

NEA – CRPPH / WPNEM

Nuclear Emergency Matters

Update on recent activities and
future work programme

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NERIS – TP Dissemination Workshop
22-24 January 2014, Oslo/ Norway

WPNEM Background & Strategy

- **Mission:** improve nuclear emergency management systems within OECD/NEA member countries; share outcomes widely
 - in co-ordination with other relevant int'l organisations
- **Focus:** identify and address needs in preparedness and response for “early” / “intermediate” phases of a nuclear/radiological emergency (including accidents and consequence management for malicious acts), with a view towards actions necessary for the transition to recovery.
- **Pillar of work:** INEX planning, conduct, analysis, reporting and follow-up

Agenda

- Completed reports (2013)
- Ongoing projects (international benchmarking)
- Future planned activities (INEX 5, until 2016)

WPNEM - 2013

Reports (published, e-reports)

- International Short-term Countermeasures Survey- 2012 Update
- EGIREs Report: Discussion on Implementation of ICRP Recommendations Concerning Reference Levels and Optimisation
- INEX 4 Exercise Summary Report
- Topical Session Report on INEX-4



Available: <http://www.oecd-nea.org/rp/wpnem/>

On-going

- CSNI (WGAMA) /CRPPH (WPNEM)- International benchmarking project on fast-running software tools used to model fission product releases during accidents at nuclear power plants (FASTRUN)
- NEA Report: Cost of nuclear accidents - liabilities issues and their impact on electricity costs
- CRPPH/WPNEM Joint Topical Session Report on Emergency Management Issues and Lessons
- INEX- 5 (in the pipeline)

FASTRUN Project

- Currently, a large variety of software tools are used for assessing accident source terms and doses by organizations responsible for emergency planning and response
- These tools are an essential part of decision making
- In order to improve the confidence in the simulated results of an accident, cross-comparison and standardization of software tools is desirable
- Benchmarking the software tools would allow better understanding of the relative strengths and shortcomings of the available tools

A Report summarizing:

- The current status of capabilities, input requirements, output variables, dose calculation frequency, dose distribution, validation basis, and the availability of fast running software tools;
- A comparison of simulation results from five different severe accident scenarios using the fast running analysis tools; and
- A comparison between simulation results from fast running software tools and sophisticated severe accident reference codes.

Peach Bottom (American BWR):

- Unmitigated SBO
- Fuel damage starts at 8.4 hours
- Containment failure at 20 hours

Surry (American PWR)

- Unmitigated SBO
- Fuel damage starts at 14 hours
- Containment failure at 45 hours

Oskarshamn (Swedish BWR):

- Loss of RHRS
- Core uncover at 12.7 hours
- Filtered venting triggered at 13.8 hours

Generic 1300 MWe French PWR (Gravelines used for weather data):

- LBLOCA with failure of safety systems
- Core uncover at 10 hours
- Filtered venting planned for 1.5 days

Point Lepreau (Canadian PHWR):

- SBO with emergency power generators
- Loss of primary heat sink at 4 hours
- Loss of ultimate heat sink at 11 hours
- Containment failure at 13 hours.

FASTRUN Scenarios

FASTRUN Project -Status

- The kick-off meeting and questionnaire distribution completed in February 2013
- Information collected from the questionnaire and the selection of scenarios for simulation completed in April 2013
- Simulations completed in September 2013
- Second meeting and preliminary assessment of results completed in October 2013
- Second round of calculations completed January 2014
- Documentation of results of individual code runs March 2014
- Assessment of results with integrated code predictions May 2014
- Summarizing overall results for the final report August 2014

- CSNI – CRPPH approval (December 2014)

Cost Study: Objectives & Background

The Fukushima accident has renewed a debate on the consequences of severe nuclear accidents and the associated costs.

What are the “true” costs of a nuclear accident? and Are existing insurance mechanisms and compensations schemes sufficient? are some of the questions raised in the policy debate.

Main objectives of the study

- Conduct an appraisal of existing studies and data on radiological consequences and economic costs of severe nuclear accidents that have occurred in civil nuclear energy.
- Review existing studies and methodologies for estimating damages associated to severe nuclear accidents, their application, uncertainties and limitations.
- Develop methodology on assessments of costs associated to severe nuclear accidents, including definition of cost elements, their characterisation and relative order of importance.
- Develop case studies on the basis of the defined methodology and perform reviews, e.g. to assess the impact of approaches and limits adopted by regulatory authorities and governments on accident consequences/costs.
- Review existing liability regimes in OECD countries, consider implications and potential improvements.

Work Plan

- The project is overseen and directed by an Ad Hoc expert group with representatives nominated by OECD/NEA members countries.
- Three meetings of the expert group are scheduled in the biennium 2013-2014.
- Publication of the final report is expected by the end of 2014.

Two workshops on:

- Workshop I (28-29 May 2013) : ***Approaches to estimation of the costs of nuclear accident***
 - Appraisal of existing studies on the costs of TMI, Chernobyl and Fukushima accidents
 - Perspectives and methodologies for assessing nuclear accident costs
 - Involvement of international experts from governments, research and industry
- Workshop II (10-11 Dec 2013): ***Nuclear accident risk, liability issues and compensations schemes***
 - Review of liability regimes currently applicable in OECD and non-OECD countries.
 - State participation: legal basis, amount and nature, financial impact on operator.
 - Mechanisms implemented if the accident liability exceeds the caps legally provided.
 - Discussion of possible mechanism that could internalise the cost of nuclear accidents.
 - Representatives of legal community and insurance industry.

Tentative structure of the report

1. Introduction

2. Severe accidents in the history of civil nuclear power

- Description of the accident (TMI, Chernobyl and Fukushima).
- Costs (material damages and health effects).
- Available data on broader economic consequences.

3. Approaches to estimation of potential damages of nuclear accidents

- Different perspectives and different definitions lead to different estimates.
- Appraisal of existing studies.
- Definition of the methodology proposed in the current study.

4. Generic case studies

- Definition of representative case studies and limitations of this approach.
- Estimations of absolute costs.
- Estimation of external cost associated with nuclear power production (cost*probability).

5. Question of funding nuclear liability

- Review the existing liability regimes in OECD countries and their coverage.
- Mechanisms implemented in case liability amounts are beyond the liability caps legally provided.
- Other mechanisms that could internalise nuclear accident cost: practical implications.

6. Conclusions and recommendations

EM Survey

Emergency communications
Issues dealing with trade
Technical assessment of accident situations

- **Emergency Communications**

- Main aspects of plans for communication (is it separate?)
- Distinctions between preparedness and response phases
- Between authorities at national and international levels
- Public communication with main players, media, source of information
- Communication with other countries to exchange decisions and recommendations
- Legal status
- Differences of communication depending on the location of the accident
- National decisions of other countries- how to incorporate, any priority
- Any change as a result of Fukushima accident (key issues)
- Communication with stakeholders (for improvements, interactions and international organisations)
- Use of social media

Survey

- **Issues dealing with trade**
 - Strategy for monitoring incoming products (food or goods) from an accident country
 - National criteria (protocol) for monitoring incoming products
 - Clearance certificate (criteria?)

Survey

- **Technical assessment (TA) of accident situations**
 - Role of TA in decision making (protective actions) and its evolution in time
 - Codes (available), used to perform TA
 - Plan of the TA for an accident in another country, involvement of international discussions with other RAs (organisation and management)
 - In case of significant differences, interpretation and management
 - Contribution of international organisations to improve the available codes

INEX 5 - Objectives

DRIVER: To build upon the experiences and lessons learnt from past nuclear accidents/incidents and the successes of previous INEX exercise series

- To test the **mechanisms** for decision making at the national level, particularly in uncertain circumstances or in the absence of data;
- To test the **arrangements** for international cooperation and coordination of data and information between countries;
- To test the **arrangements** for practical support and assistance between groups of countries or geographical regions; and
- To **investigate** the longer term issues beyond the urgent response phase.

INEX 5

INEX 5 - Scope

KEY ISSUES / ASPECTS

- How to improve emergency communications
- How to address incoming trade
- Early availability and sharing of information is a difficult issue
- Accident assessment considerations based on limited, uncertain information
- Decision making in uncertain circumstances
- Designation of emergency planning zones

Scope

Recommendations

- A table top exercise or moderated workshop
- Not a real time test
- Based upon a NPP (but NOT a re-enactment of the accident at Fukushima)
- Based upon a common scenario
- Consider coincident impacts or multiple units
- Include impacts on other critical national infrastructure
- Consider mutual assistance
- Modular approach to materials

Scenario

- The technical scenario is envisaged to fulfil the following requirements:
 - Nuclear Power Plant
 - Single common scenario
 - Severe accident scenario
 - Trans-boundary impacts
 - Intermediate phase
 - Characterisation of the offsite impact
 - Large area of impact/extendibility issues
 - Emergency actions taken

Evaluation Questionnaire

- Important for evaluation (good practice from I3 & I4)
- To contrast and compare the experiences of member states and IOs

Stages for preparation

- To identify additional objectives for INEX-5 to support the main objectives.
- Based upon all these objectives the Evaluation Questionnaire will be derived for review by the I5PG and the WPNEM.

I5 Timeline

- Final proposal + road map to CRPPH, May 2014
- Final documents to WPNEM, October 2014
- Approval by the WPNEM, **October 2014**

- May 2015, extraordinary meeting for country specific issues + update to CRPPH meeting

- **Initial window, September 2015- March 2016**

- Possible extension, end of August 2016
- Collection Qs- end of October 2016
- **Workshop, Spring 2017**
- **Final Report, end of 2017**

New Expert Group

- Expert Group on Lessons Learnt from Non-Nuclear Events
 - Review of the responses to non-nuclear events (evacuation, sheltering, implementation of key protective actions) that can be used to enhance existing preparedness efforts for nuclear power plant accidents.
 - Information on urgent responses to actual events can be used to illustrate the effectiveness of protective measures such as shelter and evacuation when discussing such actions with stakeholders.
 - Member states that choose to participate in this study will be asked to identify two or three (or more) events that have occurred within their country in the past 10 years that resulted in members of the public being alerted and either protective actions were implemented or were considered.
- Data collection (by using a questionnaire) for following topical areas:
 - Hazard that caused the evacuation; Demographics; Community awareness of area hazards and potential protective actions; Emergency planning and response; Evacuation specific details; Special needs individuals and facilities; and Shelters.

Information Exchange

- Some WPNEM members have invited other WPNEM experts to participate in peer reviews of national guidance, coordinated by NEA
 - France/ ASN (CODIRPA -The COmission DIRecteur Post-Accident “Guide for Leaving the Urgent Phase of a Nuclear or Radiological Emergency”)
 - Discussion topics: scope, zoning, etc
 - Outcome – a useful process for all participants.
 - Led to second peer review of Finnish guidance
 - Finland / STUK (Protective Measures in Early and Intermediate Phases of a Nuclear or Radiological Emergency)
 - Discussion topics: Protection strategy, Organization, OILS and terminology
 - Outcome: Strengthened Finnish guidance, input and experience for revision of peer review member’s national guidance
- WPNEM is ready to conduct similar types of peer reviews

To assist its member countries in maintaining and further developing, through **international co-operation, the scientific, technological and legal bases** required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes.

To provide authoritative assessments and to forge **common understandings** on key issues, as **input to government decisions on nuclear energy policy**, and to broader OECD policy analyses in areas such as energy and sustainable development.



Thank you for your attention

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