
	<p>Advanced Safety Assessment Methodologies: extended PSA</p>	
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## ASAMPSA\_E FIRST END-USERS WORKSHOP

**“Where efforts must be placed to establish useful guidance  
(or complete existing ones)  
for the development and use of extended PSA for NPPs?”**

Uppsala, Sweden

May 26-28, 2014



**Clarion Hotel Gillet**  
**Dragarbrunnsgatan 23 75320 Uppsala, Sverige**  
<https://www.nordicchoicehotels.se/clarion/clarion-hotel-gillet/>

(The workshop is hosted by Vattenfall, the preparation is coordinated by IRSN)

### Updated Agenda

*The objective of the workshop is to promote discussions to identify some priorities for the ASAMPSA\_E project.*

*The time allocated to each session may be quite short regarding the number and difficulty of topics (session 4 in particular: this session covers all types of external events that have to be handled in ASAMPSA\_E. Each of these external events has its own demands on modelling and frequencies...). Additional recommendations from participants (from parallel discussions) could be included in the final conclusion of the workshop (session 7).*

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SESSION 1 - INTRODUCTION

SESSION 2 - LESSONS FROM PAST REAL EVENTS / HAZARDS FOR PSAs



SESSION 3 - GENERAL CONSIDERATIONS ON *EXTENDED PSA*

SESSION 4 - INITIATING EVENTS MODELLING AND SCREENING

SESSION 5 - INTRODUCTION OF HAZARDS IN PSAs

SESSION 6 - REVIEW OF PAST REAL EXTERNAL HAZARDS

SESSION 7 - CONCLUSIONS OF THE WORKSHOP

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## 26 May - Day 1

### SESSION 1 - INTRODUCTION 13h15-14h15

13:15 Welcome of participants by Vattenfall - **Manager from Forsmark (FKA)**

13:30 Objectives of the ASAMPSA\_E project and overview of the ASAMPSA\_E guidance content as planned today by the project partners - **IRSN, Mr. Emmanuel RAIMOND**

13:55 Organization and expected impact of the workshop - overview of the ASAMPSA\_E questionnaire and responses (20') - **IRSN, Mr. Yves GUIGUENO**

14:15 Information from EURATOM FP (15') - **European Commission, Mr. Roberto PASSALACQUA**

### SESSION 2 - LESSONS OF PAST REAL EVENTS / HAZARDS FOR PSAs - Chairman: Mr. Yves GUIGUENO (IRSN) ; Secretary : Joel PIHL, FKA

14:30 Example of lessons learnt from past real events/hazards for PSA developments

- Synthesis of questionnaire answers (15') - **INR, Mrs. Mirela NITOI**
- Discussion: End-Users recommendations for ASAMPSA\_E (20')
- Presentations on lessons learnt from past real events/hazards :
  - Disturbance on electrical grid (10') - **FKA, Mr Joel PIHL, Mr. Per LAMELL,**
  - Disturbance-- of heat sink (10') - EDF (to be confirmed)
  - Le Blayais NPP flooding event (10') - **IRSN, Mrs Patrica DUPUY, Dr. Vincent REBOUR**
  - Overview of Fukushima Daiichi Accident (10'), **presented by JANSI on behalf of TEPCO**
  - Presentation by **KAERI, Dr. Kwang-II AHN** (10')

15:55 Break



### SESSION 3 - GENERAL CONSIDERATIONS ON EXTENDED PSA (1/2) - Chairman: Mrs. Patricia DUPUY (IRSN) ; Secretary : Mr. Anders Karlsson, FKA

16:25 Regulatory framework/needs

- Synthesis of questionnaire answers (15') - **JSI, Dr. Andrija VOLKANOVSKI**
- Discussion: End-Users recommendations for ASAMPSA\_E (25')

17:05 Definition and scope of extended PSAs

- Synthesis of questionnaire answers (15') - **SSTC, Mr. Oleksandr SEVBO**
- Discussion: End-Users recommendations for ASAMPSA\_E (15')

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17:35 Combination of hazards and events



- Synthesis of questionnaire answers (10') - EDF, Mrs. Marie GALLOIS
- Discussion: End-Users recommendations for ASAMPSA\_E (20')

18:05 List of internal and external hazards to be considered in extended PSAs

- Synthesis of questionnaire answers (10') - TUS, Prof. Dr. Ivan IVANOV
- Discussion: End-Users recommendations for ASAMPSA\_E (15')

18:30 End of day 1

19:30 Dinner at the hotel

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**27 May - Day 2**

**SESSION 4 - INITIATING EVENTS SCREENING AND MODELLING (8h-15h) - Chairman: Dr. Vincent REBOUR (IRSN) co-chair Mr. Göran HULTQVIST, FKA; secretary: Mr. Anders KARLSSON, FKA**

*Many topics can be addressed in Session 4, for example:*

1. Seismic - high and low activity areas
2. Flooding from rivers and rain
3. Flooding from high seawater level and waves
4. Tsunamis - high and low risk areas
5. High and low air temperature
6. High water temperature (above design)
7. Effects of ice- frazil ice and ice storms
8. High wind and tornados
9. Lightening and disturbance on the grid
10. Blocking of cooling water by biological material + Oil spills
11. Solar storm and other extremely rare events
12. Man-made external events

*For each topic, methodologies available (or research activities) to predict should be part of discussions*



- amplitude of events with frequencies  $> 1E-4$  /y,
- amplitude of events with frequencies between  $1E-4$  and  $1E-6$ /y
- amplitude for events with frequencies  $< 1E-6$ /y (far beyond design)

#### **8:00 Screening process and criteria**

- Synthesis of questionnaire answers (20') - EDF, Mrs. Dominique VASSEUR and Mrs. Marie GALLOIS
- Discussion: End-Users recommendations for ASAMPSA\_E (40')

#### **9:00 Hazards characterisation for PSAs**

- Synthesis of questionnaire answers (30') - EDF, Mrs. Dominique VASSEUR and Mrs. Marie GALLOIS
- Discussion: End-Users recommendations for ASAMPSA\_E (30')
- Presentations on hazards characterization :
  - "Probabilistic methods for extreme natural hazard characterization" (10') - EDF, Mr. Pietro BERNARDARA
  - "Incidence of climate change on natural hazards characterization" (10') - EDF, Mrs. Sylvie PAREY
  - Issues for seismic characterization (10'), Vienna University, Dr. Kurt DECKER,

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10:40 - 11:00 Break

- Complementary presentations on hazards characterization:
  - Seismic in areas with low seismic activity (15') - Mr. Björn LUND, Uppsala University
  - External temperature - high and cold (15') - SMHI, Sweden
  - Sea water level and effects of climate changes (15') - FMI, Finland
- Examples of past real hazards and their effects:
  - Sandstorm and hurricane Kyril in January 2001 (10') - Mr Milan JAROS, UJV
  - Consequences of degraded safety barriers and degraded operational system (heating, ventilations, power supply, etc.) (15') - Mrs. Josefin LARSSON, Risk Pilot
- Specific End-Users recommendations for ASAMPSA\_E (40 min)

12:50 - 13:50 Lunch

**SESSION 5 - INTRODUCTION OF HAZARDS IN PSAs (1/2) - Chairman: Mr. Gabriel GEORGESCU, IRSN; secretary: Göran HULTQVIST, FKA**

13:50 Introduction of hazards in L1 PSAs (and common issues with L2 PSA)

(e.g.: Methods to quantify SSC failure modes and conditional probability, human reliability assessment, mission times, multi-units issues ...)

- Synthesis of questionnaire answers (30') - Joel PIHL, FKA
- Discussion: End-Users recommendations for ASAMPSA\_E (1h00')

15:20 Break

15:40 Work in subgroups on introduction of hazards (separated by specific hazards)

Split into subgroups (~5 groups).



To develop specific End-Users recommendations for ASAMPSA\_E for each sub-group.

17:25 Synthesis of recommendations from subgroups

This need at least 60 minutes (5 minutes per topics ....)

18:35 End of day 2

19.30 Dinner at the hotel

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## 28 May - Day 3

### SESSION 5 - INTRODUCTION OF HAZARDS IN PSAs (2/2) - Chairman: Mr. Göran HULTQVIST, FKA; secretary: Mrs. Nadia RAHNI, IRSN

#### 08:00 Introduction of hazards in Level 2 PSAs (specific issues)

Synthesis of questionnaire answers (15') - GRS, Dr. Horst LÖFFLER,

- Discussion: End-Users recommendations for ASAMPSA\_E (45')

#### 9:00 L2 PSA for SFP and shutdown states

• Current situation (10') - GRS, Dr. Horst LÖFFLER,

- Discussion: End-Users recommendations for ASAMPSA\_E (20')

### SESSION 3 - GENERAL CONSIDERATIONS ON EXTENDED PSA (2/2) - Chairman: Mr. Göran Hultqvist, FKA; secretary: Mr. Yves Guigueno, IRSN

#### 09:30 Uses and applications of extended PSAs

• Synthesis of questionnaire answers (15') - IRSN, Mrs (Dr.) Nadia RAHNI

- Discussion: End-Users recommendations for ASAMPSA\_E (15')

#### 10:00 Safety / risk target and decision making

• Synthesis of questionnaire answers (15') - EDF, Mr. Pascal BRAC

- Discussion: End-Users recommendations for ASAMPSA\_E (15')

#### 10:30 Results presentation and uncertainties

• Synthesis of questionnaire answers (15') - JSI, Dr. Andrija VOLKANOVSKI

- Discussion: End-Users recommendations for ASAMPSA\_E (15')

#### 11:00 Quality of extended PSAs

• Synthesis of questionnaire answers (5') - IRSN, Mr. Yves GUIGUENO

- Discussion: End-Users recommendations for ASAMPSA\_E (10')

#### 11:15 Examples of extended PSA applications

• Synthesis of questionnaire answers (5') - TUS, Prof. Dr. Ivan IVANOV



- Discussion: End-Users recommendations for ASAMPSA\_E (10')

### SESSION 6 - REVIEW OF PAST REAL EXTERNAL HAZARDS- Chairman: Mrs. Patricia DUPUY, IRSN; Secretary: Joel PIHL, FKA

#### 11:30 Review of past real external hazards

• Synthesis of questionnaire answers (10') - IRSN, Yves GUIGUENO

- Discussion: end-users recommendations for ASAMPSA\_E (30')

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12:30 -13:30 - Lunch

**SESSION 7 - CONCLUSIONS OF THE WORKSHOP - Chairman: Mr. Emmanuel RAIMOND, IRSN, Mr. Göran HULTQVIST, FKA, and Secretary: Mr. Yves GUIGUENO, IRSN**

13:30 Conclusions of the workshop

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| <ul style="list-style-type: none"><li>• Workshop summary report : final list of End-Users recommendations</li><li>• Follow-up actions</li></ul> |
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15:30 End of the workshop