Improving the Management of Severe Accidents – Initiatives being undertaken by the NEA following Fukushima

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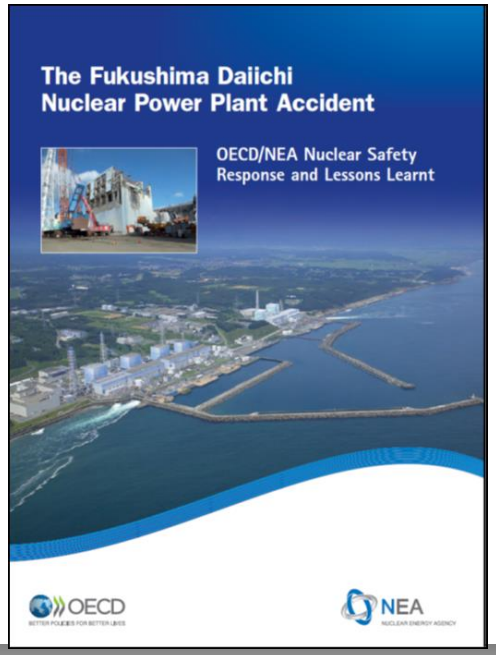
NEA Follow-up to Fukushima

- The NEA has supported member countries in individual and collective responses to Fukushima.
- Actions thus far are summarized in "The Fukushima Daiichi Nuclear Power Plant Accident *OECD/NEA Nuclear Safety Response and Lessons Learnt*"
- Includes activities related to improving the management of and response to severe accidents



http://home.nea.fr/pub/2013/7161-fukushima2013.pdf

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Activities related to SAM

- Committee on the Safety of Nuclear Installations (CSNI - primarily focussed on safety research activities)
  - Filtered containment venting
  - Hydrogen behaviour
  - Spent fuel pools
  - Fission Product Release Tools
  - Human Performance under Extreme Conditions
- Committee on Nuclear Regulatory Activities (CNRA - support for nuclear regulatory bodies)
  - Task Group on Accident Management

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Status Reports

- Status reports are being prepared on filtered venting, hydrogen behaviour, spent fuel pools and fission-product release tools – due for submission to CSNI in 2014
- Objective is to summarize existing knowledge base, taking into account range of reactor designs (BWR, PWR, PHWR)
- Possible contributions to accident management guidance are being identified in the areas of venting strategies, use of sprays, hydrogen-risk management, managing fuel-pool heat load, etc.

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Human Performance under Extreme Conditions

- Summary of current state of knowledge on human performance under extreme conditions, and of good practices to support effective performance (due 2014)
- Workshop held in Feb 2014 with a wide range of expertise and experience, nuclear and non-nuclear
- Major theme was the need to focus on resilience (flexibility, redundancy, etc.) in developing response capability to severe accidents – increasing reliability and robustness may not address unexpected events
- Probably requires a fundamental (including societal) shift, as response cannot be 100% prescribed
  - e.g. shift by operations staff from a focus on procedures

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Task Group on Accident Management (1)

- Task group asked to review accident management practises in light of Fukushima and identify measures that should be considered to enhance accident management activities and regulatory guidance.
- Group's overall conclusion is that an *Integrated Accident Management* (IAM) approach should be adopted:
  - Balance preventative and mitigating measures
  - Integrate all on- and off-site resources, even if not dedicated to accident management
- The task group is now reviewing areas of accident management that would benefit from further work.

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Task Group on Accident Management (2)

- Examples of commendable practises:
  - IAM guidelines should be validated for damaged infrastructure, impaired on- and off-site communications, long duration accidents, etc.
  - Equipment needed to prevent escalation should be foreseen – e.g. maintain cooling, control combustible gases, filter containment venting, etc.
  - Staffing and training needs to take into account long duration and multiple unit accidents
  - Well-defined processes are required for storage, transfer, maintenance, training, etc. of mobile equipment

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Conclusion

- The NEA has a broad programme of work that addresses lessons learnt from Fukushima
- Existing knowledgebase and good practises being collected for accident management technology
- Ensuring effective human performance in extreme conditions requires a shift to resilience
- An Integrated Accident Management framework and associated commendable practises are recommended to ensure effective response to severe accidents

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