International Experts Meeting 7 on Severe Accident Management in the Light of the Accident at the Fukushima Nuclear Power Plant

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Outline

• Background
• Purpose & Objective
• Topics Covered
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• Posters
• Conclusions - President’s Summary
• Statistics
Background

- 7th IEM
- Organized as part of NSAP
- Led by NSNI (SAS) and IEC
  - Scientific Secretaries
- President - Anwar Habib – Chairman PNRA
- Co-President – Valery Bezzuptsev - Rostechnadzor
- Programme Committee
  - Farouk Eltawila – FANR UAE
  - Stuart Lewis – EPRI
  - Yong Man Song – KAERI
  - Tony Ulses – IAEA - Scientific Secretary
  - Jeff LaFortune – IEC - Scientific Secretary
  - Lyndon Bevington - NSAT

- Target experts involved with severe accident management, regulatory bodies, operating organizations and technical support organizations
Purpose and Objective

• Gather and share knowledge and experience gained in the light of the Fukushima Daiichi nuclear accident concerning severe accident management

• Identify lessons learned and best practices so that this information can be used to guide future actions for Member States and the IAEA

One conclusion from IEM1 was the need to strengthen severe accident management guidelines, practices and regulation (balance between prevention and mitigation)
Topics Covered

- Sharing improvements made to severe accident management programmes following the Fukushima Daiichi accident
- Discussing the appropriate regulatory treatment of severe accident management
- Discussing how to train and equip operators to effectively implement SAMGs
- Identifying any knowledge gaps related to the implementation of SAMGs and how to fill these gaps
- Discussing linkages between on-site and off-site response plans during a severe accident
- Identifying potential priority areas for research and development
Programme (1/6)

- Opening – president and co-president
- Toyoshi Fuketa, Commissioner, NRA (Japan)
  - *Lessons Learned from the Fukushima Dai-ichi Accident and Responses in New Regulatory Requirements*
- Gustavo Caruso, Special Coordinator, Nuclear Safety Action Team (IAEA)
  - *IAEA Activities under the Nuclear Safety Action Plan*
- Roy Harter, Duane Arnold Energy Center (USA)
  - *Severe Accident and Beyond Design Bases Event Response – An End-User Perspective*
- Vasily Galkin, World Association of Nuclear Operators – WANO
  - *WANO Post-Fukushima Severe Accident Management Project*
- Olivier Isnard, Institute for Radiological Protection and Nuclear Safety (France)
  - *On-site/Off-site interface for an effective emergency management*
- Naohiro Masuda, TEPCO (Japan)
  - *East Japan Earthquake on March 11, 2011 and Emergency Response at Fukushima Daini Nuclear Power Plant*
Programme (2/6)

- Session 1 – Improvements to Severe Accident Management Guides (SAMGs)
  - Deb Mukhopadhyay (India)
    - Improvement of Severe Accident Management for Indian NPPs
  - Lovell Gilbert (Canada)
    - Enhancements to Severe Accident Management Guidelines To Address Fukushima Daiichi Lessons Learned
  - Hermann Plank (Germany)
    - SAMGs for German NPPs
  - Jaewhan Kim (Republic of Korea)
    - Integrated Coping Strategies for Beyond Design Basis External Events
  - George Vayssier (Netherlands)
    - Severe Accident Management – Lessons Still To Be Learned From Fukushima-Daiichi
  - Andrew White (OECD/NEA)
    - Improving the Management of Severe Accidents – Initiatives being undertaken by the NEA following Fukushima
  - Michael Hugon (EURATOM)
    - Euratom Research Activities On Severe Accident Management
  - Michel Bieth (JRC-Petten)
    - JRC-IET Activities to Support Enhancement of Severe Accident Management Guidelines (SAMGs)
Session 2 – Equipment and Training Needs for Severe Accident Response

- Bertrand L’Epinois (France)
  - Progress, perspectives and challenges in the field of design characteristics as regards severe accident management

- Dimtar Popov (Bulgaria)
  - KNPP Achievements Towards Mitigation of Severe Accidents

- Pascal Izydorczyzk (France)
  - Groupe INTRA Development and Application of Equipment and Tools for Intervention After an Accident

- Chander Mohan Bhatia (India)
  - Accident Management Programme for Indian PHWRs

- Gábor Petofi (Hungary)
  - Fukushima Effect on SAM Requirements and Regulatory Oversight in Hungary

- Christopher Cole (Canada)
  - CNSC Severe Accident Management Regulatory Activities

- Edward Fuller (USA)
  - Severe Accident Analyses to Support Filtering Strategies Rulemaking

- Ian Gordon (UK)
  - Application of Learning from Fukushima Daiichi to Severe Accident Management for a Major Fuel Cycle Facility
Session 3 – Appropriate Regulatory Treatment of Severe Accident Management Measures

- Jennifer Uhle (USA)
  - Perspectives on Regulation of Severe Accident Management
- Abdel-Raouf Gadalla (Egypt)
  - Strengthening National Regulatory Capabilities in Countries Embarking on New Commercial Nuclear Power Programs Post Fukushima Accident
- Jagannathan Arunan (India)
  - Severe Accident Management – Regulatory Challenges and Fixing of Priorities
- Han-Chul Kim (Republic of Korea)
  - Inspection and Validation Activities on Severe Accident Management in Korea after the Fukushima Accident
- Muhammad Sufyan Khan (Pakistan)
  - Post Fukushima Lesson: Regulatory Model Development for the Validation of SAMGs
- Kurt Couckuyt (Belgium)
  - Updating WENRA Reference Levels for existing reactors in the light of TEPCO Fukushima Daiichi accident lessons learned
- Nadezda Kozlova (Russian Federation)
  - Regulator and TSO activity in the area of severe accident management in the light of accident at Fukushima-Daiichi NPP
- Ali Tehrani (UK)
  - Beyond Design Basis Analysis: Developments in UK’s Approach and Perspective
Session 4: Linkage between On-Site and Off-Site Response; Emergency Response Challenges in Severe Accidents in the Presence of Extreme Natural Events

- Masahiko Hamada (Japan)
  - *Fukushima and JSDF: Difficult communication between off-site and on-site*
- Dave Nodwell (Canada)
  - *Organizational Interfaces in Offsite Nuclear Responses*
- Miroslav Lipar (IAEA)
  - *OSART results in the area of Accident Management*
- Maria Itziar Grolleau (France)
  - *Post-Fukushima Development of Operating Reactor Severe Accident Management and ERO Guidelines*
- Staffan Hennigor (Sweden)
  - *Severe Accident Management Guidelines & Emergency Preparedness Planning – Not One Without the Other*
- Yoichi Watanabe (IFRC)
  - *Relief activities conducted by the Japanese Red Cross Society after the Fukushima Daiichi Nuclear Power Plant accident and the challenges for the future*
- Alexander Kolevatykh (Russian Federation)
  - *Activities on Enhancing Preparedness to BDBA and Severe Accident Management*
Programme (6/6)

• **Session 5 On-Site Emergency Response: Challenges in Severe Accidents and Link with SAMGs**

  - David Wilson (Canada)
    - *On-Site emergency response planning and severe accident management*
  - Lindley Perryman (South Africa)
    - *Koeberg NPP: Severe Accident Management Improvements*
  - Fred Dermarkar (Canada)
    - *Human and Organizational Performance Considerations in Severe Accident Management*
  - Zhiyi Yang, (China)
    - *Development of Severe Accident Management Guidelines and its Implementation in China*
  - Babar Ghias (Pakistan)
    - *KANUPP-Lessons from FUKUSHIMA*
  - Vladivoj Reznik (Slovakia)
    - *Implementation of the Severe Accident Management in Slovenské elektrárne*
  - E. Anderson (USA)
    - *ISOE Expert Group; Management of Worker Dose during Severe Accident Conditions*
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President’s Summary (1/2)

- **Training programs** should take a practical, learn by doing, approach using realistic training aids and allow for an evaluation of their effectiveness.
- **Flexibility and resourcefulness** in accident management strategies.
- Strengthening **regulatory capabilities**.
- **Instrumentation and Control** - agreement needed as to the minimum number of variables that need to be monitored to effectively respond to a severe accident; discussion on degree of instrument qualification needed.
- **Response equipment (onsite & offsite)** - guidance needs to be developed to establish the best approaches to the management and deployment of this equipment.
- **Common operational picture** – Severe accident management guides and emergency plans need to ensure that all response teams including operators, technical support centres and emergency responders have a common situational awareness in order to respond effectively.
- **Expanded response to a severe accident** - Member states should also ensure that they have provisions to be able to, if required, extend the response arrangements.
- **Emergency management organization** - Emergency plans and severe accident management strategies should explicitly recognize the risk of losing key personnel and make provisions to ensure the resilience of the response teams.
This IEM brought together **onsite and offsite response** experts
- shared ideas on how best to further strengthen their ability to provide a **coordinated response** during a severe accident

The IAEA plays a crucial role in assisting MSs to prepare their capability to respond to a severe accident and several suggestions for future IAEA activities were noted
- IAEA should work with Member States to continue to improve Severe Accident Management provisions by further developing guidance and continuing to encourage the use of the IAEA services
- IAEA to sponsor benchmarking activities on severe accident management and emergency response
- IAEA should consider developing guidance for damage control management at NPPs
- IAEA should assist Member States to better coordinate severe accident management strategies with emergency response
Statistics

- ~170 experts from 36 Member States and 6 international organisations.
- 13 keynote presentations
- 31 invited presentations
- 20 posters
- Five technical sessions
  - Improvements to Severe Accident Management Guides (SAMGs)
  - Equipment and Training Needs for Severe Accident Response
  - Appropriate Regulatory Treatment of Severe Accident Management Measures
  - The link between On-Site and Off-Site Response
  - Challenges in Severe Accidents and Link with SAMGs
- All the presentations are available on the IAEA web site and a report will be published in due course.

Thank you for your attention