



VTT

**International activities:
SITEX and EURAD**

**KYT OMT Seminar CNS
25.10.2019**

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25.10.2019 VTT – beyond the obvious

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Overall safety - Elements of uncertainty

Uncertainty

- From error to uncertainty – from exact value to distribution of values
- Pretty much literature, definitions and discussions
- In simple case, many measurements of single quantity gives distribution of values, which hopefully can be deformed Gaussians
- Straightforward mathematics to combine Gaussian uncertainties of several quantities (and quite often only one uncertainty rules like chemical analysis)
- Sampling uncertainty may be more significant: rock sample for sorption experiments from site
- Finally, need to model in Safety Case: model uncertainties – every model becomes inaccurate in some conditions: Newtonian mechanics at high velocity
- How to evaluate uncertainty when no values are available?

Overall safety and uncertainty analysis

- One point of view of overall safety might be kind of very much extended uncertainty analysis
- Safety Case consists of very large data and complex models, of which uncertainty can and should be analysed (the result may be depressing, and not easy to accept)
- But new uncertainty elements appear, when organisations start to "interpret" Safety Case: construct, operate and redeveloping Safety Case
 - Network of networks, where flow of information may very difficult or even impossible to control
 - Acceptance of the situation: 1) much work is needed and 2) such a good safety culture, which analyses issues, and not simply rejects them as minor importance

SITEX_Network

- <https://www.sitex.network/>
- SITEX.Network Sustainable network for Independent Technical EXpertise on radioactive waste management
- Bel V BE Valéry Detilleux Vice President TSO
- SURO CZ Jitka Miksova TSO
- EIMV SI Nadja Železnik Treasurer TSO
- GI-BAS BG Doncho Karastanev TSO
- IRSN FR Delphine Pellegrini President TSO
- TS Enercon HU Ferenc Takats TSO
- PSI CH Wilfried Pfingsten Secretary General TSO
- VTT FI Markus Olin TSO
- FANC BE Fredecic Bernier Reg
- ENERGIAKLUB HU Eszter Matyas CSO
- MKG SE Johan Swahn Vice President CSO
- Mutadis FR Gilles Heriard-Dubreuil CSO
- NTW FR Linda Delory CSO
- SYMLOG FR Claire Mays CSO
- CLIS de Bure FR Benoit Jaquet CSO

Benchmark on reviewing approaches (WG#1)

- Benchmarking on codes is quite common in the RWM field.
- Benchmarking on reviewing approaches is a new way to proceed.
- How will it work?
 - By simulating interactions between regulatory body (RB), (prospective) waste management organisation (WMO) and Civil Society (CS), from the start to the end of a safety assessment review: a (part of) safety file is presented, clarifications and additional information are required through questionnaires and meetings, CS concerns are collected, recommendations are issued.
- The selected topic is an intrusion scenario caused by geothermal activities.
 - Every player will have his place as TSO or CS, with or without code.
 - This aims at learning from each other's, testing the review guide and analysis grid developed previously by SITEX as well as identifying good practices.

State-of-knowledge related to deep borehole disposal (WG#2)

- Many countries develop geological disposal facilities to dispose of high level waste. Some of them investigated deep borehole disposal as an alternative. What is this concept and what are the outcomes of these works? What's about safety issues, societal concerns, economic matters? A bibliographic study will be made by both institutional and non-institutional SITES.Network members, sharing the issues at stake. A practical synthesis will clarify what has to be known on that topic.

Topical day (20-21/11/2019, Ljubljana, Slovenia)

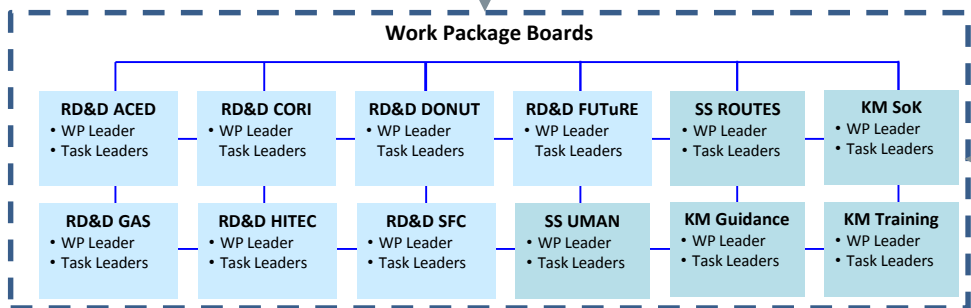
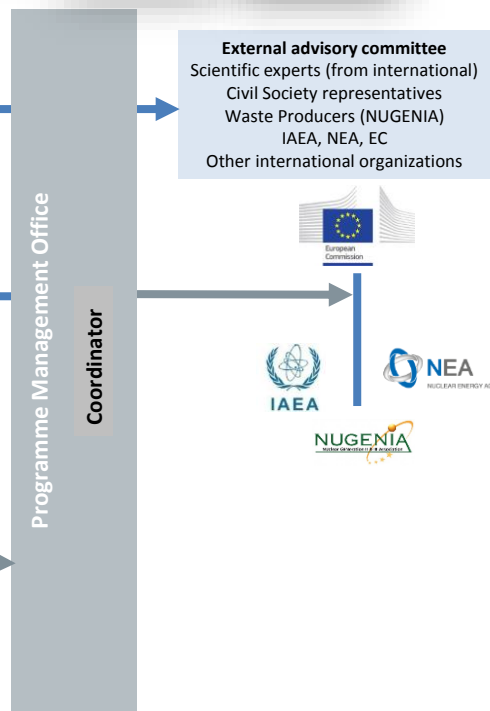
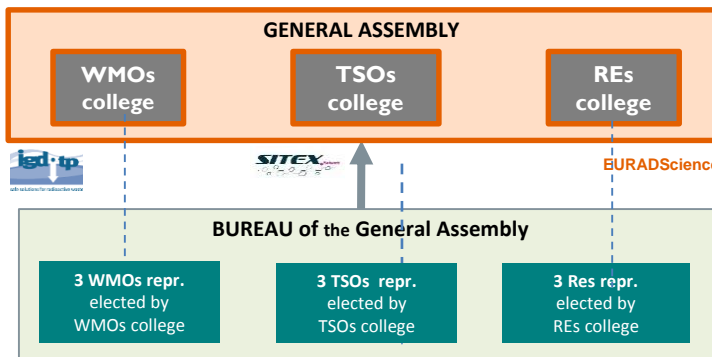
Governance of radioactive waste management

- Registration and information: <http://www.sitex.network>
- For this first Topical day, SITEX.Network has the pleasure to invite:
 - Marie Kerveillant (Post-Doctoral researcher, ESCP Europe, France)
 - Céline Parotte (Senior researcher, SPIRAL research center, Belgium)
 - key researchers in the field of Governance of radioactive waste management, who obtained their PhD's a few years ago, respectively on:
 - The role of the public in the French nuclear sector : The case of "local information commissions" (CLIs) for nuclear activities in the West of France,
 - The Art of Government of High-Level Radioactive Waste. Comparative Analysis of Belgium, France and Canada.
- The objectives of this Topical day are to have an overview of their work, as well as to exchange on key challenges facing our organisations in this field.
- SITEX offered to pay some of the costs for one person attending from VTT

EURAD

- The Joint Programme will generate and manage knowledge to support EU Member States with their implementation of the Directive 2011/70/Euratom ([Waste Directive](#)), taking into account the different magnitudes and stages of advancement of member state National Programmes. This will encompass:
 - ... developing and implementing their national RD&D programmes for the safe long-term management of their full range of different types of radioactive waste through participation in the RWM Joint Programme; in particular:
 - Consolidating existing knowledge for the safe start of operation of the first geological disposal facilities for spent fuel, high-level waste, and other long-lived radioactive waste, and supporting optimization linked with the stepwise implementation of geological disposal; and
 - Enhancing knowledge management and transfer between organisations, Member-States and generations.
- From this, these high-level objectives, ... the following specific objectives:
 - Develop, maintain and consolidate the scientific and technical basis of safe radioactive waste management;
 - Address important and complex issues and enable expert networking;
 - Enhance knowledge management and transfer between organisations, Member-States and generations; and
 - Engage with Civil Society

EURAD Governance



EURAD UMAN – Why ? (1/4)

- Decisions associated with radioactive waste management programmes are made in the **presence of irreducible and reducible uncertainties**
- Several **choices** made on the basis of limited information in early programme phases may also **have to be confirmed** before or during the construction and operation of the facility
- At the end of the process, **uncertainties will inevitably remain** and it should be demonstrated that these uncertainties do not undermine safety arguments
- Hence, the **management of uncertainties is a key issue when developing and reviewing the safety case** of waste management facilities and...
- ...in particular, of waste disposal facilities due to the long time scales during which the radiotoxicity of the waste remains significant



Conclusions

Conclusions

- Much more detailed and advanced analysis needed for uncertainty analysis, and decreasing uncertainties, when possible
- Overall Safety concept needed and should be used in new international projects, too
- For the year 2020, possible to attend two SITEX projects – financing is still open