

HLW REPOSITORY OPTIMISATION INCLUDING CLOSURE (OPTI)

WP 13



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October 24th, 2024

Kick-off Meeting, Gent (Belgium)

HLW REPOSITORY OPTIMISATION INCLUDING CLOSURE (OPTI)

- **Strategic Study**
- **Links with the EURAD SRA**
 - 5.1.1: Design requirements
 - 5.1.4 Design qualification
 - 5.2.2: Optimisation (of the facility components and design)
- **Links with the Roadmap Themes**
 - Engineered Barrier Systems
 - Disposal facility design and optimisation
 - Safety Case

SRA DRIVERS AND OBJECTIVES

- **Implementation Safety**
- **Innovation for Optimisation**
- **Societal Engagement**

Develop a mutual understanding and provide recommendations about methodologies and further activities for design and optimization of specific HLW deep geological repository systems, structures and components (SSCs) and procedures.

MAJOR ACHIEVEMENTS EXPECTED BY END OF YEAR 2

The planned duration of the StSt is two years. The major achievements after that period correspond to the planned outcomes:

- Organise interactions between the EURAD actors (civil society included) about optimization of HLW GDF
- Develop a mutual understanding of the different actors views about what optimization for a HLW GDF means
- Identify the main technical or socio-technical challenges associated with the optimization of HLW GDF

WP DESCRIPTION

Context

- Optimization will be in focus of advanced programmes as first repositories enter in construction / operation periods
- The need of optimization is justified by the long running character of repository projects and thus by expected changing boundary conditions (e.g. new waste types), evolution of technology and/or the adaptations of processes due to operational experiences
- Optimization is a process that shall involve all stakeholders of a RWM programme, civil society included
- Optimization provides necessary benefits regarding technical, economical, long-term safety related aspects as well as flexibility and robustness

WP DESCRIPTION

Impact

- A mutual understanding about the views of the different actors on optimisation will be developed
 - What are the main drivers for optimization? At that points in the program is optimization needed, recommended or forbidden? What main key challenges are seen for optimization?
- If appropriate, formulation of a common understanding about optimization, considering the views of the different colleges/stakeholders
- Networking about best practices for Optimisation strategies for SSCs (e.g. EBS) and DGR processes
- Outcomes will help less advanced programmes in their earlier phases of repository development
- Transfer of knowledge from advanced to less developed programmes will be facilitated
- R&D needs about specific SSCs and procedures that could be optimized further will be identified

WP DESCRIPTION

- **Task 1 – Management and Coordination (Philipp Herold, BGE)**
- **Task 2 – Knowledge Management (Anne-Catherine Dieudonné, TU Delft)**
 - Subtask 2.1 – Knowledge capture
 - Subtask 2.2 – Knowledge Transfer
- **Task 3 – Mutual Understanding (Valery Detilleux, BEL V)**
 - Building a mutual understanding of optimization approaches for waste disposal facilities and their management in RWM programmes and safety cases. Baseline study-oriented task.
 - Subtask 3.1 - Workshop to build mutual understanding
 - Subtask 3.2 - Case study
- **Task 4 – Identification of Key Challenges for Optimization (Jiri Svoboda, CTU)**



TASK 2 – KNOWLEDGE MANAGEMENT

- **Sub-task 2.1 - Knowledge capture**

- A green paper will be prepared at the beginning of the WP (6 months after the launch) that will gather EURAD actor views that stimulate discussion on the need for optimization, the phases when optimization is needed, the main (technical) challenges for optimization and the best or existing strategies how to do optimization. **To collect the input a first workshop is planned.**

- **Sub-task 2.2 – Knowledge transfer**

- In cooperation with KM WP/(s), deliver specific activities to transfer knowledge to interested parties.
- Some examples of knowledge transfer activities: online training, face-to-face training, e-learning materials, workshops, posts for social media, summary sheets, videos, guidance
- **not yet defined in detail**

TASK 3 – SUBTASK 3.1 MUTUAL UNDERSTANDING

- **GDF projects are characterized by several decades of development and operation**
- **A GDF project is always a highly complex project with the participation of not just a wide spectrum of scientific and engineering disciplines but also a wide spectrum of stakeholders**
- **Naturally, in such a complex system every actor has its own view and particularly own focus**
- **This is notably reflected in the understanding and expectations of the different stakeholders about GDF optimization**
- **Within subtask 3.1 the different views of optimization will be shared between the different actors and a mutual understanding of these views will be built**

TASK 3 – SUBTASK 3.1 MUTUAL UNDERSTANDING

- **the following major questions related to optimization will notably be addressed in a workshop**
 - What aspects include the optimization of a disposal facility? (technically, regulatory, etc.)
 - Why to optimize?
 - At what time in the project is optimization needed or required?
 - What are the needs and the goals related to optimization (economics, flexibility, safety...)?
 - How to implement an optimization process?
 - What strategies to implement/perform optimization are available?
 - How to create a balance between the stakeholders' objectives and the (maybe) multi-objective key challenges?

TASK 3 – SUBTASK 3.2 CASE STUDY

- To support the discussions in sub-task 3.1 a generic case study has to be developed
- The case study serves as a basis for the development and illustration of the mutual understanding regarding optimization approaches in sub-task 3.1
- The case study represents a theoretical case of challenging optimisation of one or more repository SSCs (systems, structures and components) and procedures
- The case study is expected to capture several different optimisation objectives pursued by the different actors
- To do so, the task contributors will first build a consensus regarding the design bases of the case study and its expected level of detail and complexity
- Starting from this consensus, optimization criteria will be identified by the different actors, as well as possible constraints and optimization approaches and methods
- Possible optimisations to the design basis will be identified, considering these criteria, constraints, approaches and methods

TASK 4

- **Task will provide overviews of the identified optimisation topics and possible optimisation approaches, considering the views of the REs, WMOs, TSOs and CSOs. The task will identify potential needs for further activities (white paper).**
- **Key topics/SSCs already identified during the WP preparation are e.g.:**
 - Optimization of buffer and backfilling composition and installation methods
 - Optimization of closure process, (gallery) sealing design, location and installation methods
 - Design of gallery support structures and flexibility in changed geo-mechanical conditions, especially in claystone
- **Additional key topics could be addressed in Task 4.**
- **Further key topics could be related to the implementation of new technologies or materials, digital environments and the implementation of digital tools in the GDF lifetime or impacts from other industries/scientific results**

SCHEDULE

- **Strategic Study – duration two years**

- First WP meeting terminated to November 28th, 2024 in Hannover (Germany)
 - (last day of the Clay Conference)
- Workshop 1 (Identify the positions of the stakeholders) in January 2025 (month 4)

		Year1 / Period 1												Year2/ Period 2											
Month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WP 13	WP meetings			T2.1						T3.1															
	workshops																								
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	T1.1																								
	T1.2																								
	T1.3																								
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MILESTONES

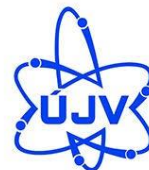
Number	Milestone name	Lead participant	Delivery date (in months)	Means of verification
1	Workshop 1 to identify the positions of the stakeholders	Anne-Catherine Dieudonné, TU Delft	3	Green paper (Deliv. 1)
2	Workshop 2 to establish a mutual understanding	Valery Detilleux BEL V	9	Green paper (Deliv. 2)
3	List of Key topics to be addressed in Task 4.	Jiri Svoboda, CTU	12	List of topics
4	White paper key challenges and steps forward	Jiri Svoboda, CTU	18	White paper (Deliv. 3)
5	Final Report	Philipp Herold, BGE	24	Final Report (Deliv. 5)

DELIVERABLES

Number	Deliverable name	Short description	Lead participant	Type	Dissemination level	Delivery date (in months)
1	Draft: Existing actor views	Report summarizing the understanding in participating countries, colleges and participating civil society plus general literature about optimisation of GDF, input from first workshop (milestone 1)	Anne-Catherine Dieudonné, TU Delft	R Draft (Green) Paper	SEN WP internal	6
	Final: Mutual Understanding of actors views about optimisation	Based on milestone 2, finalise deliverable 1 by documenting the mutual understanding/consensus view about the goals, strategies, and key challenges within optimization.	Valéry Detilleux, BEL V	R Final (Green) Paper	PU	14
2	Technical Key challenges for Optimization of HLW GDFs	Documents potential for further actions for specific key optimisation challenges, based on milestone 2 and 3	Jiri Svoboda, CTU	R (White) paper	PU	18
3	Outcome/impacts report to Member States and End Users	Summarize the papers and the work in task 3 and 4, including case study as test field, conclude what new position was formulated	Philipp Herold, BGE	R Technical Report	PU	20
4	Final Report	Summarize the papers and the work in task 3 and 4, including case study as test field, conclude what new position was formulated, Summarize End user Feedback	Philipp Herold, BGE	R Final Report	PU	24

PARTICIPATING ORGANIZATIONS

- The WP includes 23 partners from 11 countries (BE, CZ, GER, FR, SE, FIN, NL, HU, SI, EST, UA).
- In addition, associated partners from Switzerland (nagra and PSI) are involved
- NTW will participate as CSO



LINKS TO OTHER WPS

- **WP12 – ANCHOR**

- Output from WP 13:

- What are the key challenges for the optimization of buffer and backfill?
 - Give WP12 the high-level needs/goals for optimization and define the information needed about bentonite to do the optimization.
 - What is expected from an alternative bentonite or a database to select a type of bentonite?
 - Discussions between the WPs and maybe a joint meeting within year 2 Troisième niveau

- **WP16 – SUDOKU**

- Steady exchange and maybe one joint meeting within year 1, exchange about the basic processes/understanding in optimization, especially in not strictly technical aspects (regulation/management,...)

- **WP6 – STEAM**

- Input to WP 13: What kind of new treatment can be expected?
 - Output from WP 13: What are the key challenges for optimization and how can WP6 contribute to this?

THANK YOU FOR YOUR ATTENTION!