EURAD-2 WP description Template #2

Please see Instructions for Work Package Preparation Team, public document for guidance (available on EURAD and PREDIS websites)

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Short Acronym and full Title	WP13 – OPTI - HLW Repository optimisation including closure		
Type of activity	☐R&D	☒ Strategic Study	Knowledge Management – covered by a separate committee and template
Budget estimation (total budget in M€, i.e ~ 1.5 M€)	Current estimation (will depend on workshops organisations, WP participants…): between 1 and 1.5 MEUR.	Duration of the WP (in months)	24
Links with EURAD SRA / Roadmap Themes (if multiple choices, indicate the primary link **in bold – maximum 3**)	☐Programme Management (Theme 1) ☐Pre-disposal (Theme 2) ☒ Engineered Barrier Systems (Theme 3) ☐Geoscience (Theme 4) ☒**Disposal facility design and optimisation (Theme 5)** ☐Siting and Licensing (Theme 6) ☒Safety Case (Theme 7)		
Links with EURAD SRA topics (if multiple choices, indicate the primary link **in bold – maximum 3)**	5.1.1: Design requirements • NEW: Conditions for Closure • Improve the methodologies for assessing the concrete linings mechanical loading evolution 5.1.4 Design qualification **5.2.2: Optimisation (of the facility components and design)** • **Optimisation of backfilling and other major implementation processes, including waste emplacement, retrieval and sealing technologies.**		
SRA drivers **(maximum 3)**	☒Implementation Safety	☐Tailored Solutions	☐Scientific Insight

	☒Innovation for Optimisation	☒Societal Engagement	☐Knowledge Management
Objective (What) – **1 sentence**	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.		
Justification: impact / innovation / added-value (Why) – bullet points or short paragraph **(maximum quarter of a page)**	Context • Optimization will be in focus of advanced programmes as first repositories enter in construction / operation periods. • 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. Impact • A mutual understanding about optimisation will be developed. • Networking about best practices for Optimisation strategies for EBS components 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.		
List of planned tasks / subtasks with % of effort per task (5% increments) **(Maximum 10 bullets)**	• Task 1 (10%): Management/coordination of the WP • Task 2 (10%): Knowledge Management (incl. training materials development and State-of-the-Art for R&D WPs, etc.) o SoTA: provide an overview of existing definitions, position papers, key articles about optimisation of radioactive waste facilities. Identify gaps that could be addressed based on a SWOT analysis. o Dissemination workshops, … • **Task 3** (25%): Building a mutual understanding about optimization approaches for waste disposal facilities and their management in RWM programmes and a safety cases. Baseline study oriented task. o Make a first “case study” on the optimization of a specific aspect (e.g. lining or backfill): What are the design bases, optimization criteria, possible constrains, optimization approaches?		

	○ Workshops to identify and build a mutual understanding about the views of each category of actor (WMO, RE, TSO, CSO) about optimisation approaches. The case study will be used as a starting point. The workshops will address for instance: What is the optimization of a disposal facility? Why we optimize? What are the needs and the goals (economics, flexibility, safety…)? How to implement an optimization process? ○ **Results of this task will be documented in a Green paper (M12).** • **Task 4** (40%): key challenges regarding optimization of specific SSCs and procedures related to waste disposal facilities: identification & exchanges about their strategic and (socio-)technical aspects. Technically oriented task. ○ Topics/SSCs to be addressed: Buffer, Backfill, Lining and Closure including Plugs/Seals, in different host rock domains. The impact of different environments on the optimisation processes associated to these topics will be considered. ○ Provide overviews of identified topics and approaches. ○ Network about optimisation options, possible common approaches and identify needs for further activities. ○ **Results of this task will be documented in a Final report (M24).** • **Task 5** (15%): Synthesis. Deliver joint proposals for further activities about area that need to be further optimized. ○ Consolidate needs for further activities identified in Tasks 3 & 4. ○ Identify what is on the market, define priorities. ○ Provide short activity proposals **(White paper(s), M18).**
List of expected outcomes linked to the identified SRA drivers **(Maximum 6 bullets)**	Joint proposals for future activities, considering views from all actors (including the Civil Society) about the optimisation of repositories. In particular: • Overview of approaches to and related optimisation strategies for specific EBS components and DGR processes (buffer, backfill, seals, support structures; emplacement, …). SRA: 5.2.2, 5.1, 3–3 - drivers: innovation for optimisation, implementation safety • Possible optimisation of options/plans related to closure processes (possible closure criteria/acceptability criteria...). SRA: 5.1.1 - drivers: Societal Engagement, implementation safety • Mutual understanding about robustness of mechanical structures such as lining in different environment and their potential optimisation. SRA: 5.1.1 – driver: Innovation for Optimisation
Deliverables	• SoTA (Task 2, M12)

(Maximum 6 – including the prescribed deliverables)	• Green paper - mutual understanding about optimization (Task 3, M12) • White paper(s) about further activities, for instance about optimisation of gallery support structures (in clayey formations) and/or performance of backfill in geological timescales (Task 5, M18) • Final report about approaches and strategies for optimisation of specific SSC and procedures related to DGR (Task 4, M24)
Critical input requirements & identified risks	• Workshops: stakeholders need to reach minimal consensus; format is time and resources intensive, participation of all stakeholders necessary.
Major achievements expected by end of Year 2 (Go/No Assessment)[1] **(Maximum 5 bullets)**	*N/A* *The WP is foreseen for 2 years. Major achievements are the foreseen WP impacts / deliverables.*
(Optional - Explain what is out of the scope?)	
List of preliminary interested organisations as partners in the WP contributing effort; **% of effort (person months, by College)**	REs: CTU/CZ, EDF/FR, CNRS-LaMcube/FR, JYU/FI, LEI/LTU, SCK CEN/BE, TU/NL, UL/BE, PSI/CH. TSOs: VTT/FI; GRS/DE, EIMV/SI; NRG/NL; SSTC NRS/UA; IRSN/FR; Bel V/BE; SURO/CZ; TSENERCON/HU WMOs: Andra/FR, BGE/DE, ONDRAS/NIRAF/BE, NAGRA/CH, COVRA/NL, NWS/UK, SKB/SE, SURAO/CZ, PURAM/HU, Posiva/FI CSOs: NTW, CEPN *Concerning the % of effort by college, a priori seen the objectives of this SS, the effort will be well shared between the 3 colleges. But in practice this will depend on who will write deliverables, organise workshops... To be clarified at a later stage thus.*
If applicable - links with previous projects / work packages	This work package considers construction related and closure related (partly also operating related) components and designs. There are interfaces with other projects for all cementitious and clayish material studies (directly or indirectly), e.g.: FP7 DOPAS, Lucoex, CEBAMA, BEACON, EURAD GAS, HITEC and older projects like Prototype Repository, FEBEX.
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[1] EC budget being only allocated for the first 2 years, each work package progress will be reviewed at the end of Year 2, to assess its continuation based on the total budget that EURAD-2 will be granted.

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