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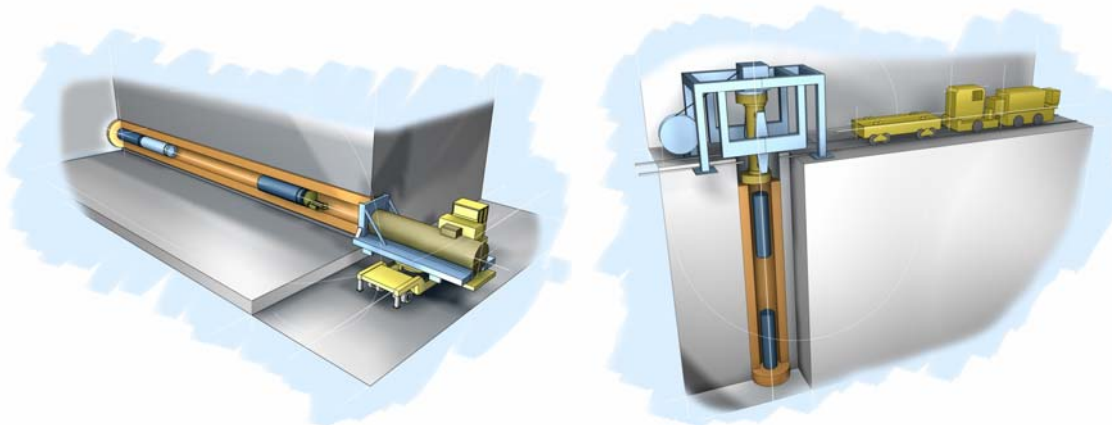


Second Circular

**International Technical Conference on the Practical
Aspects of Deep Geological Disposal of Radioactive Waste**

THEME

**Underground Disposal Unit Design & Emplacement Processes
For a Deep Geological Repository
“Operational & Safety Considerations”**



Hosted by

Czech Technical University in Prague – Faculty of Civil Engineering

Centre of Experimental Geotechnics

Prague, Czech Republic

June 16-18, 2008



Underground Disposal Unit Design & Emplacement Processes For a Deep Geological Repository “Operational & Safety Considerations”

16-18 June 2008, Prague, Czech Republic

Organised by the ESDRED Project and Co-Sponsored by the EC, RAWRA,
Czech Technical University in Prague, ANDRA and GRS

ESDRED PROJECT - A BRIEF OVERVIEW

The primary goal of the integrated ESDRED Project is to design, fabricate and test technological demonstrators in order to show that designs are realistic and to demonstrate the industrial feasibility of various geological repository concepts. ESDRED (**Engineering Studies and Demonstrations of Repository Designs**) is a joint research effort by 7 major European national radioactive waste management agencies and 6 R & D organisations. The research is conducted by 13 partners from 9 European countries who decided to work together on engineering and technology. ESDRED is co-ordinated by ANDRA, the French national

radioactive waste management agency. The five year project has a total budget of €18.7 million, of which 7.3 million is a grant from the EU's 6th Framework Programme.

ESDRED is focused on technology and has three main objectives.

- To design and fabricate full scale technological demonstrators and to prove their feasibility.
- To promote a shared European vision in the field of technology.
- To disseminate widely the main objectives and the knowledge developed within ESDRED.

AIMS & OBJECTIVES OF THE CONFERENCE

The objective of this conference is to examine the technical and the practical aspects of different disposal unit concepts and associated waste emplacement equipment and processes. This will include looking at concepts that fall within the boundaries of the ESDRED Project as well as looking at some other national concepts that are not being considered within ESDRED; always in the context of practical operational considerations as well as operational and long term safety. Due to very strong international interest the subject of “Engineered Barrier Systems” has been included as an important conference theme.

The conference aims to provide a forum for exposing the concepts that have been, or are in the process of being, developed throughout the world in various host rocks such as salt, granite, tuff and clays. The wastes concerned are vitrified waste, spent fuel as well as medium level long lived waste such as technological waste or TRU Waste.

These various concepts will be compared and discussed at an international level. For each concept, the operational and long term safety requirements, the construction and waste emplacement processes as well as the rationale in terms of occupational safety will be exposed.

Specific attention will be given to full scale demonstrations and to operational experience in existing facilities, underground research laboratories (URL's) or surface mock-ups.

There will be a single stream of presentations in a large well equipped lecture hall. Posters will be on display throughout the Conference in the spacious front entrance hall of the University.

The conference should be of interest to designers, decision makers, licensing authorities, policy makers, waste producers and politicians. It will end with a special session intended primarily for university students from the Prague area.

CONFERENCE VENUE AND RELATED DETAILS

The conference will be held on the campus of the Czech Technical University in Prague, Faculty of Civil Engineering located less than 20 minutes from the airport and 10 minutes from beautiful downtown Prague. Public transit connects both to the airport and to downtown.

The university facilities are modern and fully equipped. Accommodation in various price ranges is available nearby and through the university. See the ESDRED web site (www.esdred.info) for details regarding the conference, abstracts, posters, registration, accommodation, the University, the city, etc.

CONFERENCE LANGUAGE

The working language of the conference is English. A maximum number of 100 participants will be accepted.

REGISTRATION FEES

These fees will cover the cost of providing an electronic copy of the proceedings, an ice breaker on the Sunday evening, coffee breaks, lunches and a conference dinner on the Monday evening. Fees for accompanying persons cover the cost of the ice breaker and the conference dinner only.

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|-----------------------------|---|
| <i>Participants/authors</i> | <i>200 €</i> |
| <i>Accompanying persons</i> | <i>50 €</i> |
| <i>Students</i> | <i>nil (for access to presentations only)</i> |

NOTE 1: Participants from the newest New Member States (Bulgaria, Romania) who face financial constraints may apply for a reduction in fees at time of registration.

NOTE 2: All correspondence regarding registration should be addressed to Pavla Bauerová at esdred.registration@andra.fr

OUTLINE OF THE PROGRAMME

Sunday, June 15

- Optional Field Trip to Josef Underground Educational Facility (see back side of Registration Form) (13:00-17:00)
- Registration (16:00-19:00)
- Icebreaker in lobby of CTU Civil Engineering Building (19:00)

Monday, June 16

- Registration (08:00-10:00)
- Opening Addresses
- Session 1 – Disposal Units in Clay **(Session Chairman – Louis Londe – Andra)**
- First Poster Session
- Session 2 – Operational Safety & Radioprotection **(Session Chairman – Chuan-Fu Wu – DOE)**

Tuesday, June 17

- Registration (08:00-10:00)
- Session 3 – Engineered Barrier Systems **(Session Co-Chairmen – Chris de Bock – Ondraf/Niras – Jaroslav Pacovský – CTU-CEG)**
- Second Poster Session
- Conference Dinner

Wednesday, June 18

- Registration (08:00-10:00)
- Session 4 – Disposal Units in Granite **(Session Chairman – Christer Svemar – SKB)**
- Session 5 – Disposal Units in Salt, Tuff, Limestone **(Session Chairman – Enrique Biurrun – DBE)**
- Session 6 – Open Session with Students **(Session Chairman – Wernt Brewitz – TU-Braunschweig)**

STEERING COMMITTEE

- Jaroslav Pacovský, *Czech Technical University in Prague, Centre of Experimental Geotechnics*
- Vitezslav Duda, *Managing Director, Czech Radioactive Waste Repository Authority (RAWRA)*
- Chris de Bock, *ONDRAF/NIRAS & ESDRED Module 1 Leader*
- Wolf K Seidler, *Coordinator ESDRED Project (Andra)*
- Wernt Brewitz, *Leichtweiss – Institute, TU-Braunschweig*
- Tilmann Rothfuchs, *Head of Final Repository Safety Research Division (GRS)*

CONFERENCE SECRETARIAT

Czech Technical University in Prague:

- Pavla Bauerová
- Jiri Svoboda
- Radek Vasicek

Czech Radioactive Waste Repository Authority:

- Karel Kunc

CONTACT

Pavla Bauerová

esdred.conference@andra.fr

FINAL TECHNICAL PROGRAM

The three day conference is being organized on the basis of a mix of invited speakers primarily from the ESDRED Project and from the international nuclear community. The activities will terminate with an open meeting with university students.

Sunday 15 June 08

16:00 Registration until 19:00

19:00 Ice Breaker

Monday 16 June 08

08:00 Registration until 10:00 (also on Tuesday and Wednesday at same time)

OPENING SESSION

Chair: Wolf K. SEIDLER

08:30 Wolf K. SEIDLER, *Conference Chairman, Andra, France*

Zdeněk BITTNER, *Honorary Conference Chairman, Dean Faculty of Civil Engineering, CTU in Prague*

Ladislav PAZDERA, *Chief of Department of Electroenergetics, Ministry of Industry and Trade, Czech Republic*

09:00 Support of Euratom framework programmes to research on radioactive waste disposal

Simon WEBSTER or Christophe DAVIES, *European Commission, Belgium*

09:30 Status of HLW disposal planning in the Czech Republic

Vitezslav DUDA, *RAWRA, Czech Republic*

10:00 Coffee Break

SESSION 1 – DISPOSAL UNITS IN CLAYS

Chair: Louis Londe

10:30 Development and Demonstration of Prototype Transportation Equipment for Emplacing HLW

Louis LONDE, Jean-Michel BOSGIRAUD, Wolf K SEIDLER, *ANDRA, France*

11:10 The Swiss Concept for Disposal of Spent Fuel and Vitriified HLW

Thomas FRIES, *NAGRA, Switzerland*

11:50 Experimental programme to Demonstrate the viability of the Belgian Supercontainer concept for HLW

Hughes VAN HUMBEECK¹, Wim BASTIAENS², Chris DE BOCK^{1,1} *ONDRAF/NIRAS, ²EIG EURIDICE, Belgium*

12:30 Lunch

14:00 First Poster Session

SESSION 2 – OPERATIONAL SAFETY & RADIOPROTECTION

Chair: Chuan-Fu Wu

14:30 Operational Safety for a KBS-3H repository

Stig PETTERSSON, Erik THURNER, Bo HALVARSSON, *SKB, Sweden*

15:00 Operational Safety and RP Considerations in Designing a HLW repository in Germany

W. FILBERT, N. NIEHUES, M. PÖHLER, *DBE TECHNOLOGY GmbH, Germany*

15:30 Coffee Break

16:00 Operational Safety and radioprotection considerations when designing the ILW-LL Disposal Drifts

S. VOINIS, D. CLAUDEL, A. ROULET, A. LESAVRE, *ANDRA, France*

16:30 Practical and Safe Implementation of Disposal With Prefabricated EBS Modules

Hideki KAWAMURA¹, Ian G. McKINLEY², and Fiona B. NEALL³

¹Obayashi Corporation, Tokyo, Japan; ²McKinley Consulting, Baden/Dättwil, Switzerland; ³Neall Consulting Ltd., Kendal, UK

17:00 Integrated Safety Case Development for Deep Geological Repositories

Hideki KAWAMURA¹, Ian G. McKINLEY²

¹Obayashi Corporation, Tokyo, Japan; ²McKinley Consulting, Baden/Dättwil, Switzerland

Tuesday 17 June 08

SESSION 3 – ENGINEERED BARRIER SYSTEMS

Co-Chair: Chris de Bock

Jaroslav Pacovský

08:10 From Bentonite Powder to EB Units: An Industrial Process

Claude GATABIN¹, Jean-Luc GUYOT², Serge RESNIKOW³, Jean-Michel BOSGIRAUD⁴, Louis LONDE⁴, Wolf SEIDLER⁴ *¹CEA Saclay, ²SEGULA Ingénierie, ³MPC, ⁴ANDRA, France*

08:50 Full-Scale Demonstration of EBS Construction Technology I

Satohito TOGURI, Hidekazu ASANO, Hajime TAKAO, Takeshi MATSUDA, Kiyoshi AMEMIYA, *RWMC, Japan*

09:30 Full-Scale Demonstration of EBS Construction Technology II

Hidekazu ASANO¹, Satohito TOGURI¹, Yumiko IWATA², Susumu KAWAKAMI², Yuji NAGASAWA², Takeshi YOSHIDA^{2,1} *¹RWMC, ²IHI Corporation, Japan*

10:10 Coffee Break

- 10:30 Design and Emplacement of Bentonite Barriers
Matthias GRUNER¹, **Klaus RUMPHORST²**, **Peter SITZ^{1,1}** ¹*TU Bergakademie Freiberg*, ²*K+S AG, Germany*
- 11:10 Mock-up KENTEX: THM behaviour of buffer in Korean HLW Repository
Jae Owan LEE, **Won Jin CHO**, **Jong Won CHOI**, *KAERI, Korea*
- 11:50 The EC/NEA Engineered Barrier System (EBS) Project
H. UMEKI¹, **E. FORINASH²**, **C. DAVIES³**, **D. BENNETT⁴**, **A. HOOPER⁵**, **A. VAN LUIK⁶**, **S. VOINIS⁷**
¹*Japan Atomic Energy Agency*, ²*OECD Nuclear Energy Agency*, ³*European Commission, DG-Research*, ⁴*TerraSalus Limited*, ⁵*UK Nuclear Decommissioning Authority*, ⁶*US Department of Energy*, ⁷*L'Agence Nationale pour la Gestion des Déchets Radioactifs (Andra)*
- 12:30 **Lunch**
- 14:00 **Second Poster Session**
- 14:30 Experimental Evaluation of Hydraulic Resistance of Compacted Bentonite/Boom Clay Interface
Anh-Minh TANG¹, **Juan Jorge MUNOZ¹**, **Yu-Jun CUI¹**, **Pierre DELAGE¹**, **Xiang-Ling LI²**
¹*Institut Navier, Université Paris-Est, ENPC-CERMES, France*, ²*EURIDICE Group, Belgium*
- 15:10 In-situ Development of Non-Intrusive Monitoring Techniques
I. BLECHSCHMIDT¹, **B. BREEN²**, **M. JOHNSON²**, **H.R. MAURER³**, **T. FIERZ⁴**, **S. PARSONS⁵**, **I. BARCENA⁶**, **J. L. GARCIA-SINERIZ⁶**, **S. VOMVORIS¹**
¹*NAGRA, Switzerland*; ²*Nuclear Decommissioning Authority, United Kingdom*; ³*ETH Zürich Department of Earth Sciences, Switzerland*; ⁴*Solexperts AG, Switzerland*; ⁵*Magneto-Inductive Systems Limited, Canada*; ⁶*AITEMIN, Spain*
- 15:50 **Coffee Break**
- 16:10 Implications of the use of Low-pH Cementitious Materials in High Activity
J.L. GARCIA CALVO, **M.C. ALONSO**, **L. FERNANDEZ LUCO**, *IETcc-CSIC, Spain*
- 16:50 Full Scale Demonstration of Shotcrete Sealing Plug under Realistic Working Conditions
I. BARCENA, **J. L. GARCIA-SINERIZ**, *AITEMIN (Spain)*
- 19:30 **Conference Dinner**

Wednesday 18 June 08

SESSION 4 – DISPOSAL UNITS IN GRANITE

Chair: Christer Svemar

- 08:10 Final Repository for Spent Nuclear Fuel in Granite - The KBS-3V Concept in Sweden and Finland
Stig PETTERSSON, **Bengt LÖNNERBERG**, *SKB, Sweden*
- 08:50 Application of the Air/Water Cushion Technology for handling of heavy waste packages in Sweden and France
Stig PETTERSSON, **Erik THURNER**, *SKB, Sweden*
- 09:30 Development of Excavation Technologies at the Canadian URL
Gregory W. KUZYK, **Jason MARTINO**, *AECL, Canada*
- 10:10 **Coffee Break**

SESSION 5 – DISPOSAL UNITS IN SALT, TUFF & LIMESTONE Chair: Enrique Biurrún

- 10:30 Emplacement Technology for the Direct Disposal of Spent Fuel into Deep Vertical Boreholes
W. BOLLINGERFEHR, **W. FILBERT**, **J. WEHRMANN**, *DBE TECHNOLOGY GmbH, Germany*
- 11:10 9+Years Disposal Experience at the Waste Isolation Pilot Plant
Norbert T. REMPE, **Roger A. NELSON**, *WIPP, USA*
- 11:50 Evaluation of the Emplacement Feasibility for a Multi-tier Expanded Capacity repository at Yucca Mountain, Nevada
Michael APTED¹, **John KESSLER²**, **Charles FAIRHURST³**
¹*Monitor Scientific LLC*, ²*Electric Power Research Institute*, ³*Itasca Consulting Group Inc., USA*
- 12:30 Proposed Deep Geologic Repository for Low and Intermediate Level Radioactive Waste at Bruce Nuclear Site, Tiverton, Ontario
R.J. HEYSTEE, *Ontario Power Generation, Canada*
- 13:10 **Conclusion of the Conference - Wolf K Seidler**, *ANDRA France*
- 13:30 **Lunch**
Third Poster Session

SESSION 6 (Students)

Chair: Wernt Brewitz

- 14:30 **Open Student Session**

PAPERS

Generally 40 minutes will be allocated to each paper including 5 to 10 minutes for questions. The deadline for the submission of your complete paper to **Pavla Bauerová** at esdred.technicalpapers@andra.fr is April 15, 2008.