

Overview of oral and poster presentations



3rd Conference on Key Topics in Deep Geological Disposal

*Challenges of a Site Selection
Process:
Society – Procedures – Safety*

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Cologne, 21 – 23 March 2022

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For more information, please visit the conference website <https://www.daef2022.org/>

Background

There is a broad international consensus that high-level radioactive waste arising from electricity production by nuclear fission has to be safely isolated from the biosphere. Disposal in deep geological formations is considered the best approach to protect human beings and the environment from radiological exposures. However, the design of an appropriate site selection process for a repository still represents a challenge and different strategies are pursued in those countries with advanced geological disposal programs.

A site selection process for a repository for high-level radioactive waste and / or spent nuclear fuel has to consider and to reconcile:

- Safety related scientific technical principles and knowledge bases as well as regulatory constraints/guidelines
- Geoscientific information based both on existing data and on site investigations and its utilization for safety, feasibility and demonstration purposes
- Detailed knowledge about type and amount of waste to be disposed of (data bases)
- Ideas/concepts how to provide safety by means of an appropriate repository design
- Social-science based aspects related to good governance, i.e. a “qualitatively good” procedural design aiming at the development of a fair process
- Land use concepts and regional planning aspects
- Legal and political boundary conditions

The reconciliation of these aspects may differ from country to country but experience shows that “safety first” is the overriding principle.

Considering the time scales of many decades required to implement a repository for high-level radioactive waste from initiating the site selection process to the closure and possibly post-closure monitoring, evidently science and technologies related to nuclear waste disposal have to be developed further during the process. Keeping and improving know-how and expertise during decades requires strong efforts to support and organize research in all related scientific disciplines with a strong focus on interdisciplinary aspects as well as permanently educating and training scientific and technical staff.

The third international conference ***Key Topics on Deep Geological Disposal – Challenges of a Site Selection Process: Society – Procedures – Safety*** will focus on the following topics:

1. **Status of high-level waste / spent nuclear fuel repository siting in Germany: Views of different actors**
2. **Status of high-level waste / spent nuclear fuel disposal programmes in various countries: Technical and societal aspects**
3. **High-level waste / spent nuclear fuel disposal: Research and development in natural sciences and engineering**
4. **High-level waste / spent nuclear fuel management strategies and governance: Research in humanities and social sciences**
5. **Competence building and knowledge transfer**

The conference will provide an adequate forum for fruitful scientific exchange and a valuable instrument for further improving multilateral co-operation for mutual benefit. The program will consist of invited and contributed presentations (oral and posters); the conference language will be English.

Conference organizers:

Being “The Research University in the Helmholtz Association”, [KIT](#) creates and imparts knowledge for the society and the environment. It is the objective to make significant contributions to the global challenges in the fields of energy, mobility, and information.

The scientific conceptualization and implementation lie in the hands of the [German association for repository research \(DAEF\)](#). DAEF represents leading research organizations active in radioactive waste disposal research. The aim of this association is to contribute to the safe disposal of radioactive waste, to support respective research and education, and to offer respective fact based information.

ORAL PRESENTATIONS

TOPIC 1 STATUS OF HIGH-LEVEL WASTE / SPENT NUCLEAR FUEL REPOSITORY SITING IN GERMANY: VIEWS OF DIFFERENT ACTORS

- 1 FINALIZING PHASE ONE – TOWARDS THE IDENTIFICATION OF
SITES OF INTEREST FOR A SURFACE EXPLORATION FOR A
GERMAN HIGH LEVEL RADIOACTIVE WASTE REPOSITORY
L. Seidel, S. Reiche, W. Rühaak (Keynote) (Germany)
- 2 ENABLING AND SUPERVISING A UNIQUE & NOVEL PROCEDURE -
BASE'S STATUTORY TASKS & VIEW ON THE GERMAN
APPROACH TO SITE SELECTION FOR A DEEP GEOLOGICAL
DISPOSAL REPOSITORY FOR HIGH-LEVEL WASTE AND ITS
CURRENT STATUS
C. Weiss, C. Borkel, S. Drees, F. Emanuel (Keynote) (Germany)
- 3 TO BE ANNOUNCED
M. Schreurs, A. Grunwald (Keynote) (Germany)

TOPIC 2 STATUS OF HIGH-LEVEL WASTE / SPENT NUCLEAR FUEL DISPOSAL PROGRAMMES IN VARIOUS COUNTRIES: TECHNICAL AND SOCIETAL ASPECTS

- 1 REGULATORY REQUIREMENTS FOR ESTIMATING THE
ADDITIONAL MEAN EFFECTIVE ANNUAL DOSE IN THE CONTEXT
OF THE GERMAN SITE SELECTION PROCEDURE
*C. Borkel, A. Diener, S. Hellebrandt, M. Jendras, M. Krauß, O. Onkun,
S. Schöbel, F. Schulzeck, M. Steiner (Germany)*
- 2 THE SUCCES AND FAILURE OF HIGH LEVEL NUCLEAR WASTE
MANAGEMENT PROGRAMS. SCIENCE AND TECHNOLOGY VS
SOCIAL ACCEPTANCE AND POLITICAL (IN)ACTION
J. Bruno (Spain)
- 3 STUDY OF THE GEOLOGICAL CONDITIONS FOR THE LOCATION
OF AN UNDERGROUND RESEARCH LABORATORY IN RUSSIA
V. Gupalo, V. Krasilnikov, A. Lozovoy (Russia)
- 4 THE ROLE OF SAFETY ASSESSMENTS IN DEVELOPING
CONSISTENT AND PLAUSIBLE SITE SELECTION AND SAFETY
ARGUMENTS
T. U. Kaempfer, X. Li, P. Marschall, S. Serno (Switzerland)
- 5 COMPUTATIONAL ENVIRONMENT FOR SAFETY ASSESSMENT OF
THE DEEP GEOLOGICAL DISPOSAL FACILITY FOR RADIOACTIVE
WASTE
*E. Saveleva, V. Svitelman, I. Kapyrin, D. Kryuchkov, N. Drobyshevskiy
(Russia)*
- 6 THE LAST 15 YEARS OF SEISMIC EXPLORATION IN NORTHERN
SWITZERLAND: CONTRIBUTIONS TO DEFINITION,
CHARACTERIZATION AND SELECTION OF SITES FOR DEEP
GEOLOGICAL DISPOSAL
*H. Madritsch, P. Birkhäuser, M. Hertrich, M. Schnellmann, T. Spillmann,
T. Vietor (Switzerland)*

7 TO BE ANNOUNCED
J. Makkonen (Finland)

TOPIC 3 HIGH-LEVEL WASTE / SPENT NUCLEAR FUEL DISPOSAL: RESEARCH AND DEVELOPMENT IN NATURAL SCIENCES AND ENGINEERING

1 EURAD: A STEP CHANGE IN EUROPEAN JOINT COLLABORATION TOWARDS SAFE RADIOACTIVE WASTE MANAGEMENT
B. Grambow, T. Beattie, P. Carbol, E. Salat, L. Theodon, R. Winsley, P. Zuidema (**Keynote**) (France)

2 SYSTEMATIC TOP-DOWN APPROACH TO DEVELOP WASTE CONTAINERS FOR HEAT-GENERATING RADIOACTIVE WASTE AND SPENT FUEL IN DIFFERENT HOST ROCKS – RESULTS OF THE R&D PROJECT KOBRA
W. Bollingerfehr, A. Wunderlich, S. Prignitz, H. Völzke, C. Herold, D. Wolff (Germany)

3 SAFETY, SCIENCE AND SYSTEM ANALYSIS
B. Grambow, R. C. Ewing (France)

4 STUDY OF U SORPTION ONTO GRANITE AND BENTONITE
F. Guido-Garcia, A. Walker, J. Racette, S. Nagasaki, T. Yang (Canada)

5 EXPERIMENTAL INVESTIGATION OF RADIONUCLIDE RELEASE FROM SPENT NUCLEAR FUELS UNDER CONDITIONS EXPECTED IN A DEEP GEOLOGICAL REPOSITORY LOCATED IN ARGILLACEOUS, CRYSTALLINE OR SALINE ROCKS – STATE OF KNOWLEDGE
M. Herm, E. Bohnert, L. Iglesias-Pérez, T. König, V. Metz, A. Walschburger, H. Geckeis (Germany)

6 LONG-TERM PERFORMANCE OF CONCRETE-BASED SUPPORT STRUCTURES FOR A HIGH-LEVEL RADIOACTIVE WASTE REPOSITORY IN CLAYSTONE
P. Herold, E. Simo, H.-J. Engelhardt, H. Räuschel, M. Manica, T. Meyer (Germany)

7 DEEP BOREHOLE DISPOSAL OF LONG-LIVED INTERMEDIATE LEVEL WASTE – GENERIC SITE SCREENING TOOLS ACCOUNTING FOR GEOLOGICAL FAULTS
U. Kelka, T. Poulet, P. Schaub, H. Sheldon, L. Esteban, D. Mallants (Australia)

8 THE OPENGEOSSYS SOFTWARE FRAMEWORK FOR REACTIVE TRANSPORT AND CHEMO-MECHANICAL MODELING IN DEEP GEOLOGICAL DISPOSAL
V. Montoya, J. Garibay-Rodriguez, R. Lu, H. Shao, D. Naumov, K. Yoshioka, J. Poonosamy, O. Kolditz (Germany)

9 MICHIGAN INTERNATIONAL COPPER ANALOGUE (MICA) PROJECT – RECENT ADVANCES
H. Reijonen, I. Aaltonen, C. Lilja, A. Liebscher, S. Norris, L. Waffle, N. Diomidis (Finland)

10 A SYSTEMATIC APPROACH TO DEVELOP RECOMMENDATIONS FOR SURFACE EXPLORATION IN GERMANY – BGR PROJECTS „GEOMEPS AND ZUBEMERK“
L. Richter, T. Beilecke, R. Dlugosch, T. Kneuker, L. Pollok, N. Schubarth-Engelschall, R. Semroch (Germany)

- 11 KOMBILYSE: COMBINED APPROACH TO SAFETY-RELEVANT ASPECTS FROM THE PERSPECTIVE OF EXTENDED STORAGE AND DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE
F.-N. Sentuc, O. Bartos, K. Hummelsheim, J. Larue, F. Rowold (Germany)
- 12 SUPPORT OF UNDERGROUND OPENINGS IN A HLW/SF REPOSITORY IN CLAY STONE
J. te Kook, A. Studeny, B. Pflüger, C. Scior, A. Huckle (Germany)
- 13 RESEARCH AND DEVELOPMENT FOR HIGH-LEVEL NUCLEAR WASTE REPOSITORY IN GERMANY
A. Göbel, A. Liebscher, A. Strusińska-Correia, T. Knuuti (Germany)
- 14 SAFETY FACING UNCERTAINTY – STEPS TOWARDS A HOLISTIC AND MORE COMPREHENSIVE ASSESSMENT OF UNCERTAINTIES IN THE SAFETY CASE
A. Eckhardt, K.-J. Röhlig (Switzerland)
- 15 DEVELOPMENT OF MAGNESIA SHOTCRETE WITH HARDROCK AND SALT SURCHARGE
J. Arendt, D. Freyer, M. Gruner, W. Kudla (Germany)

TOPIC 4 HIGH-LEVEL WASTE / SPENT NUCLEAR FUEL MANAGEMENT STRATEGIES AND GOVERNANCE: RESEARCH IN HUMANITIES AND SOCIAL SCIENCES

- 1 BUILDING CONFIDENCE IN THE FACE OF UNCERTAINTY: THE ROLE OF THE SAFETY CASE
L. Bailey, P. Künzi (Keynote) (UK, Switzerland)
- 2 TRANSDISCIPLINARY RESEARCH ON NUCLEAR WASTE MANAGEMENT – CAN IT WORK? A CASE STUDY ON REPOSITORY SAFETY
K.-J. Röhlig, M. Ebeling, A. Eckhardt, P. Hocke, P. Krütli (Germany)
- 3 REVIEW OF COPPER CORROSION BY THE SWEDISH RADIATION SAFETY AUTHORITY (SSM) IN THE CONTEXTS OF THE LOT EXPERIMENTS AT THE ÄSPÖ FACILITY AND THE ONGOING LICENSING PROCESS FOR ESTABLISHING A REPOSITORY FOR SPENT NUCLEAR FUEL IN SWEDEN
B. Strömberg (Sweden)
- 4 NUCLEAR WASTE AS “MATTER OF CARE”: OPPORTUNITIES FOR A PARADIGM SHIFT IN THE LONG-TERM GOVERNANCE OF HLW AND SPENT FUEL IN BELGIUM
A. Bergmans, C. Parotte (Belgium)
- 5 SPATIAL EFFECTS OF SURFACE FACILITIES FOR FINAL DISPOSAL: PERCEPTIONS OF THE SAME AND IMPACT ON PLACE ATTACHMENT – A TRANSDISCIPLINARY EXPERIMENTAL SETTING
M. Mbah, J. Neles, S. Bremer, T. Leusmann, D. Lowke (Germany)
- 6 LEGAL, CULTURAL AND POLITICAL CHALLENGES FOR TRANSBOUNDARY PUBLIC PARTICIPATION IN THE CONTEXT OF THE SITING PROCEDURE FOR HIGH-LEVEL RADIOACTIVE WASTE
F. Sperfeld, M. Mbah, S. Schütte (Germany)

- 7 COGNITIVE BIASES AND GROUP BIASES IN ORGANIZATIONS -
DEVELOPMENT OF A QUESTIONNAIRE FOR THE BIAS-RELATED
DIAGNOSIS OF PLANNING PROCESSES
F. Englisch, O. Sträter (Germany)
- 8 FUTURE PICTURES FOR FINAL DISPOSAL
S. Enderle, P. Hocke (Germany)

TOPIC 5 COMPETENCE BUILDING AND KNOWLEDGE TRANSFER

- 1 TO BE ANNOUNCED
H.-C. Pape (Keynote) (Germany)
- 2 IMPLEMENTATION OF KNOWLEDGE MANAGEMENT (KM) IN THE
GERMAN WMO
P. L. Wellmann, G. Hoefer (Germany)

POSTER PRESENTATIONS

TOPIC 2 STATUS OF HIGH-LEVEL WASTE / SPENT NUCLEAR FUEL DISPOSAL PROGRAMMES IN VARIOUS COUNTRIES: TECHNICAL AND SOCIETAL ASPECTS

- 1 ANALYSIS OF INTERACTIONS BETWEEN OPERATIONAL SAFETY AND POST-CLOSURE SAFETY OF A HLW REPOSITORY
A. Lommerzheim, J. Wolf, N. Bertrams, D. Buhmann, B. Förster, P. Herold, J. Leonhard, U. Noseck (Germany)

TOPIC 3 HIGH-LEVEL WASTE / SPENT NUCLEAR FUEL DISPOSAL: RESEARCH AND DEVELOPMENT IN NATURAL SCIENCES AND ENGINEERING

- 1 ICROSS – INTEGRITY OF NUCLEAR WASTE REPOSITORY SYSTEMS – CROSS-SCALE SYSTEM UNDERSTANDING AND ANALYSIS: A MULTIDISCIPLINARY COLLABORATIVE RESEARCH PROJECT IN THE HELMHOLTZ ASSOCIATION
D. Bosbach, H. Geckeis, O. Kolditz, M. Kühn, T. Stumpf, iCross Team (Germany)
- 2 OVERVIEW OF THE IBL (INTERNATIONAL BENTONITE LONGEVITY) PROJECT
W. R. Alexander, M. Ito, E. P. Kremer, H. M. Reijonen, M. Yamada (Switzerland)
- 3 THE CORI PROJECT ON CEMENT-ORGANIC-RADIONUCLIDE-INTERACTIONS – AN ACTIVITY WITHIN THE EC EURAD PROJECT
M. Altmaier (Germany)
- 4 IMPLEMENTATION OF RETRIEVABILITY IN GERMAN REPOSITORY CONCEPTS FOR HIGH-LEVEL RADIOACTIVE WASTE IN CRYSTALLINE FORMATIONS
P. Herold, J. Leonhardt, A. Keller, R. P. Leon Vargas (Germany)
- 5 RECENT ADVANCES IN THE LABORATORY COMPACTION OF CRUSHED SALT
B. Laurich, K. Svensson, K. Zemke, D. Stührenberg (Germany)
- 6 FEP AND SCENARIOS – BASIC TOOLS FOR THE DESIGN AND PERFORMANCE ASSESSMENT OF GEOTECHNICAL BARRIERS
A. Lommerzheim, N. Müller-Hoeppe (Germany)
- 7 THE USE OF NATURAL ANALOGUES IN THE SITE SELECTION PROCESS
N. Marcos, H. Reijonen (Finland)
- 8 DAEF – WORKING GROUP CONCRETE CORROSION
O. Czaikowski, U. Düsterloh, J. Engelhardt, D. Freyer, A. Gutsch, K. Jantschik, H.-C. Kühne, M. Heidmann-Ruhz, T. Meyer, M. Niemeyer, J. Wollrath, K. Zemke (Germany)
- 9 FROM FRACTURES TO MODELS: IT'S ALL ABOUT NETWORKING
C. Müller, J. Flügge, A. Hassanzadegan, H. Zhao (Germany)
- 10 OVERVIEW OF BGR'S PARTICIPATION IN EXPERIMENTS AT THE MONT TERRI ROCK LABORATORY, SWITZERLAND
D. Rebscher, BGR Mont Terri Project Team (Germany)

- 11 CONTRIBUTION OF BENTONITE AND CEMENTITIOUS MATERIAL TO ACTINIDE RETENTION UNDER HYPERALKALINE CONDITIONS AND INCREASED IONIC STRENGTH
K. Schmeide, (Germany)
- 12 SHAFT SEALING BY SANDWICH SEAL SYSTEMS: A LARGE-SCALE EXPERIMENT PERFORMED AT THE MONT TERRI ROCK LABORATORY
K. Wieczorek, K. Emmerich, R. Schuhmann, J. Hesser, M. Furche, D. Jaeggi, S. Schefer, J. Aurich, J. Carlos Mayor, S. Norris, K. Birch, M. Sentis, J. L. García-Siñeriz, F. Königer, U. Glaubach, C. Rölke, R. Diedel (Germany)
- 13 VOLUME CHANGE BEHAVIOR OF UNSATURATED CLAYSTONE/ BENTONITE MIXTURE SAMPLES CHARACTERIZED BY DIFFERENT INITIAL DRY DENSITIES
M. Middelhoff, O. Cuisinier, F. Masrouri, J. Talandier (France)
- 14 ASSESSMENT OF RADIONUCLIDE SOLUBILITY AND RADIONUCLIDE SOURCE TERMS FOR DIFFERENT HOST-ROCK CONDITIONS
D. Fellhauer, X. Gaona, M. Altmaier, H. Geckeis (Germany)
- 15 THEREDA – THERMODYNAMIC REFERENCE DATABASE FOR THE NUCLEAR WASTE DISPOSAL IN GERMANY
F. Bok, H. C. Moog, X. Gaona, D. Freyer, L. Wissmeier (Germany)
- 16 A SYSTEMATIC APPROACH FOR SURFACE EXPLORATION OF SITES – A DATABASE TO RESEARCH AND EVALUATE SUITABLE METHODS
R. Dlugosch, T. Beilecke, T. Kneuker, L. Pollok, L. Richter, N. Schubarth-Engelschall, R. Semroch (Germany)
- 17 COMPACTION OF CRUSHED SALT FOR THE SAFE CONTAINMENT – OVERVIEW OF PHASE 2 OF THE KOMPASS PROJECT
L. Friedenberg, J. Bartol, J. Bean, O. Czaikowski, U. Düsterloh, N. Müller-Hoeppe, B. Laurich, C. Lerch, S. Lerche, C. Lüdeling, M. Mills, T. Popp, B. Reedlunn, K. Svensson, L. Wenting, K. Zemke, J. Zhao (Germany)
- 18 OVERCORING OF NUCLEAR WASTE CANISTERS FOR RETRIEVAL FROM SHORT VERTICAL BOREHOLES
A. Keller, P. Herold (Germany)
- 19 ADVANCING TRANSIENT SIMULATION OF HYDRO-MECHANICALLY COUPLED SYSTEMS IN GEOLOGICAL DISPOSAL APPLICATIONS
D. Kern, T. Deng, F. Magri, V. I. Malkovsky, T. Nagel (Germany)
- 20 INFLUENCE OF RESIDUAL STRESSES ON BARRIER INTEGRITY DEMONSTRATION FOR ROCK SALT
Nina Müller-Hoeppe (Germany)
- 21 SIMULATION OF RADIONUCLIDE DIFFUSION PROFILES IN BENTONITE – PREDICTION FOR THE LONG TERM IN-SITU TEST AT GRIMSEL TEST SITE (GTS), SWITZERLAND
U. Noseck, T. Schäfer, I. Blechschmidt (Germany)
- 22 GEOPHYSICAL CHARACTERISATION OF TECTONIC FAULT ZONES IN THE VICINITY OF POTENTIAL REPOSITORY SITES: A CASE EXAMPLE FROM SWITZERLAND
T. Spillmann, H. Madritsch, T. Diehl, A. Hölker (Switzerland)

- 23 REDUKTION OF THE GEODYNAMIC RISK IN THE DISPOSAL OF
RADIOACTIVE WASTE IN GEOLOGICAL FORMATIONS
V. Tatarinov, V. Kaftan, V. Morozov, A. Manevich (Russia)
- 24 IMPLEMENTATION OF A TEMPERATURE- AND STRESS-
DEPENDENT APPROACH TO DESCRIBE BITUMEN MATERIAL
BEHAVIOUR AS SEALING MATERIAL
R. P. León Vargas, P. Herold, E. Simo (Germany)
- 25 RETENTION OF RADIONUCLIDES IN THE SURROUNDINGS OF A
REPOSITORY FOR NUCLEAR WASTE: SELECTED SCENARIOS
*J. Lützenkirchen, F. Heberling, A. Skerencak-Frech, M. Altmaier, V.
Metz, H. Geckeis (Germany)*
- 26 AN INTERNATIONAL JOINT EXERCISE ON SENSITIVITY
ANALYSIS: FIRST RESULTS
E. Plischke, K.-J. Röhlig (Germany)

**TOPIC 4 HIGH-LEVEL WASTE / SPENT NUCLEAR FUEL MANAGEMENT
STRATEGIES AND GOVERNANCE: RESEARCH IN HUMANITIES AND
SOCIAL SCIENCES**

- 1 ON HUMAN CLOSENESS AND SAFETY: PARTICIPATION IN THE
PRODUCTION OF EXECUTIVE ORDER LAW FOR THE
IMPLEMENTATION OF THE GERMAN SITE SELECTION ACT
U. Smeddinck (Germany)

TOPIC 5 COMPETENCE BUILDING AND KNOWLEDGE TRANSFER

- 1 RECERTIFICATION OF THE WASTE ISOLATION PILOT PLANT:
PERFORMANCE ASSESSMENT CALCULATIONS TO
DEMONSTRATE REGULATORY COMPLIANCE
T. R. Zeitler, S. Brunell, D. Kicker, J. Long (USA)
- 2 THE DEVELOPMENT AND IMPLEMENTATION OF A KNOWLEDGE
MANAGEMENT PROJECT FOR THE BACK END OF THE NUCLEAR
FUEL CYCLE
J. E. Meacham, E. J. Bonano, P. G. Meacham (USA)