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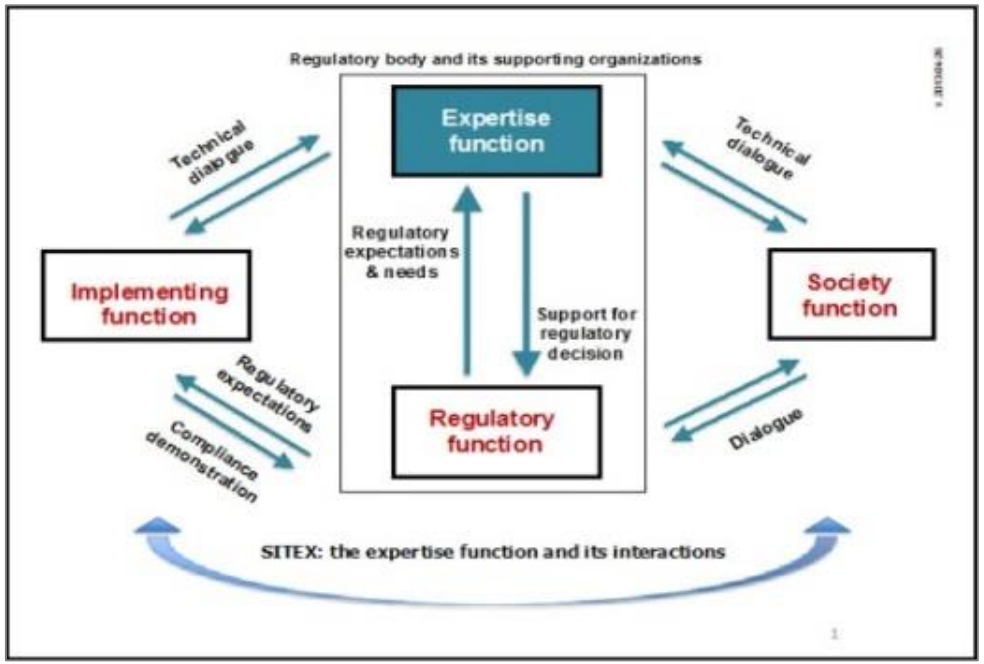
SITEX-II experience in training and tutoring for reviewing a safety case for geological disposal

Outline

- Introduction
- Activities of Work Package 3 of project SITEX-II
- Synthesis of existing practices for training and tutoring of experts in geological disposal safety
- Development of a training module for generalist experts in geological disposal
- Lessons learned from the pilot session
- Future SITEX training
- Conclusions

Introduction (1)

- EURATOM FP7 SITEX project (2012–2013), „Expertise function“



The expertise function and its interactions

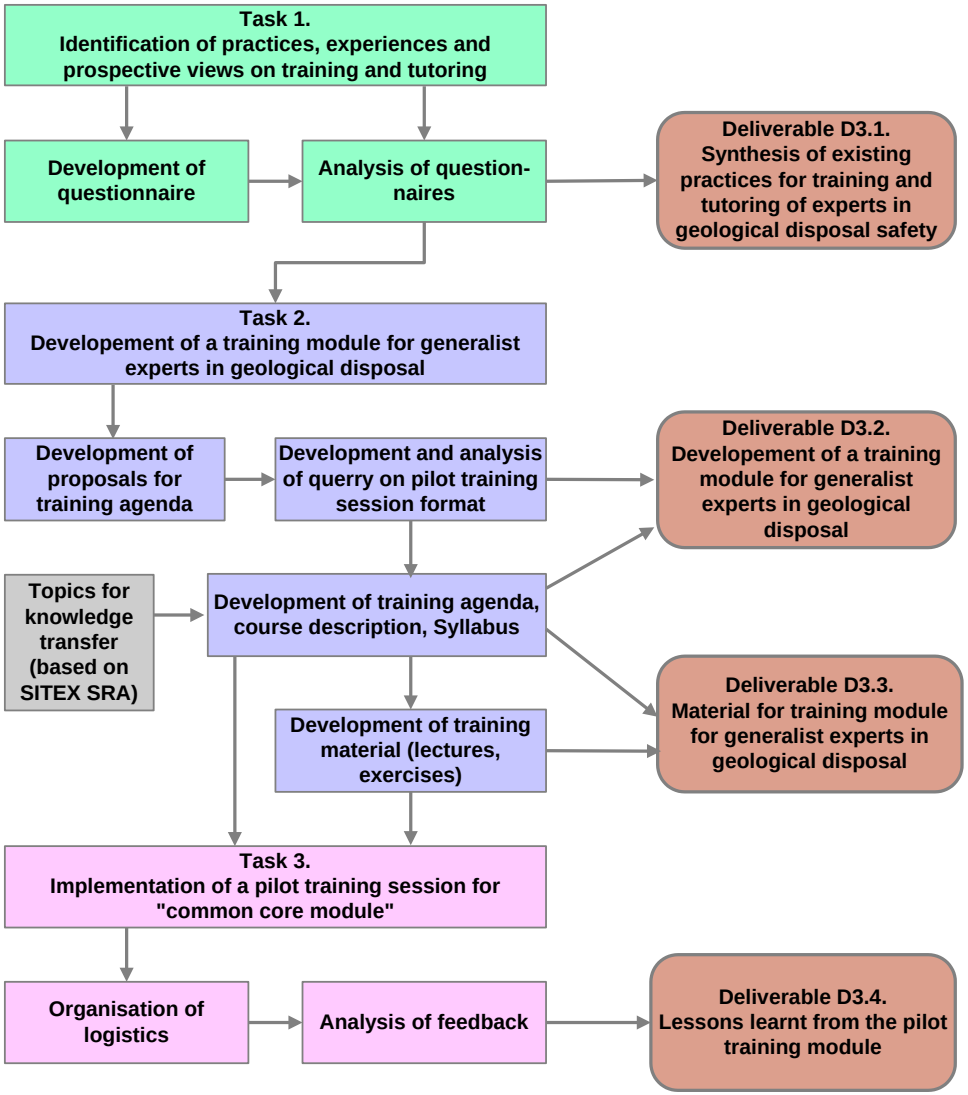
- EURATOM Horizon2020 SITEX-II project (2015-2017), implementation and demonstration

- SITEX means *„Sustainable network for Independent Technical EXpertise of Radioactive Waste Disposal“*

Introduction (2)

- SITEX-II objectives:
  - The definition of the Strategic Research Agenda (SRA)
  - The production of a guidance on the technical review of the safety case submitted at different phases of disposal facility development (planning, construction, operation, etc.)
  - The development of a training module for generalist experts involved in the safety case review process, including the implementation a pilot training session;
  - The commitment of Civil Society (CS) in the definition of the SRA, interactions between CS and experts conducting the review
  - The preparation of the “administrative” framework for a sustainable network

Activities of Work Package 3 of project SITEX-II



- Participants (IRSN, LEI, Bel V, FANC, Mutadis, DECOM, CNSC, CVREZ, ENSTTI)
- 3 tasks, 3 milestones, 4 deliverables, 1 progress report

Synthesis of existing practices for training and tutoring of experts in geological disposal safety

- Main findings:
  - The importance and necessity of knowledge management and learning processes such as training, learning from experience and continual improvement is acknowledged
  - Different means of knowledge management and expert training are used. Usually, organizations have several ways for knowledge management and training of experts in parallel
  - On-the-job training, participation in research projects and taking external courses were reported as the common ways for competence development
  - To ensure effective competence building in the specialized areas for technical review of a safety case, a means to “equalize” the background of the participants needs to be considered

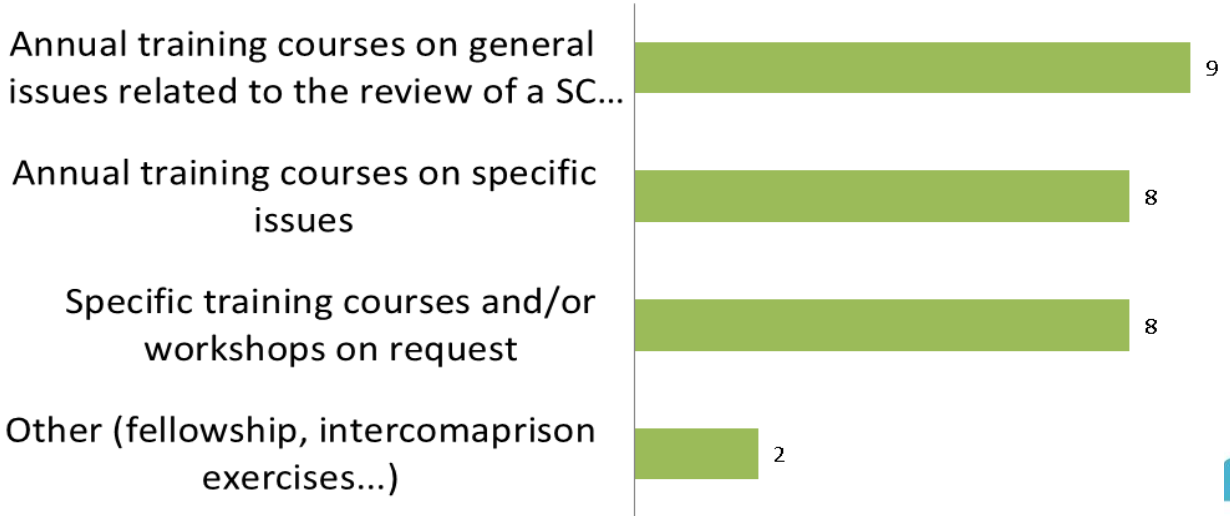
Training on geological disposal through the available educational schemes

- Five different types of experts being involved in the technical review process were identified (*generalist experts*, *environmental experts*, *numerical modellers*, *risk experts*, *experts in long-term safety*) (SITEX project)
- Events organized and coordinated by the IAEA are highly acknowledged and attended most frequently
- Training organized by ENSTTI or IRSN internal schools are not focused specifically on geological disposal; nevertheless, to some extent such training addresses radioactive waste disposal topics

In view of the absence of training schemes dedicated to the review of the safety case for geological disposal at an international level, the development of a sustainable scheme could expect international acknowledgment

Needs for training in next periods (2016-2020; 2021-2025)

- The need for development of training modules for all of the identified expert profiles was acknowledged
  - Training module for generalist experts has been given priority based on the higher level of interest expressed for such training in the near term (2016–2020)
  - The identification of precise expert training needs over the next five-year period (2021–2025) appeared to be a difficult (*i.e. due to uncertainties in the progress of national geological disposal programme*)



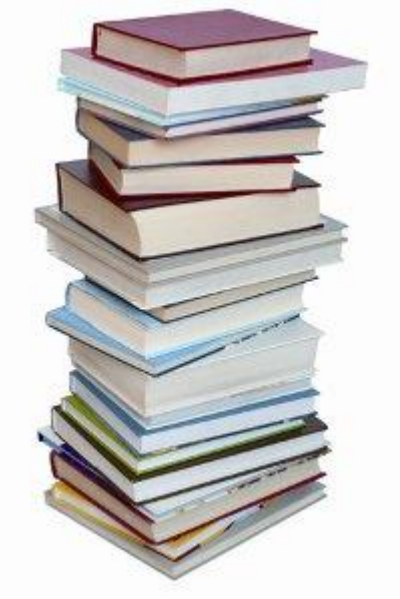
Nevertheless, most organizations expressed interest in annual training courses on specific issues for later period

Development of a training module for generalist experts in geological disposal (1)

- Several proposals were discussed including the possibility of a training programme to be presented over a two to three-year period
  - The first year of the training programme would involve three events/activities:
    - A 2-week module with lectures including visits to research laboratories
    - Visits to disposal facility sites and URLs together with structured discussion session with facility staff
    - Participants undertaking a review of existing safety case and presentation of the outcome at a training seminar
  - During the second/third year two training seminars on topical issues in regulatory review and independent Expertise Function research programmes would be presented in combination with activities of SITEX network

Development of a training module for generalist experts in geological disposal (2)

- Topics included in strategic research agenda (SRA) of interest to the expertise function developed within SITEX-II and identified as having common interest for knowledge transfer were considered
- Range of topics included in the training course demonstrates the complexity and broad scope of aspects to be considered



Training material includes lectures, practical exercises, final exam

Development of a training module for generalist experts in geological disposal (3)

Day 1	A1. “Overview of Lithuanian nuclear and waste management programs” A2. “Overview of the Ukrainian national RW management program and recent developments” A3. “Geological disposal programs” A4. “Geological disposal concepts and challenges” A5. “Overall regulatory process and technical and scientific expertise requirements”
Day 2	B1-B2. “Regulatory expectations of the safety case”+ Exercises
Day 3	C1. “Regulatory review and assessment process and its challenges” C2. “Regulatory review, moving from conceptualisation to implementation” Exercise “Application of the review grids”
Day 4	D1. “Design and conduct of supporting research programmes” D2. “Summary of current programmes and future Joint Programming” D3. “Stakeholder engagement and introduction to Pathways Evaluation Process” D5. “PEP exercise”
Day 5	E1. “Recent experience with regulatory review of French Safety case for radwaste disposal in clay formation” E2. “Recent experiences and topical issues with regulatory review of the Finnish safety case for geological disposal”

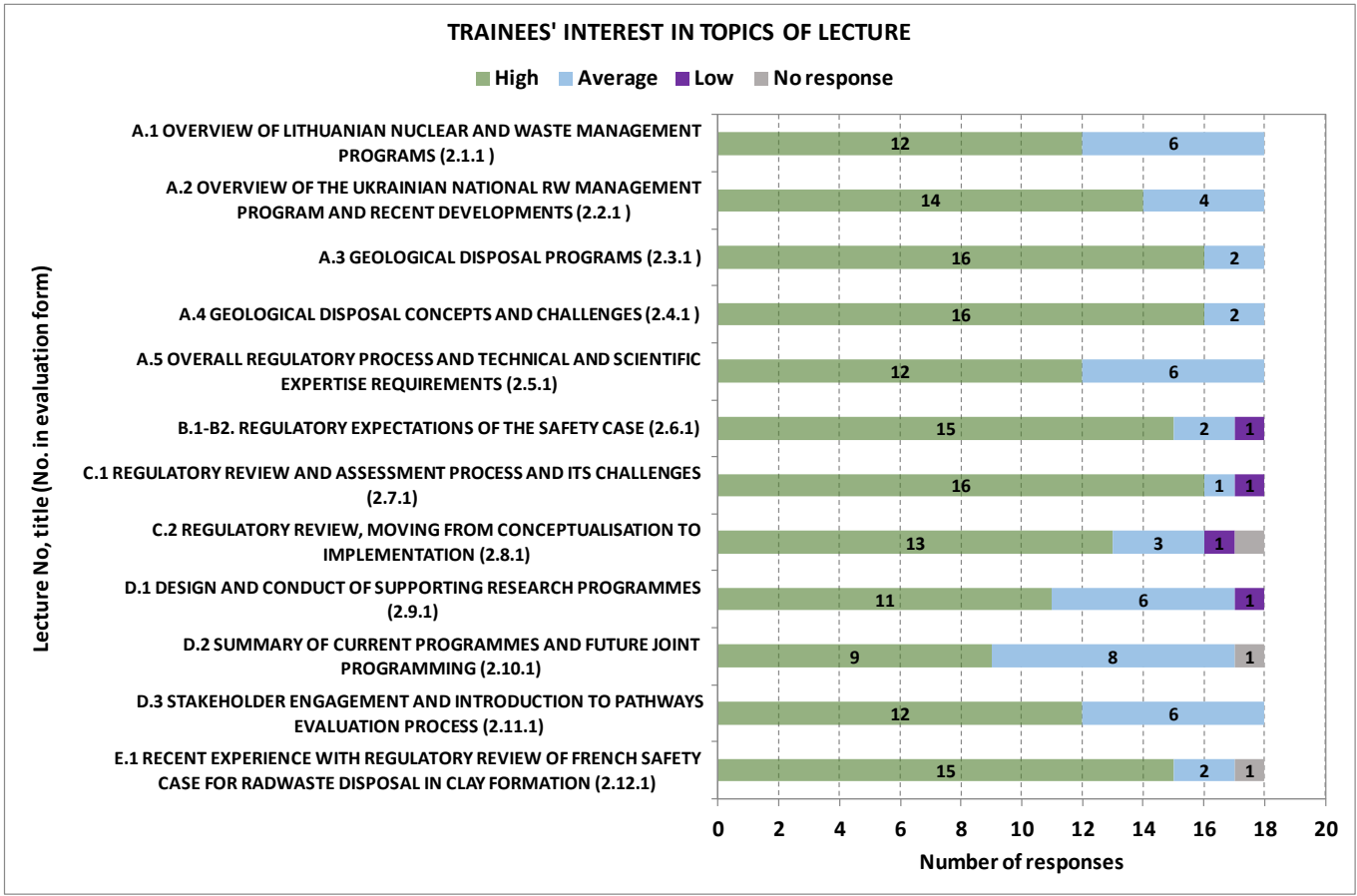
Pilot SITEX training session

- Organized in June 12-16, 2017, Kaunas, Lithuania
  - 18 trainees (Bulgaria, Belgium, Czech Republic, France, Germany, Lithuania, United Kingdom, Ukraine)
  - 12 lecturers

Lessons learned from the pilot session (1)

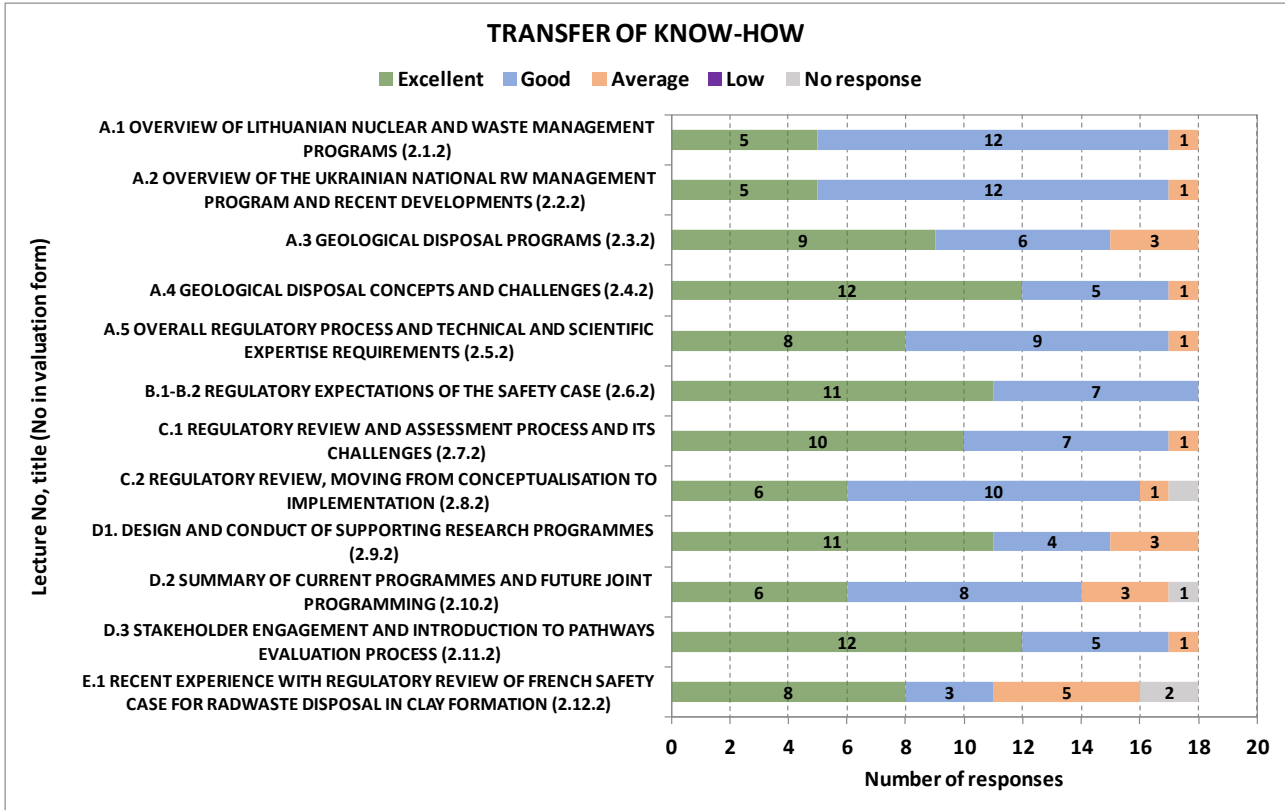
- Great interest in training on regulatory review of the safety case for geological disposal and on a variety of related processes/activities necessary to support the regulatory review

- Training session was highly rated (**18.4** out of 20, overall evaluation by trainees)



Lessons learned from the pilot session (2)

- Pilot training session was successful, attracted appropriate and active participants, confident and experienced lecturers and provided good feedback for further improvement
- **70%** of trainees received a rather high mark and exceeded the average mark
- Suggestions were grouped as related to:
  - *organisational aspects,*
  - *the content of developed module*
  - *the content of future training*



Future SITEX training

- 1 possibility – full training programme

Series of training course including labs visits	+	Scientific visits	+	Project on review of existing safety case

- 2 possibility – a set of training courses on specific topics e.g.

Training on regulatory review of safety case of geological disposal	+	Training on topic A	+	Training on topic B

(tested in pilot session)

- **Modular training programme**

Training on regulatory review of safety case of geological disposal ← **(tested in pilot session)**

Example of potential topics

+

Training on R&D to support the review of SC for geological disposal
(setting the research programme, managing the research, focus for e.g. on research during site selection, etc.)
+ **Lab visits**

+

Training on technical review of SC for geological disposal: from conceptualisation to implementation + **Application of review grids** + **Project on review of existing safety case**

+

Training on interaction with CS along implementation of geological disposal *(interaction with R&D, intergenerational governance, social science, citizen science in relation to geological disposal, etc.)* + **PEP exercise**

Conclusions

- The effective collaboration within the SITEX-II project WP3 led the training module material being developed for testing at a pilot training session
- The material developed was based on extensive experience gained by different organisations such as research organisations, technical support organisations, regulatory authorities, civil society organisations
- The experience of development and implementation of the pilot training session, as well as the evaluation of the feedback from all participants form an extensive basis for further development of the training and tutoring services to be provided by the SITEX network

Acknowledgement

- This project has received funding from the EURATOM research and training programme 2014-2018 under grant agreement No 662152
- Special thanks to all SITEX-II project partners and associated group members

Thank you for your attention

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