITO.

Since the Fukushima accident, most of the focus has been on the lessons learned related to the technical aspects of nuclear safety. However, the accident at Fukushima has again reminded us about the paramount influence of human and organizational factors on nuclear safety. The human and organizational factors, which have traditionally been considered in the design and operation of nuclear facilities to influence human performance, are still not sufficiently integrated when safety is evaluated, using for example the concept of defence-in-depth.

We therefore need to complement the current safety approach with an integrated or systemic approach of ITO. The systemic ITO concept emphasises how safety also lies in the *interaction between individuals, technology and organization*. Historically the approach to safety has been mainly compartmentalized, looking into each factor, in depth, separately. This is needed to identify weaknesses and address each area, the human, technical and organizational factors, but

it also prevents us from grasping the influence of the full system of ITO interactions. It is not enough to scrutinize one factor at a time when strengthening safety, we need to continuously probe for latent weaknesses which can, if left unattended, end up in unwanted events.

An integrated approach to safety is needed. It entails expert collaboration across a range of disciplines and fields of expertise, not solely technology related. By integrating different competences, educational backgrounds and ways of thinking we are able to systematically enhance systemic safety.

The Fukushima accident also highlights that this systemic thinking needs to be applied at national and international levels. The interaction between the different organizations, such as the regulator, governments, vendors, technical support organizations, suppliers, contractors, other national stakeholders as well as the international stakeholders such as the IAEA, are all part of the global nuclear ITO system and we should support its interactions through an open, frank, and questioning collaboration at a national, regional, and international level.

Another important aspect to be considered is how to support countries embarking on a nuclear power programme to define, communicate and apply the concepts of safety culture. We need to reaffirm the importance of nuclear safety as a core value and behaviour resulting from a collective commitment of governmental organizations, as well as all stakeholders.

We have learned through major nuclear and non-nuclear accidents that safety culture has a significant influence and that different national cultural aspects have an impact onto these accidents. We need to ask ourselves *what in our national culture can hinder good safety behaviour and negatively impact nuclear safety?* I would like to encourage all of you to address this particular aspect of safety culture at a national level. Countries embarking to nuclear power also need to consider this issue in a timely manner as part of their nuclear safety infrastructure development. I hope this topic will be addressed during this week.

Now, speaking of national cultures, I would like to honour the operators at Fukushima Daiichi who did everything they could to mitigate the evolution and consequences of the accident under the extremely difficult situation. We know that many of the operators on site did not know the conditions of their families due to the devastated infrastructure caused by the tsunami.

The Secretariat, together with Member States, has already undertaken numerous activities in the area of safety culture and ITO. Initially INSAG-1 provided the concept of safety culture and INSAG-4 provided the definition of a strong safety culture. The IAEA Safety Fundamentals include principles related to safety culture and introduced the ITO concept. In addition safety culture and integrated management system are also addressed in relevant safety requirements

(GSR Part1 and GS-R-3). In this line, the IAEA is currently working in strengthening the application of these concepts in the new *Requirements for Leadership and Management for Safety under preparation*.

Since 2009, the IAEA has been working with the two concepts, safety culture and ITO, in order to enhance the understanding and recognition of their importance towards an integrated approach for safety, in particular, providing MS the necessary support on how to practically apply these concepts. We have also developed a new safety culture assessment methodology based on behavioural science and experiences of assessing safety culture. There are other IAEA documents on safety culture that have been published or are about to be published.

One of the most effective ways to make safety culture tangible is to start with a hands-on safety culture self-assessment. We offer training on safety culture self-assessment for both regulatory bodies and operating organizations taking into account behavioural sciences in their development. It is the intention of these training courses to equip Member States' organizations with knowledge and skills for future safety culture improvement activities. I encourage all of you to take advantage of using this methodology and the associated tools.

In strengthening our peer review services we have added behavioural experts to the OSART teams and we are providing, upon request, independent safety culture assessment within the OSART missions. We are also now providing an OSART review service for the nuclear operators at corporate organization level. In the regulatory framework, IRRS also includes the assessment of the regulatory oversight of human and organizational factors and safety culture aspects.

In June 2012 the IAEA organized a Technical Meeting on *Managing the unexpected in the perspective of ITO*. It was concluded that there is a need to revise the prevalent accident model which is based on linear cause-and-effect and recognize the complexity of the whole ITO systems interrelations. It was also concluded that to manage the unexpected you need to manage for the unexpected: this means to continuously probe and learn about how these interactions are working. This entails learning from both the weakness and the strengths as well as from daily operations.

This IEM provides an opportunity to also continue the dialogue on Managing the Unexpected and is an important forum to consider what needs to be done to strengthen nuclear safety. I hope that you all will contribute to this important work and that by Friday there will be concrete actions to be taken by the Secretariat and Member States to further improve safety.

As you are aware, Director General Amano announced in September last year, his decision to prepare an IAEA comprehensive report on the Fukushima Daiichi accident. The topic of safety

culture will form an important component of this report. In that light, this meeting will provide an important opportunity to identify and discuss these issues, which will be further considered in the preparation of this report.

To conclude, I would like to emphasise once again that the events in Japan concern every nation, every regulator, every operator, every TSO, every stakeholder involved in the nuclear industry – every person in this room, including myself. We cannot afford to be complacent, we need to keep learning and integrating behavioural and social sciences with technology to proactively prevent and mitigate accidents.