



# DOPAS 2016 Seminar

**DAY ONE, Wednesday 25 May 2016, Turku Radisson Blu**

<b>Session 1: Opening ceremony and keynote presentations highlighting European cooperation in demonstrating repository feasibility</b>		
<b>Chair: Johanna Hansen</b>		
<b>Co-chair: Matt White</b>		
Time	Title	Authors
0900-0910	Opening of the DOPAS 2016 Seminar	<u>Johanna Hansen</u> , DOPAS coordinator <i>Posiva Oy, Finland</i>
0910-0920	Welcome from Posiva	<u>Erkki Palonen</u> , Corporate Adviser <i>Posiva Oy, Finland</i>
0920-0940	Programme status in radioactive waste management and strategic evolution in support to R&D	<u>Christophe Davies</u> , Project Officer <i>European Commission, Belgium</i>
0940-1010	Role of demonstrations for a spent fuel repository concept	<u>Erik Thurner</u> , Senior Adviser <i>SKB International, Sweden</i>
1010-1040	Overview of the DOPAS Project	<u>Johanna Hansen</u> , DOPAS Coordinator <i>Posiva Oy, Finland</i>
<b>1040-1105</b>	<b>BREAK</b>	

<b>Session 2: Key conclusions from the DOPAS Project (Part 1)</b>		
<b>Chair: Marjatta Palmu</b>		
<b>Co-chair: Jan-Marie Potier</b>		
Time	Title	Authors
1105-1110	Introduction	
1110-1130	Objectives and main outcomes from the DOPAS full-scale demonstrators: FSS, EPSP, DOMPLU, POPLU and ELSA	DOPAS Experiment leaders in Panel <u>Régis Foin</u> <sup>1</sup> , <u>Jiri Svoboda</u> <sup>2</sup> , <u>Pär Graham</u> <sup>3</sup> , <u>Petri Koho</u> <sup>4</sup> and <u>Michael Jobmann</u> <sup>5</sup> <sup>1</sup> <i>Andra, France,</i> <sup>2</sup> <i>Czech Technical University, Czech Republic</i> <sup>3</sup> <i>Swedish Nuclear Fuel and Waste Management Co (SKB), Sweden</i> <sup>4</sup> <i>Posiva Oy, Finland</i> <sup>5</sup> <i>DBE TECHNOLOGY GmbH (DBE TEC), Germany</i>
1130-1200	Design basis of plugs and seals	<u>Matt White</u> <sup>1</sup> , <u>Behnaz Aghili</u> <sup>2</sup> and <u>Slimane Doudou</u> <sup>1</sup> <sup>1</sup> <i>Galson Sciences Limited, United Kingdom</i> <sup>2</sup> <i>Swedish Nuclear Fuel and Waste Management Co (SKB), Sweden</i>
1200-1230	Progress on the design and implementation of plugs and seals in the DOPAS Project	<u>Jean-Michel Bosgiraud</u> <sup>1</sup> , <u>Matt White</u> <sup>2</sup> and <u>Slimane Doudou</u> <sup>2</sup> <sup>1</sup> <i>Andra, France</i> <sup>2</sup> <i>Galson Sciences Limited, United Kingdom</i>
<b>1230-1400</b>	<b>LUNCH AND POSTER SESSION</b>	





# DOPAS 2016 Seminar

Session 2: Key conclusions from the DOPAS Project (Part 2)		
Chair: Marjatta Palmu		
Co-chair: Jan-Marie Potier		
Time	Title	Authors
1400-1425	Performance assessment of plugs and seals	<u>André Rübel</u> , <i>Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) GmbH, Germany</i>
1425-1450	Application of lessons learned during the DOPAS Project to less advanced waste management programmes – Case study: Radioactive Waste Management Ltd	<u>Dean Gentles</u> <sup>1</sup> , Wolfgang Kickmaier <sup>2</sup> , Matt White <sup>3</sup> , Slimane Doudou <sup>3</sup> and Alastair Clark <sup>2</sup> <sup>1</sup> <i>Radioactive Waste Management Limited, United Kingdom</i> <sup>2</sup> <i>McCombie, Chapman, McKinley Consulting, Switzerland</i> <sup>3</sup> <i>Galson Sciences Limited, United Kingdom</i>
1450-1515	<b>BREAK</b>	

Session 3: Plugging and sealing experiences from other applications		
Chair: Dean Gentles		
Co-chair: Jiri Svoboda		
Time	Title	Authors
1515-1520	Introduction	
1520-1540	Treatment of seals and sealing systems in total system performance assessment	Mark Crawford <sup>1</sup> , Dan Galson <sup>1</sup> and Lucy Bailey <sup>2</sup> <sup>1</sup> <i>Galson Sciences Limited, United Kingdom</i> <sup>2</sup> <i>Radioactive Waste Management Limited, United Kingdom</i>
1540-1600	Full-Scale tunnel and shaft seals: Tunnel Sealing Experiment (TSX) and Enhanced Sealing Project (ESP) at the Underground Research Laboratory (URL) in Canada	<u>D.A.Dixon</u> <sup>1</sup> , D.Priyanto <sup>2</sup> , J.B.Martino <sup>2</sup> , P.Korkeakoski <sup>3</sup> , R.Farhoud <sup>4</sup> and K.Birch <sup>5</sup> <sup>1</sup> <i>Golder Associates Ltd., Canada;</i> <sup>2</sup> <i>Canadian Nuclear Laboratories, Canada;</i> <sup>3</sup> <i>Posiva Oy, Finland;</i> <sup>4</sup> <i>Andra, France;</i> <sup>5</sup> <i>Nuclear Waste Management Organization (NWMO), Canada,</i>
1600-1620	The Gas-Permeable Seal Test in the Grimsel Test Site	<u>Thomas Spillmann</u> <sup>1</sup> , B. Lanyon <sup>2</sup> , R. Senger <sup>3</sup> , Paul Marschall <sup>1</sup> and Jörg Rüedi <sup>4</sup> <sup>1</sup> <i>Nagra, Switzerland</i> <sup>2</sup> <i>Fracture Systems, United Kingdom</i> <sup>3</sup> <i>Intera, USA</i> <sup>4</sup> <i>Pöyry, Switzerland</i>
1620-1640	Experiences from an <i>in situ</i> test site for a sealing element in shafts and vertical excavations in rock salt	Beatrix Stielow <sup>1</sup> , Jürgen Wollrath <sup>1</sup> , Matthias Ranft <sup>1</sup> , <u>Monika Kreienmeyer</u> <sup>2</sup> , Thomas Schröpfer <sup>2</sup> and Jan Bauer <sup>2</sup> <sup>1</sup> <i>Bundesamt für Strahlenschutz (BfS), Germany</i> <sup>2</sup> <i>Deutsche Gesellschaft zum Bau und Betrieb von Endlagern für Abfallstoffe mbH (DBE), Germany</i>
1640-1700	Development of a UK approach to sealing deep site investigation boreholes: knowledge transfer from other industries	Francois Groff <sup>1</sup> , <u>Nick Jefferies</u> <sup>2</sup> and Simon Norris <sup>3</sup> , <sup>1</sup> <i>Schlumberger, United Kingdom</i> <sup>2</sup> <i>Amec Foster Wheeler, United Kingdom</i> <sup>3</sup> <i>Radioactive Waste Management Limited, United Kingdom,</i>
1700-1715	Posiva plans and experiences for borehole closure	<u>Taina Karvonen</u> <sup>1</sup> and Johanna Hansen <sup>2</sup> <sup>1</sup> <i>Saario &amp; Riekkola Oy, Finland</i> <sup>2</sup> <i>Posiva Oy, Finland</i>
1715-1730	Conceptual sealing strategy and initial performance assessment for the Chandler Storage and Isolation Facility	<u>Steve Reece</u> <i>Tellus Holdings, Australia</i>



# DOPAS 2016 Seminar

**DAY TWO Thursday 26 May 2016, Turku Radisson Blu**

<b>Session 4: Design, siting and construction of plugs and seals (Part 1)</b>		
<b>Chair: Jean-Michel Bosgiraud</b>		
<b>Co-chair: Behnaz Aghili</b>		
Time	Title	Authors
0810-0815	Introduction	
0815-0835	Initial plug and seal design for the Dutch repository concept	Philip J. Vardon <sup>1</sup> , Jiao Yuan <sup>1</sup> , Michael A. Hicks <sup>1</sup> , <u>Yajun Li</u> <sup>1</sup> <sup>1</sup> <i>Geo-Engineering Section, Delft University of Technology, the Netherlands</i>
0835-0855	Development and performance of various low-pH cementitious materials for plugs and seals in geological disposal demonstrations (DOPAS Project)	<u>Erika Holt</u> <sup>1</sup> , Markku Leivo <sup>1</sup> , Tapio Vehmas <sup>1</sup> , Jari Dunder <sup>2</sup> , Elina Paukku <sup>3</sup> , Behnaz Aghili <sup>4</sup> , Jiří Svoboda <sup>5</sup> , Petr Večerník <sup>6</sup> , Xavier Bourbon <sup>7</sup> , Sandrine Bethmont <sup>7</sup> , Jean-Michel Bosgiraud <sup>7</sup> and Matt White <sup>8</sup> <sup>1</sup> <i>VTT Technical Research Centre of Finland Oy, Finland</i> <sup>2</sup> <i>Posiva Oy, Finland</i> <sup>3</sup> <i>Sweco Rakennetekniikka Oy, Finland</i> <sup>4</sup> <i>Swedish Nuclear Fuel and Waste Management Co (SKB), Sweden</i> <sup>5</sup> <i>Czech Technical University, Czech Republic</i> <sup>6</sup> <i>ÚJV Řež a.s, Czech Republic</i> <sup>7</sup> <i>Andra, France</i> <sup>8</sup> <i>Galson Sciences Limited, United Kingdom</i>
0855-0915	FSS (Full-Scale Seal) Experiment transposition from laboratory tests to full-scale emplacement reality (DOPAS Project)	<u>Regis Foin</u> and Jean-Michel, Bosgiraud <i>ANDRA, France</i>
0915-0930	Preparations before experiments - production for plug locations for DOMPLU and POPLU (DOPAS Project)	<u>Sanna Mustonen</u> <sup>1</sup> and Pär Grahm <sup>2</sup> <sup>1</sup> <i>Posiva Oy, Finland</i> <sup>2</sup> <i>Swedish Nuclear Fuel and Waste Management Co (SKB), Sweden</i>
<b>0930-1000</b>	<b>BREAK</b>	



# DOPAS 2016 Seminar

Session 4: Design, siting and construction of plugs and seals (Part 2)		
Chair: Jean-Michel Bosgraud		
Co-chair: Behnaz Aghili		
Time	Title	Authors
1000-1020	DOMPLU plug filter and seal design, construction and results (DOPAS Project)	Pär Grahm <sup>1</sup> and Mattias Åkesson <sup>2</sup> <sup>1</sup> Swedish Nuclear Fuel and Waste Management Co (SKB), Sweden <sup>2</sup> Clay Technology AB, Sweden
1020-1035	Bentonite based materials for the Full-Scale Emplacement (FE) experiment: design and production steps	Benoit Garitte <sup>1</sup> , Herwig R. Müller <sup>1</sup> , Hanspeter Weber <sup>1</sup> , Frank Ooms <sup>2</sup> , Martin Holl <sup>3</sup> and Sébastien Paysan <sup>4</sup> <sup>1</sup> National Cooperative for the Disposal of Radioactive Waste (Nagra), Switzerland <sup>2</sup> CEBO, The Netherlands <sup>3</sup> JRS, Germany <sup>4</sup> Laviosa MPC, France
1035-1050	Horizontal bentonite backfilling and concrete plug for the Full-Scale Emplacement (FE) experiment at the Mont Terri URL: requirements, design, instrumentation and emplacement	Benoit Garitte <sup>1</sup> , Sven Köhler <sup>1</sup> , Herwig R. Müller <sup>1</sup> , Toshihiro Sakaki <sup>1</sup> , Tobias Vogt <sup>1</sup> , Hanspeter Weber <sup>1</sup> , Martin Holl <sup>2</sup> , Michael Plötze <sup>3</sup> , Volker Wetzig <sup>4</sup> , Moreno Tschudi <sup>5</sup> , Heinz Jenni <sup>6</sup> , Tim Vietor <sup>1</sup> , Eric Carrera <sup>7</sup> , Gerd Wieland <sup>7</sup> , Sven Teodori <sup>8</sup> , José-Luis García-Siñeriz Martínez <sup>9</sup> and Frank Jacobs <sup>10</sup> <sup>1</sup> National Cooperative for the Disposal of Radioactive Waste (Nagra), Switzerland <sup>2</sup> J.Rettenmaier & Söhne, Germany <sup>3</sup> ETH, Switzerland <sup>4</sup> VersuchsStollen Hagerbach, Switzerland <sup>5</sup> Belloli, Switzerland <sup>6</sup> Rowa, Switzerland <sup>7</sup> Amberg Engineering, Switzerland <sup>8</sup> ÅF-Consult, Switzerland <sup>9</sup> AITEMIN, Spain <sup>10</sup> TFB, Switzerland
1050-1110	Hydro-mechanical and chemical-hydraulic behaviour of different types of shaft sealing materials (DOPAS Project)	Oliver Czaikowski, Kyra Jantschik, Helge C. Moog, Klaus Wieczorek and Chun-Liang Zhang Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) gGmbH, Braunschweig, Germany
1110-1130	Performance of Czech Bentonite Material in the Plug in Geological Disposal Demonstrations.	Večerník Petr <sup>1</sup> , Vašíček Radek <sup>2</sup> , Štáštka Jiří <sup>2</sup> , Trpkošová Dagmar <sup>1</sup> , Havlová Václava <sup>1</sup> , Hausmannová Lucie <sup>2</sup> , Smutek Jan <sup>2</sup> , Svoboda Jiří <sup>2</sup> and Dvořáková Markéta <sup>3</sup> <sup>1</sup> ÚJV Řež,; Czech Republic <sup>2</sup> Czech Technical University, Czech Republic <sup>3</sup> SURAO, Czech Republic
1130-1255	<b>LUNCH AND POSTER SESSION</b>	



# DOPAS 2016 Seminar

Session 5: Performance of plugs and seals		
Chair: André Rübel		
Co-chair: Pär Grahm		
Time	Title	Authors
1255-1300	Introduction	
1300-1320	Instrumentation and monitoring systems for evaluation of plug responses in geological disposal demonstrations (DOPAS Project)	Erika Holt <sup>1</sup> , <u>Edgar Bohner</u> <sup>1</sup> , Torbjörn Sandén <sup>2</sup> , Richard Malm <sup>3</sup> , Jaroslav Pacovsky <sup>4</sup> , Jiri Svoboda <sup>4</sup> and Matt White <sup>5</sup> <sup>1</sup> VTT Technical Research Centre of Finland Oy, Finland <sup>2</sup> Clay Technology AB, Sweden <sup>3</sup> Sweco AB, Sweden <sup>4</sup> Czech Technical University, Czech Republic <sup>5</sup> Galson Sciences Limited, United Kingdom
1320-1340	REM (Resaturation test at metric scale): Preliminary hydraulic simulation (DOPAS Project)	<u>Antoine Pasteau</u> <sup>1</sup> , Jacques Wendling <sup>1</sup> , Nathalie Conil <sup>1</sup> and Claude Gatabin <sup>2</sup> <sup>1</sup> Andra DRD/EAP, France <sup>2</sup> CEA/LECBA, France
1340-1400	Integration Of demonstrator activities in performance assessment: analysis of processes and indicators (DOPAS Project)	<u>Jaap Hart</u> , Ecaterina Rosca-Bocancea, Thomas Schröder and Jacques Grupa <i>Nuclear Research and Consultancy Group (NRG), The Netherlands</i>
1400-1420	Quantitative versus qualitative performance assessment of closure	Heini Reijonen <sup>1</sup> , Pirjo Hellä <sup>1</sup> , Nuria Marcos <sup>1</sup> , Barbara Pastina <sup>2</sup> <sup>1</sup> Saanio and Riekkola Oy, Finland <sup>2</sup> Posiva Oy, Finland
1420-1440	Towards robust models of well seals and plugs in CO <sub>2</sub> storage sites	<u>Richard Metcalfe</u> , James Wilson and Steven Benbow <i>Quintessa Limited, United Kingdom</i>
<b>1440-1510</b>	<b>BREAK</b>	



# DOPAS 2016 Seminar

Session 6: Concluding remarks: current status of repository plugging and sealing		
Chair: Erika Holt		
Co-chair: Frédéric Bernier		
Time	Title	Authors
1510-1530	DOPAS training workshop 2015	<u>Marjatta Palmu</u> <sup>1</sup> and Radek Vašíček <sup>2</sup> <sup>1</sup> <i>Posiva Oy, Finland</i> <sup>2</sup> <i>CTU, Czech Republic</i>
1530-1550	Regulatory point of view on the demonstration of the feasibility of plugs and seals for the final repository of radioactive nuclear waste	<u>Pekka Välikangas</u> <i>Radiation and Nuclear Safety Authority (STUK), Finland</i>
1550-1630	Current status of repository plugging and sealing and remaining technical and operational issues (DOPAS Experiments)	Panel session facilitated by <u>Erika Holt</u> <sup>1</sup> , with an introduction by <u>Matt White</u> <sup>2</sup> , followed by DOPAS Experiment leaders: <u>Régis Foin</u> <sup>3</sup> , <u>Jiri Svoboda</u> <sup>4</sup> , <u>Pär Grahm</u> <sup>5</sup> , <u>Petri Koho</u> <sup>6</sup> <sup>1</sup> <i>VTT Technical Research Centre of Finland Oy, Finland</i> <sup>2</sup> <i>Galson Sciences Limited, United Kingdom</i> <sup>3</sup> <i>Andra, France,</i> <sup>4</sup> <i>Czech Technical University, Czech Republic</i> <sup>5</sup> <i>Swedish Nuclear Fuel and Waste Management Co (SKB), Sweden</i> <sup>6</sup> <i>Posiva Oy, Finland</i>
1630-1650	Rapporteur summary	<u>Pierre Berest</u> <i>Ecole Polytechnique, Palaiseau,, France</i>
1650-1700	Closing remarks	<u>Johanna Hansen</u> <i>Posiva Oy, Finland</i>