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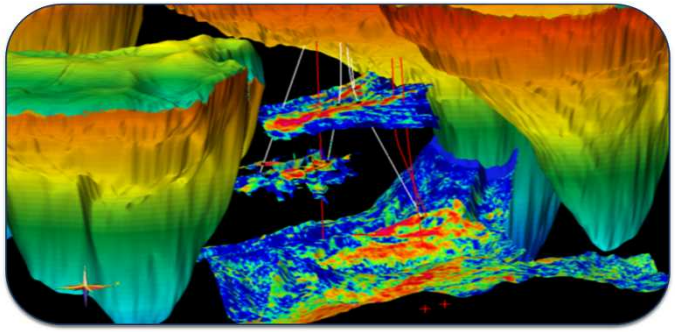

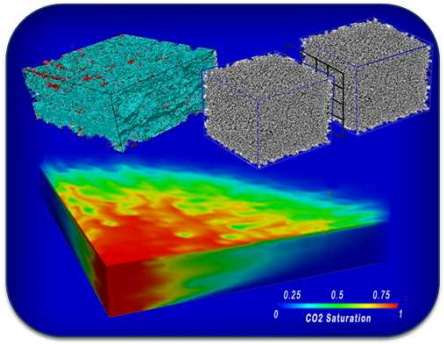

Synopsis of Proceedings of the 6th US/German Workshop on Salt Repository Research, Design, and Operation

Frank D. Hansen
Walter Steininger
Wilhelm Bollingerfehr

Presentation at Salt Club Meeting
Videoconference
March 22, 2016

U.S. DEPARTMENT OF ENERGY

National Nuclear Security Administration

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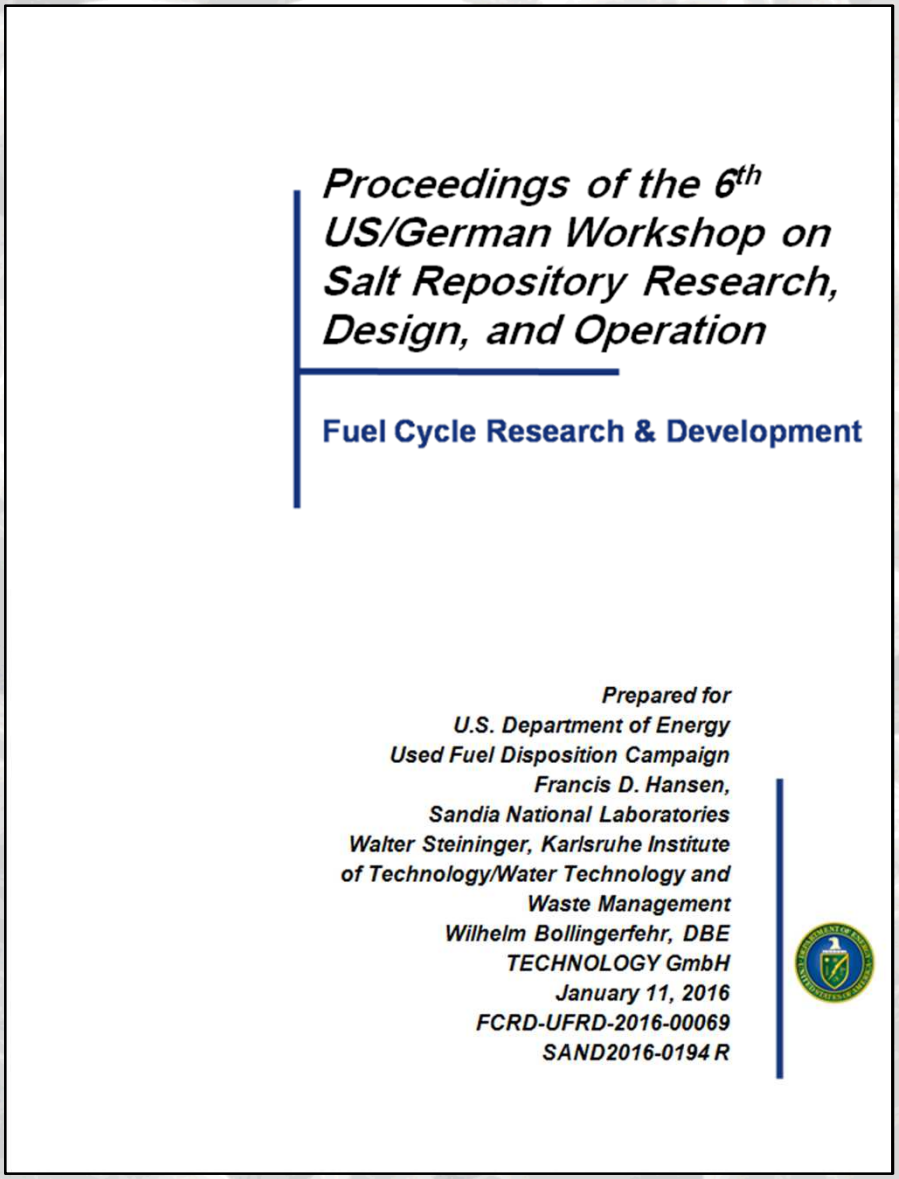
6TH US/German Workshop Overview



Proceedings of the 6th US/German Workshop on Salt Repository Research, Design, and Operation

Fuel Cycle Research & Development

Prepared for
U.S. Department of Energy
Used Fuel Disposition Campaign
Francis D. Hansen,
Sandia National Laboratories
Walter Steininger, Karlsruhe Institute of Technology/Water Technology and Waste Management
Wilhelm Bollingerfehr, DBE TECHNOLOGY GmbH
January 11, 2016
FCRD-UFRD-2016-00069
SAND2016-0194 R

6TH US/German Workshop Overview

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- The 6th US/German Workshop on Salt Repository Research, Design, and Operation was held in Dresden, Germany and totaled 73 participants, including representatives engaged in salt research from Poland and the Netherlands.

- The cross-section of participants encompassed
  - regulatory authorities
  - branches of the US Department of Energy (DOE)
  - members of Federal Ministry for Economic Affairs and Energy in Germany (BMWi)
  - The State Authority for Mining, Energy and Geology
  - German and US universities and research companies
  - Special contribution by the Technical University Freiberg on their 250th Anniversary.

6TH US/German Workshop Overview

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The ongoing workshops are underwritten by a Memorandum of Understanding between DOE and BMWi and extend benefit to the Organisation for Economic Co-operation and Development's (OECD´s) Nuclear Energy Agency (NEA) Salt Club.

The Workshop was initiated by Welcome Addresses from Mrs. U. Borak on behalf of BMWi and Dr. T. Lautsch of Deutsche Gesellschaft zum Bau und Betrieb von Endlagern für Abfallstoffe GmbH (DBE)

6TH US/German Workshop Overview

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- The current series of workshops was started in 2010, by mutual agreement between lead salt researchers in Germany and SNL.
- Since the initial meeting, workshop locations have alternated between the US and Germany. These collaborations help ensure documentation of the state of the art, which is tantamount to creating a knowledge archive.
- Workshop structure helps illuminate the contemporary state of the industry and thereby identify the most fruitful salt repository research, development and demonstration.
- Germany and US salt researchers have worked together since the 1970s.

6TH US/German Workshop Overview

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Proceedings comprising technical presentations and abstracts, as well as external, co-authored technical reports are distinctions of mutually beneficial salt repository progress.

- NEA website: https://www.oecd-nea.org/rwm/saltclub/
- US/German Workshop website: http://energy.sandia.gov/energy/nuclear-energy/ne-workshops/usgerman-workshop-on-salt-repository-research-design-and-operation/

6TH US/German Workshop on Salt Repository, Design & Operation

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- The number of attendees and topics has grown appreciably.
- An observation made at the Dresden workshop was that owing to the number of participants and the diversity of subject matter, the venue took on appearances of a symposium.
- Thus, coordinators will attempt to return to a workshop/breakout structure with a more focussed portfolio.
- The group will continue to document and report on elements that have history and substantial scientific basis, as a means to preserve that knowledge.
- Mature issues will be balanced with elements of arising concerns to render progress on matters of interest on both sides of the Atlantic Ocean.

Comparison of Bedded and Domal Salt Characteristics

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- Motivation from the German perspective is explained by Bollingerfehr et al. in their abstract and presentation contained in the Appendices of the Proceedings.

- German partners (BGR, DBE TEC, GRS, and IfG) are currently performing an R&D project called KOSINA (Development of a generic HLW repository concept in bedded salt including safety and safety demonstration concept), the objective of which is to develop both technical site-independent generic repository concepts for a bedded-salt repository for heat generating waste and a safety concept.

Comparison of Bedded and Domal Salt Characteristics

- In past German programs, bedded salt formations were not considered to host a repository for HLW despite usage as hazardous waste disposal facilities.

- Therefore, the KOSINA project was addressed in BMWi´s new research concept as an important issue to improve knowledge and perform investigations to clarify conceptual questions and to contribute to the technical-scientific basis for the safety oriented evaluation of potential repository systems in host rocks available in Germany.

Comparison of Bedded and Domal Salt Characteristics

- Since 1987, nuclear waste disposal in the US has concentrated on bedded salt while similar efforts in Germany emphasized geologic domal salt.
- The US is once again considering possible repository choices and has interests in relevant differentiating characteristics of bedded and domal salt.
- In Germany and the US rock salt remains one of the potential host rock formations.
- Salt repository researchers in Germany and the US continue to agree this coincidence provides an excellent opportunity for collaboration.
- A compendium of some description is foreseen that compares and contrasts differences and similarities of bedded and domal salt characteristics at different scales and explores repository implications.

Comparison of Bedded and Domal Salt Characteristics

- In addition to salt repository experience, each country has extensive history of mining and salt exploitation for industrial purposes, which enriches the collective understanding of basic salt physical, mechanical, chemical, petrological, hydrological, and thermal behavior.
- These assets provide a supporting basis for such a compendium and compelling reasons to undertake this task are evident.
- The greater question discussed in breakout session at the 6th US/German Workshop on Salt Repository Research, Design, and Operation is how to approach the undertaking.
- What should be contained in the document? How should it be structured?
- A consensus developed that such a comparison document holds the potential to be a major contribution to international salt repository R&D as sanctioned by the NEA Salt Club.

7TH US/German Workshop on Salt Repository, Research, Design & Operation

- September 7-9, 2016
- Embassy Suites by Hilton Crystal City – National Airport, Arlington, VA (Washington, DC)
- Conference registration will open mid-May 2016, closing on August 15.
- This location should enable attendance by federal colleagues.
- We hope to enhance the ***workshop*** environment by advancing breakout sessions on selected topics and fewer formal presentations.

7TH US/German Workshop on Salt Repository Research, Design & Operation

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A draft agenda is maturing. Topics include

- Safety case issues
- Repository design
- geomechanics issues
- Plugging and sealing
- Percolation
- Aging inventory
- Special topics

- Other suggestions can be considered

- **SPECIAL NOTE:** We will be compiling a 2017 calendar with featured "salt" photographs. **We ask participants to send candidate photos** (to Laura) of salt colleagues (people pictures), natural salt environments, cool micrographs, experimental rigs and tested samples, or virtually anything salt related that would light up a calendar. We will compile the calendar to be given as a conference memento.