



Summary of Session 0

IEM on

**“Strengthening R&D Effectiveness in the Light of
the Accident at the Fukushima Daiichi NPP”**

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Session 0

- Topic of Session:
 - R&D Strategies after the Fukushima Accident
- Presentations:
 - 1 Keynote Speech
 - 1 Invited Presentation
 - 6 Technical Presentations
 - No Related Posters

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Key Points from Presentations (1)

- No new phenomena, but
 - some challenges that were not fully appreciated previously
 - Very long period without power
 - Hydrogen explosion in Reactor Buildings.
 - Incorrect instrumentation indications at severe conditions
 - Spent fuel pools safety
 - Large volumes of contaminated liquid

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Key Points from Presentations (2)

- Many R&D projects are in the works at national, regional and international levels, many relevant to Fukushima accident phenomenology and code improvement
- Many permanent and ad hoc groups promote international cooperation
 - In particular, post-Fukushima task groups
- Priorities on specific R&D topics being reconsidered

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Key Points from Presentations (3)

- Important roles of R&D for supporting nuclear safety discussed
- Focused identification and prioritization of research topics
- Improved understanding of some physical phenomena during SA still desired
- BDBA R&D provides input to accident management strategies
- The Fukushima accident reactivated need in SA R&D

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Key Points from Discussion (1)

- Session topic was “R&D strategies after Fukushima”
 - We discussed but did not have time to arrive at conclusions:
 - Whether there is an R&D strategy in place
 - Whether a formal strategy on a national or international level would be required
 - Whether R&D priorities in countries and international organizations are aligned, and whether any formal prioritization may be possible and beneficial
 - Whether any formal guidance on R&D strategy, prioritization and use of results, for example by IAEA, could be beneficial
 - Whether there could be benefit from further international coordination of R&D

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Key Points from Discussion (2)

- Key inputs
 - National strategies and priorities depend on concrete situations, such as reactor technologies, national regulations and specific concerns
 - State of the Art reports are very useful in preserving knowledge and systematic identification of gaps, the latter allowing determining priorities for future work
 - The focus should be on solutions that are expected to be efficient even against challenges that could not have been specified ahead, example being the FLEX concept
 - A large number of international or regional organizations are providing input into the R&D activities, to the extent this may in itself lead to loss of effectiveness

Key Points from Discussion (3)

- Key inputs
 - It is important to minimize duplication or inefficient use of resources, which can be achieved through increased coordination
 - The industry and regulators could cooperate in conduct of R&D. Rules and responsibilities need to be clearly defined in the latter case to address the regulator's independence
 - If R&D is sponsored jointly by industry and regulator, each side should remain independent in interpretation of results
 - Sharing of R&D information should not lead to sharing of the same bias

Key Issues and Areas to be Addressed in Future R&D (1)

- Better understanding of the existing plant safety margins and their role in plant robustness
- Improvements of methods, models and tools including PSA
 - Addressing key uncertainties and cliff edges
- Provisions to address challenges (such as extended SBO and hydrogen risk)
 - Development and implementation of design enhancements
- Need for technical capabilities, procedures, staff

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Key Issues and Areas to be Addressed in Future R&D (2)

- Safety assessment for multi-unit sites
 - Certain unique challenges
- Risk from external events
 - Different external hazards at each site
- Spent fuel safety issues
- Human, organizational and societal factors
- Emergency response capability

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Lessons Learned with regard to Session Topic

- Strong international coordination through multiple existing frameworks:
 - Intergovernmental: IAEA, NEA, EU
 - Industry: EPRI, WANO, INTO, Owners' Groups, etc.
 - NUGENIA, ETSON, SNETP, etc.
- Value of R&D and generated knowledge clearly demonstrated in enabling us to understand the Fukushima accident causes, progression and consequences
- Short term safety enhancements identified and largely already implemented
 - Focus of efforts transfers to mid- and long-term priorities

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Recommendations for Further International Collaborative Work

- Many frameworks are available for promoting, coordinating and supporting R&D work
 - Interfaces among those become complicated and there is a need to avoid duplication on the one hand, and to assure optimum use of the existing infrastructure, on the other hand
- Guidance spelling roles of R&D, processes for identification and prioritization of projects, evaluation and use of outcomes may be helpful in the national and international R&D activities
- Consider calling for a focussed forum organized or sponsored by the IAEA to establish high level principles and guidance

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...Thank you for your attention!