

# D1.2



## Beacon Final workshop

### DELIVERABLE D1.2

Dissemination type: Other

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Reporting period: 01/06/20– 31/05/22

Date of issue: **31/05/2022**

Start date of project: **01/06/17**

Duration: 60 Months

This project receives funding from the Euratom research and training programme 2014-2018 under grant agreement No 745 942

Dissemination Level	
PU	Public

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Beacon partners	Digital	

Beacon final workshop took place at Imperial College London the 17<sup>th</sup> to 19<sup>th</sup> of May 2022. It was a live meeting with possibility to follow online. The day before the meeting started the sound online did not work well and the last 24 hours before the meeting and during the first half day the IT people were working hard to make the sound work, and succeeded at last, but the first half day the sound was not working well for the people online. Days 2 and 3 it worked well. People following the meeting online asked questions via the chat function.

66 people registered to attend the workshop in person, 61 attended in person. Most of the people that had to cancel last minute (due to Covid and other circumstances) instead followed the meeting online. At the point of printing the participant list 26 people had registered to follow the meeting but in the end about 35 people followed the workshop online.

Of the 61 attending in person 6 people were representatives of the civil society, more about this in deliverable D6.4.

Of the total about 96 people (attending in person and online), and including 4 of the 6 civil society representatives 40 people were “external” participants who had not worked with Beacon. To facilitate the workshop and the subject to these external participants some special measures were taken:

- Beacon, its background and workpackages were presented and explained in the beginning of the workshop.
- During the poster session and the breaks a film was screened that explains the Swedish KBS3 concept of final repository for radioactive waste, and puts the bentonite mechanical evolution into a context.
- Olivier Leupin had a session putting Beacon into a context from the Nagra perspective
- Frédéric Bernier presented PEP serious games that has been used to put radioactive waste management and other complicated issues into a context and facilitate discussion between general public/civil society and researchers.

Agenda and participant list are attached.



## Agenda Beacon Final Workshop

This is also the 5<sup>th</sup> and last Annual Meeting and General Assembly Meeting of the Beacon project

Date, time: **17 May** 13.00 - **19 May** 15.00

Place: **Imperial College London**, Skempton Building - Department of Civil and Environmental Engineering, Lecture theatre 201, Imperial College Road, South Kensington, London

Beacon partners have nametags that are marked with post-its.

**Pink** for WPs 3 & 5 Model development and testing

**Green** for WP4 Experimental

**Yellow** for WP1 Assessment cases, WP2 Collection of existing data/models and WP6 Civil society

**Orange** for management and coordination

If you have Beacon related questions, don't hesitate to ask anyone of the involved. They will be able to answer or point towards someone who can.

Tuesday	17 May	Chair
13.00 -13.10	Welcome to Beacon final workshop, 5 <sup>th</sup> Annual Meeting and General Assembly ( <b>Beacon Executive Board</b> )	
13.10 -13.20	Welcome to Imperial College London ( <b>Lidija Zdravkovic</b> , ICL)	
13.20 -13.30	<b>Seifallah Ben Hadj Hassine</b> , EC (online)	
13.30 -13.50	Beacon general introduction and background ( <b>Patrik Sellin</b> , SKB)	
13.50 -14.35	Geomechanical coupled models involving unsaturated clays (Invited speaker <b>Sebastià Olivella</b> , UPC)	PS
14.35 -15.05	Break	
15.05 -15.25	WP1 Definition and application of assessment case ( <b>Olivier Leupin</b> , Nagra)	
15.25 -15.55	WP4 Laboratory testing ( <b>Klaus Wiczorek</b> , GRS)	
15.55 -16.25	WP3 Model development ( <b>Antonio Gens</b> , UPC)	
16.25 -16.55	WP5 Testing, verification and validation of models ( <b>Jean Talandier</b> , Andra)	
	Questions	PS
17.00 -17.20	Poster introduction - 3 slides each: 1 for title and two describing, white background, 2 min/ poster <ul style="list-style-type: none"> <li>Hydro-mechanical properties of compacted bentonites GMZ and MX80 (<b>Chun-Liang Zhang/Klaus Wiczorek</b>, GRS/BRIUG)</li> <li>Estimation of the buffer homogenisation in the prototype repository (<b>Mattias Åkesson</b>, SKB)</li> <li>Implementation of an advanced constitutive model for bentonite using MFront for safety and performance assessments of HLW-repositories in the numerical code OpenGeoSys (<b>Eric Simo</b>, BGE Technology)</li> <li>Description of the hysteresis based material model (<b>Ola Kristensson</b>, Clay)</li> <li>Modeling of initially heterogen systems using the hysteresis based material model (<b>Alex Spets</b>, Clay)</li> <li>Hypoplastic modelling of bentonite homogenisation (<b>David Mašin</b>, CU)</li> <li>Numerical modelling of an inhomogeneous bentonite barrier for radioactive waste disposal applications (Giuseppe Pedone (<b>Lidija Zdravkovic</b>), ICL)</li> <li>Downscaled tests for studying the influence of the temperature in the homogenization process (<b>Xavier Pintado</b>, Mitta Engineering)</li> </ul>	
17.20 -	Poster session. Snacks/finger food served.	
17.30 -	A 6 min animation that puts the bentonite into a context of a final repository will be shown on the screen in the lecture hall. Can be shown again on request.	MW



Wednesday	18 May	Chair
09.00-09.05	Welcome back	SN
09.05-09.25	WP2 Collection and compilation of existing data and available models ( <b>Simon Norris</b> , RWM/NWS)	
09.25-09.45	WP6 Dissemination to civil society ( <b>Johan Swahn</b> MKG)	
	Questions	
09.55-10.40	Experimental insights into pellet-based and granular bentonite buffer materials (Invited speaker <b>Enrique Romero-Morales</b> , UPC)	JT
10.50-11.20	Break	
	Plenary presentations (15 min per person/team + 5 for questions and change of speaker)	
11.20 - 11.40	Microstructural evolution of binary barriers during saturation ( <b>Maria Victoria Villar</b> , Ciemat)	JCM
11.40 - 12.00	Bentonite homogenization and microstructure evolution modelled using a double structure constitutive law ( <b>Antonio Gens</b> , UPC)	JCM
12.00 - 12.20	How does wall friction drive bentonite heterogeneity? ( <b>Robert Charlier</b> , ULiege)	JCM
12.20 -13.20	Lunch served, hosted by the project	
13.20 -13.40	Swelling into a void as function of sample/void ratio, temperature and salinity ( <b>Caroline Graham</b> , BGS)	SM
13.40 -14.00	Microstructure evolution in pellet based bentonite hydration: focus on pore size distribution characteristics ( <b>Liliana Gramegna</b> , ULiege)	SM
14.00 -14.20	Prediction of bentonite behaviour using hydro-mechanical model developed in COMSOL Multiphysics ( <b>Darius Justinavicius</b> , LEI)	SM
14.20 -14.40	Simultaneous determination of deformation and liquid content in swelling clay using X-ray radiography ( <b>Joni Tantt</b> , JYU)	SM
14.40-14.50	Future Beacon related work ( <b>Jiri Svoboda</b> , CTU)	
14.50 - 15.20	Break	
	Presentations of work performed outside Beacon	
15.20 - 15.40	Large-scale testing of a Sandwich shaft seal ( <b>Klaus Wieczorek</b> , GRS)	SN
15.40 - 16.00	Long-term aspects of bentonite self-healing and self-sealing via the IBL-project ( <b>Heini Reijonen</b> , GTK)	SN
16.00- 16.20	Hydration survey of a large scale sealing experiment (Bure, France) ( <b>Matías Alonso</b> , Andra)	SN
16.20 - 16.40	Study of coupled gas migration phenomena through clay barrier systems intended for the isolation of high-level nuclear waste ( <b>Marcelo Sánchez</b> , Texas A&M University)	IH
16.40 - 17.00	Hydro-chemo-mechanical modelling of bentonite sealing components ( <b>Marcelo Laviña</b> , Amphos21)	IH
18.00	Dinner hosted by the project	



Thursday	19 May	Chair
09.00-09.05	Welcome back	KW
09.05 – 09.25	Analysis of the mechanical behaviour of a heterogeneous bentonite backfill upon non-isothermal saturation ( <b>Jose A. Bosch</b> , EPFL)	KW
09.25 – 09.45	Applications of a thermo-hydro-mechanical internal limit model to bentonite experiments ( <b>Rebecca Newson</b> , Quintessa)	KW
09.45 – 10.05	Double porosity model for bentonite in thermo-hydro-mechanical processes ( <b>Steffen Beese</b> and <b>Vinay Kumar</b> , BGR)	IH
10.05 – 10.25	Investigation of BCV bentonite ( <b>Jiri Svoboda</b> , CTU/CU)	IH
10.25-10.55	Break	
10.55-11.10	Putting Beacon into context ( <b>Olivier Leupin</b> , Nagra)	
11.10-11.25	Modelling of the SKB assessment case using the HBM model ( <b>Daniel Malmberg</b> , Clay Tech)	OL
11.25-11.40	Sensitivity analysis of bentonite block-pellet tunnel backfill mechanical evolution during saturation ( <b>Heidar Gharbieh</b> , DSA ex. VTT)	OL
11.40-11.50	PEP serious games (Frédéric Bernier, EARB/FANC)	
11.50-12.20	EARB: Input towards submitted deliverables, the workshop contents and the project as a whole	
12.20-13.10	Lunch served, hosted by the project	
13.10-13.25	WP3, summary and conclusions ( <b>Antonio Gens</b> , UPC)	
13.25-13.40	WP4, summary and conclusions ( <b>Klaus Wiczorek</b> , GRS)	
13.40-13.55	WP5, summary and conclusions ( <b>Jean Talandier</b> , Andra)	
13.55-14.20	Summary discussion of WPs 3-5	AG, KW, JT
14.20 – 14.45	Summarizing Beacon. Impact on the treatment of the mechanical evolution of bentonite barriers in future assessments. ( <b>Olivier Leupin</b> , Nagra/ <b>Patrik Sellin</b> , SKB)	
14.45 – 14.55	How to move forward/ideas for future work ( <b>Jiri Svoboda</b> , CTU)	
14.55 – 15.00	Any remaining decisions for Beacon Annual meeting and General Assembly	MW
15.00	End of workshop, 5 <sup>th</sup> Annual Meeting and General Assembly	

AG – Antonio Gens

JCM - Juan Carlos Mayor

JT – Jean Talandier

IH – Irena Hanusová

KW – Klaus Wiczorek

MW – Mary Westermark

OL – Olivier Leupin











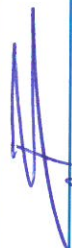


PS – Patrik Sellin

SM – Susanna Maanoja




SN – Simon Norris



**List of participants at the Beacon final workshop, 5th Annual Meeting and General Assembly Meeting, 17-19 May 2022,  
Imperial College London**















First name	Surname	Organisation	Coun	Signature
Russell	Alexander	Bedrock Geosciences	CH	
Stamatina	Alexandropoulou	Imperial College London	GB	
Matias	Alonso	UPC - CIMNE	ES	
Steffen	Beese	BGR	DE	
Frédéric	Bernier	FANC	BE	
Alexander	Bond	Quintessa Ltd	GB	
Jose A	Bosch	EPFL	CH	
Robert	Charlier	University of Liege	BE	
Katherine	Daniels	British Geological Survey	GB	
Malcolm	de Butler	NTW	FR	
Pablo	EIZAGUIRRE Garcia Andra/École Nationale des Ponts et Chaussées	FR	FR	
Alessio	Ferrari	EPFL	CH	
Antonio	Gens	Universitat Politècnica de Catalunya - UPC	ES	

# Signature




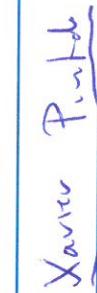










Heidar	Gharbieh	DSA	NO	
Caroline	Graham	British Geological Survey	GB	
Liliana	Gramegna	ULiege	BE	
Bastian	Graupner	ENSI	CH	
Irena	Hanusová	SÚRAO	CZ	
Jon	Harrington	British Geological Survey	GB	
Lucie	<del>Hausmannova</del>	<del>SÚRAO</del>	CZ	
Darius	Justinavicius	Lithuanian Energy Institute	LT	
Matthew	Kirby	Nuclear Waste Services	GB	
József	Kóbor	City Council Pécs, Committee of the Regions	HU	
Hana Veronika	Konvalinkova	Platforma proti HU	CZ	
Tomas	Koudelka	Czech Technical University in Prague	CZ	
Tomas	Krejci	Czech Technical University in Prague	CZ	
Ola	Kristensson	Clay Technology	SE	












Signature

Vinay	Kumar	BGR	DE	
Marcelo	Laviña	Amphos 21	ES	
Olivier	Leupin	Nagra	CH	
Jinsong	Liu	Swedish Radiation Safety Authority	SE	
Susanna	Maanoja	Posiva Oy	FI	
Daniel	Malmberg	Clay Technology	SE	
David	Mašin	David Mašin	CZ	
Christiana	Mauro	NTW	HU	
Juan Carlos	Mayor	Enresa	ES	
Richard	Metcalf	Quintessa Limited	GB	
Nadia	Mokni	IRSN	FR	
Jan	Najser	Charles University	CZ	
Rebecca	Newson	Quintessa Ltd	GB	
Simon	Norris	NWS	GB	

Signature

Sebastia	Olivella	UPC and CIMNE	ES	
Sam	Parsons	Nuclear Waste Services	GB	
Wilfried	Pfingsten	PSI	CH	
Xavier	Pintado	Mitta Oy	FI	
David	Potts	Imperial College London	GB	
Veli-Matti	Pulkkanen	VTT	FI	
Heini	Reijonen	Geological Survey of Finland	FI	
Enrique	Romero Morales	UPC	ES	
Marcelo	Sanchez	Texas A&M University	US	
Gianvito	Scaringi	Charles University	CZ	
Majid	Sedighi	The University of Manchester	GB	
Patrik	Sellin	SKB	SE	
Eric	Simo	BGE	DE	
Alex	Spetz	Clay Technology	SE	

Johan	Swahn	MKG	SE	
Jiří	Svoboda	CTU in Prague	CZ	
Jean	Talandier	Andra	FR	
Joni	Tanttu	University of Jyväskylä (JYU)	FI	<i>Joni Tanttu</i>
Katerina	Tsiampousi	Imperial College London	GB	
Colin	Wales	NTW and Cumbria Trust Ltd	GB	
Mary	Westermarck	SKB	SE	
Klaus	Wieczorek	GRS gGmbH	DE	
María Victoria	Villar	CIEMAT	ES	
Lidija	Zdravkovic	Imperial College London	GB	<i>Zdravkovic</i>
Mattias	Åkesson	SKB	SE	<i>Mattias Åkesson</i>
Emilia	Dashillo	IMPERIAL COLLEGE	GB	




#### Online participation

Nieves	Rodríguez-Villagra	Ciemat	ES
Rubén	Iglesias	CIEMAT	ES
Borys	Zlobenko	SI IEG NAS of Ukraine	UA
Anna	Romanchuk	Lomonosov Moscow State University	RU
nadia	mokni	IRSN	FR
Frederic	Deleruyelle	IRSN	FR
Ville	Heino	Posiva	FI
Laura	Asensio	UCLM	ES
Caroline	Graham	British Geological Survey	GB
Eva	Viglasova	Comenius University in Bratislava, Faculty of Natu	SK
Giuseppe	Pedone	Imperial College London	GB
Jon	Harrington	British Geological Survey	GB
Tomo	SUZUKI	SUBATECH	FR
Alexandru	Tatomir	BGE	DE
Seifallah	Ben Hadj Hassine	EC	BE
Guillermo	Garcia	CIEMAT	ES
Tobias	Wengorsch	BGE	DE

Paul	Suckling	Quintessa Ltd.	GB
Shorash	Miro	Bundesgesellschaft für Endlagerung mbH	DE
Christoph	Behrens	Bundesgesellschaft für Endlagerung	DE
Asta	Narkuniene	Lithuanian Energy Institute	LT
Frederik	Fahrendorf	Bundesgesellschaft für Endlagerung (BGE)	DE
Michael	Weirres	Bundesgesellschaft für Endlagerung	DE
Stephen	Klimke	Bundesgesellschaft für Endlagerung	DE
Thomas	Lohser	BGE (Bundesgesellschaft für Endlagerung mbH)	DE
Lucie	Hausmannova	SURAO	CZ