Outages, their consequences and probabilities of occurrence.

How to quantify them economically

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Scope

- Probabilility in Contingency
- Challenge to deal with probabilities
- Duration of outage and its impact
- How they can be “quantified” economically

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Questions to the attendees

- Challenge to deal with probabilities
- Duration of outage and its impact
  - Short term
  - Long term
- How they can be “quantified” economically

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The probability of a major nuclear accident

The probability of melting of the nuclear core or a reactor is deemed to be 1*10^-5 per annum:

- 5*10^-5 per annum applied to the 900 MWe generation
- 1*10^-5 per annum applies to the recent 1300 MWe generation
- 1*10^-6 per annum will apply to the future generation

- Nuclear has an history and society/regulator are more demanding

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The consequences of a major nuclear accident

- direct costs:
  - death (fatal and not fatal cancers, early death),
  - diseases;
  - farming restrictions;
  - moving and re-housing people.
- indirect effects on the economy:
  - Impact on global economy, tourism
  - Add 25 % in addition to direct costs

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The economic value of the risk of a major nuclear accident

The effective cost of a major accident is 0.023€/MWe.

Conclusion:

The nuclear industry:

- calculates probabilities of accidents,
- consequences are factored into the economic analysis

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Chemical industry/ probabilities of initiating events

The chemical industry is actively seeking probabilities for risk assessment

Breaking a pipe:

- **Earthquakes :** **1.10-6/an to 1.10-7/annum**
- **Lightning:** **1.10-7/annum**

- **Fire start in a warehouse:** **About 10-2 per annum**

Aircraft crashes

- **Commercial aircraft crash:** **10-12/m2 per annum**
- **Military aircraft crash:** **10-11/m2 per annum**
- **GA aircraft crash (below 5.7T):** **10-10/m2 per annum**

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Short exercise – Railway station

YOUR railway station is out of service today and YOU can't be home before 11 pm:

- What is the value of the pain for you today?
- What is the value of the pain for you if the station is out of service for 3 years?

Probabilities of occurrence of events: accidents

History of accidents of ATM origin in ECAC

A probability of 0.6 per annum

98	99	00	01	02	03	04	05	06	07	08
0			1	2		1			1	

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