

# **C**hallenges to Regulators in Siting and Licensing the Construction and Operation of Radioactive Waste Repositories

Workshop Proceedings  
Helsinki, Finland  
8–9 September 2015



**Challenges to the Regulators in Siting and  
Licensing the Construction and Operation of  
Radioactive Waste Repositories**

**Proceedings of the RWMC Regulators' Forum  
Workshop  
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8-9 September 2015**

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NUCLEAR ENERGY AGENCY  
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

## Foreword

Radioactive waste management programmes in some countries are advancing to the final stages of development for construction and operation of disposal facilities. Such repository development affects both the waste management programme implementers and the regulators and there is interest internationally in sharing lessons and understanding commonalities and differences in and amongst regulators. Depending on the country, the priorities to be given to the management of different types of radioactive waste may be diverse. In a number of countries large volumes of short-lived low- and intermediate-level waste (LILW) exist and the emphasis is given to the planning of disposal solutions appropriate to the class of the waste. In other countries disposal facilities for short-lived LILW are in operation already, and the emphasis is given to the final management of high-level waste (HLW) in geological disposal facilities. In a few countries these projects will enter soon in the licensing and implementation phases.

However, a number of issues continue to impact the stakeholders and the processes. In the countries most advanced in their geological disposal programmes, important changes are taking place in the waste management and regulatory organisations, as they shift focus from research, development and demonstration (RD&D) to industrial development. Industrial feasibility and operations reliability and safety are now important focus areas, and with these come demands for additional and different qualifications and skills, (e.g. project management skills and procedures for construction, including procurement activities), increased quality assurance, and new requirements on management systems in the presence of long-term safety imperatives. Many waste management organisations and regulatory authorities have experienced similar transitions in the case of disposal of LILW. Although the change is more substantial when it comes to geological disposal and higher activity waste, experiences with the construction and operation of surface LILW waste disposal and lessons learnt are useful.

At the March 2013 meeting of the OECD Nuclear Energy Agency (NEA) Regulators' Forum, organised under the auspices of the NEA Radioactive Waste Management Committee (RWMC), it was decided that focus would be given to the challenges to regulators connected with the development of repositories for the various types of radioactive waste. To respond to these arising issues, the Regulators' Forum agreed to host a workshop titled "Challenges to the Regulators in Siting and Licensing the Constructions and Operation of Radioactive Waste Repositories" on September 8-9, 2015, in Helsinki, Finland." The key objective of the workshop was to identify, and exchange experience on, the current and future challenges faced by regulators when initiating and fulfilling the siting process for, and preparing licensing of, a geological repository. Topics covered implementing a

graded approach for different types of radioactive waste; preparing submissions or reviews of a construction license application; optimisation as a continuous process over decades during repository siting, design, construction, operation and closure; and ensuring transparent processes where public expectations are adequately taken into account.

The workshop gave a diverse reflection of the various developmental levels of the different geological disposal programmes, ranging from general information on organisations and their licensing regimes, to specific information on technical, regulatory, managerial, administrative and procedural issues. It also provided participants with an opportunity to share, in a roundtable environment, best practices, lessons learned, and practical options and experiences for regulatory progress in the siting, construction, licensing and operation of disposal facilities. It is hoped that the workshop contributed overall to an increased level of expertise and maturity in the field of waste repository licensing, construction and operation.

This document briefly synthesises the workshop presentations and discussion findings of the round table sessions.

### **Acknowledgments**

The NEA wishes to express its gratitude to the members of the Workshop Programme Committee for their contributions in planning and organising the workshop.

The NEA also would like to thank STUK Finland and the Finland Ministry of Employment and the Economy, for hosting us in Helsinki; the speakers for their informative and stimulating presentations; and all participants for their valuable inputs and contributions.



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## Introduction

The workshop “Challenges to the Regulator in Siting and Licensing the Construction and Operation of Radioactive Waste Repositories” was opened by Herkko Plit, Deputy Director-General at the Ministry of Employment and the Economy of Finland. Mr. Plit welcomed participants, noted the importance of the topic of the workshop and applauded the progress of countries already embarked or embarking on geological repositories. Michael Siemann (NEA) and Walter Blommaert (Regulators’ Forum Chair) then further impressed upon participants the importance of understanding of best regulatory practice in various phases of the development of radioactive waste repositories and their licensing process and explained the objectives and the structure of the workshop. The workshop was attended by a balanced mix of regulators, implementers and policy makers from 19 countries. To engage participants in more in-depth discussions on the presented topics and also to encourage professional exchange, three round table discussions were carried out throughout the workshop. Results of the group discussions were reported by the rapporteurs.

Following the introductory session (Session 1), Finland presented its experience with the development of a national waste repository (Session 2). This session included policy, regulatory, and industrial perspectives. In Session 3, France, Switzerland, and Canada examined in depth the specific challenges to the regulator during the LILW and HLW repository siting phase. The first roundtable or breakout group followed, to discuss questions related to siting. During Session 4, implementers and regulators from Belgium, Finland, and Sweden then presented their experiences and viewpoints on issues related to licensing and safety assessments of geological disposal facilities. The second roundtable followed, which discussed targeted questions on the pre-licensing and licensing phases. Session 5 (day 2) focused on feasibility of construction, wherein key safety issues that must be addressed were presented and discussed by representatives from Korea, Finland, and Hungary. Session 6 switched the focus to operation of geological repositories. Spain and the United States addressed licensing and recertification challenges, while the United Kingdom provided a review of the environmental safety case and permitting. A final roundtable followed to discuss construction and operation phases of repositories. In the last session of the workshop, Session 7, France provided its experience in preparing and managing the post-closure phase.

The workshop succeeded in examining the shift from RD&D to facility and industrial development. It was recognised during the workshop that multiple aspects must be taken into account to see this shift to fruition, including strong

political and national strategies, stakeholder support, and high levels of expertise. Also of note, the definition and impact of retrievability and reversibility on the design and operation of a repository were examined and challenged in each roundtable and considered a major hurdle.

## **Main Findings**

### **Session 2: Experience in Finland**

In Session 2, The Ministry of Employment and the Economy (MEE), the Regulator (STUK) and two Implementers (TVO and Posiva), gave an overview of LILW repositories in operation in Finland since the 1990s. It was noted that with the early establishment of a national framework for the SNF deep geological repository, and adequate financing achieved, a construction license for the repository was expected to be granted by the Government soon. The licensing process may be quite complex, but making the process clear and transparent, and having the right level of stakeholder involvement, has enabled Finland to receive strong political support for this project. Additionally it was noted that Finland's regulatory process is an active one, with a high level of contact and cooperation with implementers. The actual construction will be regulated by STUK, the nuclear regulator. It will include several reviews and approval steps, holdpoints and viewpoints.

### **Session 3: Challenges to Siting**

In Session 3, France, Switzerland, and Canada examined in depth the specific challenges to the regulator during the LILW and HLW repository siting phase. France discussed, in particular challenges during siting under the constraints of reversibility noting that authorisation for such is a complex process requiring high levels of flexibility and monitoring.

Canada currently has a number of projects at different stages of the siting process. The Canadian Nuclear Safety Commission (CNSC) is an independent regulator, with active out-reach activities to explain the role of the CNSC as a regulator (e.g. levels of involvement at the early stages of siting, full reviews throughout the siting and construction phases, and agreed processes) and to discuss in an open forum topics related to repository safety as well as collaborative international research. Of note, Canada mentioned the importance of siting criteria, dialogue, and transparency, with a clear understanding of the roles of each stakeholder. The motto was that a safe repository is derived from the proper balance of site, technology, and "system" in place.

Switzerland elaborated on the important benefits that can be garnered from test laboratories, including independent and objective experimentation and data, high levels of expertise, state-of-the-art equipment and research methods, and international co-operation. Additionally, the labs encourage transparency with their visitors centre and “open to the public” platform.

#### **Session 4: Pre-licensing and Licensing**

During Session 4, Belgium presented a case of licensing a Near Surface Repository (Dessel); Finland discussed the processes involved in preparing for and conducting a review of an SNF Repository; and Sweden discussed general license issues for an SNF Repository.

In total, fundamental issues surrounding “voluntary” pre-licensing and the safety case need to be resolved. A mutual understanding and coordinated application of processes and procedures is necessary. Additionally, regulatory resources, opportunities to practice (e.g. with pre-license applications), clear and focused review processes (e.g. inspections), adequate project management, and improved communications are necessary across the board. There should be a step-wise process (especially for R&D programs); decisions should be made on “incomplete” information; and there should be a goal toward separate legal processes (e.g. Environmental Code / Nuclear legislation).

Varying national circumstances affect agreed process and scope for licensing scenarios. For example, Sweden’s license application is addressed by two different legislative acts: the Environmental Code and the Nuclear Activities Act. The license application is thus reviewed in parallel by two regulators: the Environmental Court and the Swedish Radiation and Safety Authority (SSM). Municipalities are involved as well since they have the right to veto and provide statements to the Government on the project’s status. At the same time both regulators define permitting conditions. On the basis of these statements and statements by the regulators, the final licensing authority, i.e. the Government, will make a decision.

As there are often numerous authorities involved, coordination, transparency, competence, resources, and a clear and common understanding of adequate guidelines and requirement updates are all the more important.

#### **Session 5: Construction**

In Session 5, Korea and Hungary provided input on their construction and licensing processes for an LILW Repository; and Finland elaborated on its planned extension of the Loviisa Repository. The following were found to be of utmost importance in the C&L process: stepwise development; regular and evolved safety assessments; flexibility for extensions; adequate public communications and acceptance rates; and continuous regulatory engagement.

## Session 6: Operation

In Session 6, Spain discussed licensing challenges and the evolution of the El Cabril LILW disposal facility; the United States provided a detailed look at the recertification process for the WIPP Repository; and the UK provided a review of the Environmental Safety Case for its LLW Repository in Cumbria. Common themes throughout this session were lessons learned from transition to operation and also during operation; a need for periodic safety reviews and inspections; preparation for and response to events (natural or otherwise); improvements in engineering for future solutions; and the need for long-term safety.

## Roundtable Discussions

A roundtable discussion regarding siting resulted in the following conclusions:

- (i) In discussions related to the role of the regulator in the siting process, so long as there is an actual “siting phase” in a country, it was found that two perspectives are often better than one – emanating from both siting and design. For the siting perspective, the order might be siting or geology mix/fit, then design, then a regulatory body gets involved. For the design perspective, the regulatory body might be involved from the beginning, then criteria and design are established. Additionally, regulator involvement could be based either on legal/non-legal assignment to make decisions or on processes and information provisions only. In a question about authority, it was concluded that if a regulator has no formal authority to take decisions, this does not mean that there are no decisions to be made (for example, if not for siting, at least for safety); and if there is no formal role for the regulator for siting, then the role should be to improve public acceptance of the chosen site. Furthermore, if the authority lies with a different group, the role of the regulatory body should be to guide that body and provide input on safety. Overall, in an ideal world, siting should have regulatory input; but the final decision on siting should lie with the stakeholders.

The early involvement of the regulator in repository project development is important, including during the pre-licensing stage. Clarification is needed however, regarding if siting fits into the development process within the pre-licensing stage or another specific stage. Dialogue between the implementer and regulator is useful in the siting process but the acceptable timing and format of such dialogue should be specified. In any case, some criteria for site selection provided by the regulator at the earliest stage could facilitate the development process of a repository program, including the licensing steps. Early regulator participation in project promotion for a repository program could be more effective if the regulator is judged by the public to have a high level of competence and credibility; where the public understands that regulatory assessments are independent, high-quality and are carried out in a professional manner.

- (ii) It was also determined that siting should not necessarily be considered as the first step of the pre-licensing phase, but take a backseat to safety. The regulator will inevitably define the space within which to make decisions on this. Of note, IAEA definitions consider different phases with two steps prior to siting which include a “need for action” and a “disposal concept”; decision-making for which would also lie with the regulator in tandem with considerations about surface-level or deep repositories, which are inevitably policy decisions. Decision-making processes on the site selection should be clear regardless, and a framework should be defined and applied – with regulatory involvement from the beginning. Concepts and options should also be well understood with relation to justification and optimisation during siting, with flexibility in the repository concept allowing tailoring to a specific site or environment. This is also the regulator’s job. Most importantly, the regulator and all stakeholders should keep in mind that moving a siting project along is a long process that can lack inertia, compared to other types of infrastructure projects. Motivation in this case is difficult, but required.

A roundtable discussion regarding pre-licensing and licensing resulted in the following conclusions:

- (i) The policy development role of the regulator is one of the only areas where it can act alone, without seeking input from stakeholders and developing guidance for the safety case and fulfilment of requirements should be a process of negotiation between the regulator, implementer and other stakeholders. This helps the regulator to perform the review – ensuring that everyone inside the process has the same understanding. There was an example where a version of the Table of Contents for the guidance document was provided also to the public for comment – all agreed that this was a useful tool for public engagement and could increase the confidence or transparency necessary for external stakeholders and drive a more open and structured discussion. Public concerns about safety especially must be taken into account ahead of time and discussed between the implementer and regulator, and the public. If the process is more open the regulator/implementer are forced to bring the options and topics to the table for discussion, though the regulator should have, based on the safety justification from the implementer, already positioned itself on: retrievability of the waste; monitoring; surface versus underground disposal; etc. In any case, not all policy issues are regulator driven, some are industry- and implementer-driven. But how a policy is delivered, along with timelines, can and should involve others (e.g. for retrievability/reversibility/disposal concept definitions; or for who is responsible for the waste at which stage). Vision documents or position papers not provided to the public are often mistaken as a closed government process.
- (ii) Regarding safety, flexibility, retrievability/reversibility, and other countermeasures are vital. Some regulatory structures are sensible in this regard; for example, those with a legal requirement for discussions

every three years on R&D of waste management. There should be continuous R&D within the regulatory bodies as well.

- (iii) Regarding defining inventories, the specific waste acceptance criteria for disposal are usually developed at the design phase and can be improved at the constructional stage based on the host rock features, design concept and waste characterisation. The examples provided within the UK and Sweden included a consent letter regarding waste and special conditions required prior to the waste being placed in the disposal site. The fuel cycle industry is or will be provided with specific waste acceptance criteria that the regulator must consider as well, which can be challenging for the regulators. Moreover, specific waste acceptance criteria depend on which type of repository exists, which radionuclides are being discussed, and if characterisation can happen easily and accurately, which is especially important for surface and near surface repositories. The Safety Case should cover this.
- (iv) The pre-licensing stage should be regulated and the level of detail required should be specified. This would help to determine how regulators can build experience with respect to the pre-licensing stage. Additionally, the implementer needs to design an appropriate Safety Case (table of contents, safety demonstration strategy, safety concept, level of detailing). A stepwise licensing procedure could be attained in a few different ways:
  - issuing different kinds of licenses for different phases of repository development (construction, test operation, operation, closure);
  - the periodic review of one general license; or
  - a licensing process that can meet changing or new circumstances throughout the lifetime of a DGR.

A roundtable discussion regarding construction resulted in the following conclusions:

- (i) There are a number of roles and responsibilities for the regulator and implementer during the construction phase. The nuclear regulator is responsible for inspecting the construction works to verify the respect of the license conditions and the safety case. The implementer is responsible for safety and for constructing in line with the license conditions and the safety case. The regulator validates the management system but the implementer is responsible for the implementation. Implementer-regulator dialogue should be maintained for all issues relating to safety, for example on the follow-up of the construction progress. The implementer has to keep an up-to-date file containing all information relating to compliance and important for future decision steps in the lifecycle of the repository (in the form of records and samples). Both the implementer and the regulator are responsible for continuous engagement with the stakeholders, in particular with the public. When there is a negative or positive deviation on the safety case, the implementer must inform the regulator so it can be evaluated. The

implementer should strive for continuous improvement based on feedback/return of operational experience/R&D/international experience and the regulator should develop adequate criteria for reviews and inspections during and after construction, ensuring the safety case is reflected in the design of the facility.

- (ii) Concerning the issue of contemporaneous construction and operation, it is important to keep the same safety issues standard across disciplines (i.e. mining and construction) – these philosophies should be properly aligned. In the case of construction and operation happening in parallel, some countries have specific regulations that do not allow interaction (separated by walls or tunnels, or separated by time), while others allow work to happen in parallel; international standards could be regulated, in principle. There is a need for public outreach/acceptance before and during construction in many cases for situations around inhabited areas (for example mitigated increased traffic/strangers) and it is helpful and beneficial to have international input and cooperation on this during a stepwise process to increase stakeholder confidence. In the case of licensing, some countries do construction and operational licensing in parallel, while others only have one license provided at the beginning which includes permission stages/hold points, options to review and revoke if necessary, and safety reviews required every so often.
- (iii) With regard to the construction of a facility in compliance with a Safety Case, the theory is that on paper it will always comply, but it would be necessary to inspect/review post-construction to measure compliance, to assure quality is within the values of the SC and feedback should be made available during and after construction process. Of course, during operation it is easy to inspect and control technical specifications in most cases. It was again mentioned that a table of contents provided ahead of the submission of a SC could be useful
- (iv) Finally, regarding the issue of retrievability in the construction phase, it is important to note that the concept of retrievability is understood differently (one container vs. all containers / one phase vs. all phases / pre- vs. post-closure) between and amongst countries. Thus, when required, the concept of retrievability should be developed before the licensing procedure and before the authorisation for construction. If retrievability is a regulatory requirement, it must be demonstrated at the latest before the operational phase starts and the concept of retrievability must not jeopardise long term safety. Furthermore, the implementer should make the case for retrievability and the regulator is responsible for the assessment. It is possible to test monitoring/ retrievability in a pilot/demonstration prior to licensing the construction.

A roundtable discussion regarding operation resulted in the following conclusions:

- (i) There are a number of operational activities that can enhance long term safety: On the physical side, sealing chambers as soon as possible after



filling and avoiding overheating of the host rock/geology. Continuous construction, disposal operations and partial facility closure should happen in parallel and requirements for these separate phases may conflict. This has to be addressed and studied further for negative effects. Further, QA procedures should ensure that the facility will be operated in compliance with the safety case: Ensuring there is minimal contradiction between the stated requirements of both operational and long term safety; providing impact assessments for all changes during operation on long term safety; having a good understanding what long term safety means; and establishing and maintaining clear communications between safety staff and operational/site/underground staff.

- (ii) There are a few major safety issues to consider and ensure limited conflicts between radiological protection, conventional safety, and operational safety. It is vital to show that a facility is safe, even with the potential of situations occurring (e.g. package drops or packages getting stuck or blocking). Of note, operation of a disposal facility should be treated as equal to operation of other nuclear facilities and radiation protection is important in all aspects of disposal operations, as the process of handling waste is risky (fire hazards, separate and often conflicting requirements for transport, geological instability, regulations for underground works, etc.). Environmental conditions and other elements must be considered to affect long-term safety, plus security and non-proliferation must be controlled. The long operational period is challenging. The nuclear regulator has the lead role in licensing and reviewing operational activities, but should harmonise regulations and work to avoid the challenge of conflicting regulatory roles.
- (iii) On the matter of building in a retrievability option, a few challenges were noted. First, it was again concluded that countries define retrievability differently. There should be greater consensus on this topic. Second, since it is a long-term process, countries should at least have a requirement for risk analysis/assessments on retrievability options (taking into account both financial and technical considerations), or provide a basic foundation of requirements, not to include specific criteria for each potential case. Again, a French example of having interim storage zone in case of retrievability was provided.



## Conclusions

The workshop was considered a success. There was a vast amount of interest in the topics covered with active participation from experts with varied interests and expertise. Informative programme overviews and project details were delivered in the given presentations.

It was acknowledged, during the workshop, that many repository projects are at different developmental levels and therefore different concerns were noted among countries and/or waste management programmes. Due to the wide range of participating programmes and due to the different phases of and experience in dealing with the stages of repository development represented, the information presented at the workshop ranged from general and generic questions to specific technical, managerial, administrative, legal, regulatory and procedural issues. Although many issues still await resolution, joint views were observed amongst the participants.

- However, despite the various developmental levels, commonalities among the waste management programmes or countries can be drawn:
- There was consensus on the role of the stepwise process which, in many countries, is inscribed in their legislation. In this context, early interaction with a competent regulator is considered important in order to communicate effectively on issues related to siting, and the construction and operational licences. It is recognised that the early identification of challenges associated with siting, construction, long term safety, and risk management related to repository operation are also crucial in development;
- Many advanced programmes recognise the importance of a strong national waste management policy and quality management system, including the planning of required resources. Competent and experienced implementers and regulators, with regular regulator-implementer dialogue, are also key to advancing repository development. This is especially important when the implementer has to be prepared for the siting and industrial phases and for supervising large contracting companies. In this respect a monitoring plan is very important. Quality management processes should be reviewed by regulators and an inspection programme put in place.
- Further differences between countries are observed in the siting and the licensing processes. The need of developing specific regulations and clearly defining the length of process and the role of the regulator are

noted as well. In some countries, regulations are imposed and assessments are performed by more than one regulating body. Such situation can be complex as different regulating authorities may stipulate different conditions. In such situation, it is often the government who has the responsibility to deliver the final decisions. Furthermore, flexibility and adaptability are key for any regulatory program. Regulators, implementers and other stakeholders need to develop a plan for maintaining adequate competencies across the field and consistently exchange lessons learned and best practices in operating experiences. A difficult situation faced by the implementers is to account for potential political changes in the planning of the essential resources for the industrial phase.

The workshop also concluded, that many others areas of this subject: “Challenges to the Regulator in Siting and Licensing the Construction and Operation of Radioactive Waste Repositories” need to be further explored. Many challenges exist, but many successes have been gained. For example, there has been progress in siting and licensing for the construction and operation of disposal facilities. But continued advancement is needed in general regulatory principles, especially in the continued establishment of independent regulators and coherent regulatory frameworks, including requirements and adequate guides for achieving success. Aspects such as (i) the need to introduce enough flexibility into the regulatory process and the siting and construction project, (ii) the adequate defining and application of retrievability and reversibility constraints, (iii) the varied roles of monitoring in the different phases of the project, and (iv) the fundamental need for communication, especially in international benchmarking and cooperation and stakeholder engagement.

This set of issues is by no means complete. For the Regulators’ Forum, it is now necessary to identify approaches to resolutions which are of joint interest in order to address them in their programmes of work. Subjects which have to be discussed further and perhaps addressed in the Programme of Work include:

1. Possible formats and conditions for regulator engagement in the earliest stages of a repository program (siting), and formulating the general principal of interaction between the implementer and regulator (and maybe other stakeholders).
2. The possibility for a regulator to provide core requirements to the Safety Case, with a sufficient level of requirements as early as possible in the start of the project under consideration.
3. The possibility of the regulator to find and implement methods to follow and address the R&D and operation experience during repository designing, construction and operation. A search of the best solution should be required.
4. A universal understanding of the retrievability and reversibility from the point of view of international dialogue of regulators.
5. An insistence of good and practical communications between above-ground and underground staffing groups (i.e. design teams,

excavation and mining teams, etc.) during construction and operation of repositories, as well as between the regulators, implementers and on-site staff. For example, each group could have a clear understanding of the regulatory and licensing process and decisions, as well as how their specific process or stage fits into the requirements of each.



## Annex I: Programme

### RWMC/RF WORKSHOP: CHALLENGES TO THE REGULATORS IN SITING AND LICENSING THE CONSTRUCTION AND OPERATION OF RADIOACTIVE WASTE REPOSITORIES

Sponsored and hosted by the Finnish Ministry of Employment  
and the Economy (MEE) and the Radiation and Nuclear Safety  
Authority (STUK)

8-9 September 2015\*  
Hotel Presidentti  
Eteläinen Rautatiekatu 4  
Helsinki, 00100  
Finland

*\*Please note:*

- Reception on Monday 7 September
- Optional site visit on Thursday 10 September

Monday 7 September 2015		
18:00 - 20:00		<b>Reception/Registration</b> Hotel Presidentti

DAY 1 – Tuesday 8 September 2015		
09:00		<b>Welcome and opening + practicalities</b> – [30 min] Herko Plit (Finland, MEE) Michael Siemann (NEA) Walter Blommaert (RF Chair)
09:30	<b>Session 1</b>	<b>Setting the scene for the workshop aims and objectives)</b> – [15 min] Walter Blommaert (RF Chair)

09:45	<b>Session 2</b>	<b>Experience with waste repositories in Finland</b> –[65 min+10 for Q&As at the end] Chair: Michael Siemann (NEA)
	2.a	<b>Ministry</b> : The policy perspective (including decision making and public involvement) – [15 min+5] Jaana Avolahti (MEE)
	2.b	<b>Regulator</b> : The regulatory perspective (role and experience of STUK over time) – [15 min+5] Jussi Heinonen (STUK)
	2.c	<b>Implementer</b> : The industrial perspective of TVO and POSIVA – [20 min+5] Liisa Heikinheimo (TVO) & Tiina Jalonen (Posiva)
11:00		<b>Break</b> – [20 min]
11:20	<b>Session 3</b>	<b>Siting phase: Challenges to the regulator during the siting of repositories for HLW and LILW</b> Chair: Carmen Ruiz Lopez (Spain, CSN)
	3.a	<b>France</b> : Challenges during siting of a deep geological repository for HLW and LILW under the constraint of reversibility – [15 min+5 min] Cécile Castel (ASN)
	3.b	<b>Switzerland</b> : Benefits to the regulator from test laboratories – [15 min+5 min] Reiner Mailänder (ENSI)
	3.c	<b>Canada</b> : Examples of projects at different stages (feasibility study, licensing process) – [15min+5min] Julie Mecke (CNSC)
12:20		Instructions on Round table discussions (R/Ts) – [10 min]
12:30		<b>Lunch</b> – [90 min]
14:00	R/Ts	Session 3: Round table discussions on Siting phase – [75 min]
15:15	<b>Session 4</b>	<b>Pre-licensing and licensing phase</b> Chair: Julie Mecke (Canada, CNSC)



	4.a	<b>Belgium:</b> Licensing application for a near surface repository for LILW – [15 min+5] Benoit Guiot (FANC)
	4.b	<b>Finland:</b> STUK: Lessons from the experience of preparing for and conducting the review of the safety assessment for a SF repository (include safeguards) – [15 min+5] Kai Hämäläinen (STUK)
	4.c	<b>Sweden:</b> General license for a spent fuel repository at depth – [15 min+5] Ansi Gerhardsson (SSM)
16:15		<b>Break</b> – [30 min]
16:45	R/Ts	Session 4: Round table discussions on Pre-licensing and licensing phase – [75 min]
18:00		<b>Adjourn</b>
		<b>DAY 2 – Wednesday 9 September 2015</b>
9:00		Oral Report from Day-1 R/Ts – [40 min]
<b>9:40</b>	<b>Session 5</b>	<b>Construction</b> Chair: Ansi Gerhardsson (Sweden, SSM)
	5.a	<b>Korea:</b> Construction and licensing of a LILW repository at medium depth – [15 min+5] Jin Yong PARK (KINS)
	5.b	<b>Finland:</b> Loviisa extension – [15 min+5] Jari Tuunanen (FPH)
	5.c	<b>Hungary:</b> B́aatapáti - Construction and licensing of a LILW repository at medium depth – [15 min+5] István LÁZÁR (HAEA)
10:40		<b>Break</b> – [30 min]

<b>11:10</b>	<b>Session 6</b>	<b>Operation</b> Chair: <i>Gérald Ouzounian (France, Andra)</i>
	6.a	<b>Spain:</b> Licensing challenges and evolution of El Cabril – [15 min+5] <i>Presenter TBC</i>
	6.b	<b>United States:</b> Recertification of WIPP at regular intervals – [15 min+5] <i>Tom Peake (EPA)</i>
	6.c	<b>United Kingdom:</b> LLW Repository, Cumbria - Review of environmental safety case and permit – [15 min+5] <i>Andrew Fairhurst (Environment Agency)</i>
<b>12:10</b>		<b>Lunch</b> – (90 min)
13:40	R/Ts	Sessions 5 & 6: Round table discussions on Construction and Operation – [75 min]
<b>14:55</b>	<b>Session 7</b>	<b>Closure and post-closure</b> Chair: <i>Walter Blommaert (RF Chair)</i>
	7.a	<b>France:</b> La Manche- ASN experience of preparing and managing the post-closure phase – [15 min+5] <i>Gérald Ouzounian (Andra)</i>
15:15		<b>Break</b> – [30 min]
15:45		Oral Report from Day-2 R/Ts – [20 min + 10 for Q&As at the end]
<b>16:05</b>	<b>Session 8</b>	<b>Stocktaking Reports</b> – [15 min each + 10 for Q&As at the end] <i>Ingemar Lund (Sweden, SSM) and Shawn Smith (USA, NRC)</i> Chair: <i>Kaisa-Leena Hutri (Finland, STUK)</i>
<b>16:45</b>	<b>Session 9</b>	<b>Closure</b>
17:10		<i>Adjourn</i>

<b>Thursday 10 September 2015</b>		
<b>Optional site visit to the Loviisa LILW repository (not an NEA official event)</b>		
7:45	Departure from Helsinki	<p>Bus transport, leaving from the Hotel Presidentti.</p> <p>The visitors are required to show their passports (or, in case of a Finnish citizen, an official ID with photo) when arriving to the Loviisa NPP.</p> <p>The visit will include:</p> <ul style="list-style-type: none"> <li>○ a general presentation of the Loviisa NPP</li> <li>○ a visit to the low- and intermediate level waste repository and a simulator</li> <li>○ a light lunch</li> <li>○ a specific presentation about RWM management by FPH/Loviisa</li> </ul>
14:00-14:30	Leaving Loviisa	The bus will first drive to the Helsinki-Vantaa airport, then stop at STUK HQs, and drive back to the Hotel Presidentti.



## Annex II: List of participants

Last Name	First Name	Organisation	Country
<b>BERNIER</b>	Frédéric	FANC	Belgium
<b>BERGMANS</b>	Anne	University of Antwerp	Belgium
<b>BLOMMAERT</b>	Walter	FANC	Belgium
<b>BOSELAERS</b>	Rudy	ONDRAF/NIRAS	Belgium
<b>DEMARCHE</b>	Marc	ONDRAF/NIRAS	Belgium
<b>DE PRETER</b>	Peter	ONDRAF/NIRAS	Belgium
<b>GUIOT</b>	Benoit	FANC	Belgium
<b>JANSSEN</b>	Pierre	Bel V	Belgium
<b>PERKO</b>	Janez	SCK-CEN	Belgium
<b>LANG</b>	Lisa	NWMO	Canada
<b>MECKE</b>	Julie	CNSC	Canada
<b>MIKSOVA</b>	Jitka	RCREZ	Czech Republic
<b>SULAKOVA</b>	Jana	State Office for Nuclear Safety	Czech Republic
<b>ULFBECK</b>	David	Danish Health and Medicines Authority, National Institute of Radiation Protection	Denmark
<b>AVOLAHTI</b>	Jaana	MEE	Finland
<b>GARDEMEISTER</b>	Ari	Saanio & Riekkola Oy	Finland
<b>HAGROS</b>	Annika	Saanio & Riekkola Oy	Finland
<b>HAMALAINEN</b>	Kai	STUK	Finland
<b>HEIKINHEIMO</b>	Liisa	TVO	Finland
<b>HEINONEN</b>	Jussi	STUK	Finland
<b>HELLÄ</b>	Pirjo	Saanio & Riekkola Oy	Finland
<b>HUTRI</b>	Kaisa-Leena	STUK	Finland
<b>IKONEN</b>	Antti	Saanio & Riekkola Oy	Finland
<b>JALONEN</b>	Tina	POSIVA	Finland
<b>KARVONEN</b>	Taina	Saanio & Riekkola Oy	Finland
<b>KOJO</b>	Matti	University of Tampere	Finland
<b>KYLLÖNEN</b>	Jarkko	STUK	Finland

Last Name	First Name	Organisation	Country
LEINO	Jaakko	STUK	Finland
O'CARROLL	Fionan	Saanio & Riekkola Oy	Finland
PALTEMAA	Risto	STUK	Finland
PASTINA	Barbara	POSIVA	Finland
PLIT	Herkko	MEE	Finland
SILLANPÄÄ	Tuulikki	STUK	Finland
SNELLMAN	Margit	Saanio & Riekkola Oy	Finland
TUUNANEN	Jari	FORTUM	Finland
VUORI	Seppo	VTT	Finland
WANNE	Toivo	Saanio & Riekkola Oy	Finland
CASTEL	Cécile	ASN	France
DE HOYOS	Amélie	IRSN	France
OUZOUNIAN	Gérald	ANDRA	France
ROCHER	Muriel	IRSN	France
THEGERSTRÖM	Claes	Commission Nationale d'Evaluation - CNE2	France
FASS	Thorsten	GRS	Germany
FISCHER-APPELT	Klaus	GRS	Germany
HARTWIG-THURAT	Eva	GRS	Germany
RECKERS	Joerg	BMU	Germany
LÁZÁR	István	HAEA	Hungary
CIPRIANI	Nadia	ISPRA	Italy
ITO	Kazumasa	NRA	Japan
UCHIDA	Masahiro	NRA	Japan
UMEKI	Hiroyuki	NUMO	Japan
JUNG	Haiyong	KINS	Republic of Korea
PARK	Jin Yong	KINS	Republic of Korea
CHWAS	Andrzej	Ministry of Economy	Poland
LAVRINOVICH	Andrey	Gosnadzor	Russia
SCHADILOV	Anatoly	SEC NRS - TSO of Rostechnadzor	Russia
TALITSKAYA	Anna	SEC NRS - TSO of Rostechnadzor	Russia
OSOJNIK	Igor	Slovenian Nuclear Safety Administration	Slovenia
TAVCAR	Polona	Slovenian Nuclear Safety Administration	Slovenia
RUIZ LOPEZ	Carmen	CSN	Spain
ÅHSBERG	Helene	SKB	Sweden

Last Name	First Name	Organisation	Country
<b>ANDERSSON</b>	Peter	Swedish National Council for Nuclear Waste Ministry of the Environment	Sweden
<b>BORG</b>	Patrick	SSM	Sweden
<b>GERHARDSSON</b>	Ansi	SSM	Sweden
<b>HEDBERG</b>	Bengt	Swedish Nuclear Power Inspectorate	Sweden
<b>LIU</b>	Jinsong	SSM	Sweden
<b>LUND</b>	Ingemar	SSM	Sweden
<b>MAILÄNDER</b>	Reiner	ENSI	Switzerland
<b>SMITH</b>	Paul	Safety Assessment Management GmbH	Switzerland
<b>FAIRHURST</b>	Andrew	Environment Agency	United Kingdom
<b>PETERS</b>	Helen	Committee on Radioactive Waste Management	United Kingdom
<b>HANEY</b>	Catherine	NRC	United States
<b>PEAKE</b>	Tom	EPA	USA
<b>SMITH</b>	Shawn	NRC	USA
<b>TREICHEL</b>	Judy	Nevada Nuclear Waste Task Force	USA
<b>FORMENTINI</b>	Marine	NEA	International Organisation
<b>GILLOGLY</b>	Mari	NEA	International Organisation
<b>LEBEDEV</b>	Vladimir	NEA	International Organisation
<b>SIEMANN</b>	Michael	NEA	International Organisation