DBE TECHNOLOGY NEWS

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2013

IAEA WORKSHOP

LICENSING OF A REPOSITORY IN BULGARIA

SAFETY ASSESSMENT FOR A REPOSITORY IN UKRAINE

Gorleben mine, operated by DBE

Verantwortung für Generationen
Responsibility for Generations

DBE TEC

DBE TECHNOLOGY GmbH

Team of DBE TECHNOLOGY GmbH

Dear Readers,

Throughout the world, we provide consulting and support services to private and public organizations, institutions, and companies in all issues concerning radioactive waste management, mining, and other related fields. Innovative solutions with a maximum of quality and efficiency that is what our work and our team of highly motivated scientists, engineers, and technicians stand for. Our partners know: Due to the close cooperation with our parent company, DBE, we have gained many years of experience in waste repository projects. Furthermore, our participation in numerous research & development projects has contributed to our high level of expertise.

To give you an idea of what we do and what we are engaged in, we have decided to publish this newsletter. From now on, it will be issued quarterly. Browse through the current topics as you like but please take particular note of the sophisticated IAEA workshop at our headquarters in Peine. Participants from 15 countries and 24 lecturers attended this one-week workshop to discuss engineering issues concerning the construction, operation, and closure of a safe geologic repository. By the way: If you are interested in finding out more, please visit our website. Just scan the QR code on the last page with your mobile phone or tablet computer.

Happy Reading!

Dr. Jürgen Krone
Managing Director
DBE TECHNOLOGY GmbH

DBE TECHNOLOGY GMBH

International Training Course on "Engineering for Safe Geological Repository Construction and Operation" from September 23-27, 2013, at our headquarters

Welcome address:
Borries Raapke (r.), managing director of DBE and chairman of the DBE Technology GmbH supervisory board, with conference chairman Dr. Enrique Biurrun (DBE Technology GmbH)

Following similar workshops in 2007, 2009, and 2011 DBE TECHNOLOGY GmbH – in cooperation with the International Atomic Energy Agency (IAEA) – organized an internal workshop on final disposal with a special focus on technical engineering for the construction and operation of a deep geological repository.

Throughout the world, geological disposal is considered to be the only safe and permanent solution for the management of long-lived radioactive waste. The training course was a component of the IAEA Network Programme with the objective to preserve the knowledge and the technologies in radioactive waste man-agement developed in countries with mature programmes and to share this expertise with countries just starting to develop their radioactive waste management programmes.

At the five-day workshop in Peine, 24 lecturers (incl. 11 from DBE and DBE TECHNOLOGY GmbH) presented state-of-the-art information on research and technology in the field of final disposal of radioactive waste. The workshop dealt with all aspects of planning, construction, operation and closure of a deep geological repository. Furthermore, the issues operational safety, long-term safety, and quality assurance were addressed. The presentations portrayed the relevant experience gained in the development of the radioactive waste management programmes of Germany, USA, France, Finland, and Switzerland and gave an overview of the related work by NEA and IAEA. Participants from 15 countries, delegated from national authorities for radioactive waste management, attended the workshop. You can find the presentations at www.dbe-technology.de.

Workshop: The participants look forward to a week of interesting lectures and discussion.

Complementing the lectures, the participants visited the licensed Konrad repository.

At the end of the training course, all parties involved rated the course a great success.

Morsleben repository, operated by DBE

DBE TECHNOLOGY GmbH supports the Bulgarian SERAW in preparing all documents for licensing procedure for a National Disposal Facility at Kozloduy, Bulgaria

To safely manage the radioactive waste from nuclear power plant (NPP) operation and early decommissioning of the four WWER 440-V230 reactors of the Kozloduy NPP (KNPP), Bulgaria has intensified its efforts to erect a near surface disposal facility for low and intermediate level waste at the Radiana site, adjacent to the KNPP.

In 2011 the Bulgarian State Enterprise for Radioactive Waste (SERAW) launched an international tender for the preparation of the technical design and intermediate safety evaluation report for the National Disposal Facility (NDF). Based on their review of the tendered responses, SERAW awarded the contract to the Consortium of DBE TECHNOLOGY GmbH (Germany), Westinghouse Electric Spain SAU and ENRESA (Spain). The consortium is led by Westinghouse.

The NDF design work started in October 2011, initially focusing on the Conceptual Design of several repository alternatives. After a comprehensive study of the developed documentation, SERAW approved the recommended Conceptual Design variant that was determined most suitable in a comprehensive multi-attribute analysis, in December 2012. The Bulgarian Nuclear Regulatory Agency (BNRA) and SERAW then authorised the Consortium to start developing the repository Technical Design. Under the responsibility of DBE TECHNOLOGY GmbH, the Technical Design work has been completed and submitted to SERAW for final review and approval. The work was conducted in close cooperation with the Consortium's Bulgarian subcontractor, EQE Bulgaria AD, to ensure adequate consideration of local Bulgarian requirements. The complete Technical Design documentation package prepared by the Consortium consists of 19 separate chapters, filling about 50 folders and totalling approximately 7,000 pages.

Waste for disposal at the NDF is to be conditioned in cubic shaped reinforced concrete containers that measure 1.95 m on a side. The waste packages will be emplaced by means of a 40-tonne bridge crane in disposal vaults made from reinforced concrete. The disposal vaults are subdivided into three internal disposal chambers. In each chamber, waste packages will be emplaced in four layers.
Each layer will consist of three rows of eight packages for a total of 24 waste packages per layer or 96 per chamber or 288 per vault. During the waste disposal operations, the disposal vaults and emplacement operations are protected against inclement weather conditions by a mobile roof. The mobile roof also houses the bridge crane used for emplacing the waste packages.

The repository is a modular-type facility, allowing the successive construction of disposal vaults to gradually increase the waste disposal capacity as needed. The construction is planned to be carried out in three main phases, each one providing vaults with sufficient disposal capacity for 20 years of repository operation.

Layout of the National Disposal Facility, Bulgaria

Emplacement equipment for borehole disposal

DBE TECHNOLOGY GmbH performed a Long-term Safety Assessment of a Trench-Type Surface Repository at Chernobyl, Ukraine

Figure 1: Aerial view of the Buryakovka repository (Ukraine). In front decommissioned parts, in back operating parts of the repository.

DBE TECHNOLOGY GmbH recently completed a safety assessment of the Radioactive Waste Disposal Facility (RWDF) Buryakovka, Ukraine. The trench-type surface repository was constructed in 1986 inside the Exclusion Zone (EZ) as part of the intervention measures taken in the aftermath of the Chernobyl NPP accident. Today, the RWDF Buryakovka is still being operated; however, its total capacity of approximately 690,000 m^3 have nearly been exhausted. Figure 1 shows an older aerial view of the facility and its surrounding area. As can be seen in the photo, most of the trenches have already been closed; a multi-layer cover topped with a vegetative cover is used for trench closure. Plans for refurbishment and expansion of the facility were originally developed over 10 years ago, but, mainly due to financial shortcomings, they could not be implemented. Since then, financial support for the planned redevelopment of the RWDF Buryakovka has been provided by the European Commission (EC).

As part of the EC support, DBE TECHNOLOGY GmbH prepared the required safety analysis report for the facility in its current state (SAR) and a preliminary safety analysis report (PSAR) for the planned future expanded facility. The expansion of the facility foresees the construction of six new trenches, installed over twelve of the existing trenches. Its total capacity will be 120,000 m^3 and its total estimated activity will be 1.1×10^{14} Bq, representing approximately 3 to 4% of the total activity (3.0×10^{15} Bq) already emplaced at RWDF Buryakovka.

The main goal of the PSAR was to evaluate the radiological impact of the planned repository expansion.

Figure 2 compares the total dose rate a member of the critical group would receive under the expected evolution of the repository for both the current and expanded configurations. As a result of the relatively small contribution from the anticipated future waste, the increase in total activity for the expanded repository is very small. The two curves of total dose rate are nearly identical and are only revealed by plotting the difference in dose rate increase as a separate curve (green curve). A detailed presentation of the project was prepared for the ICEM Conference held in Brussels from September 8 to 12, 2013.

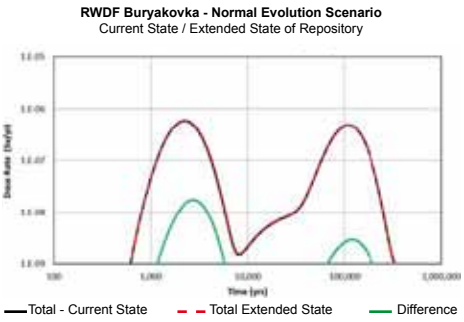

Figure 2: Total annual dose for present and expanded repository state with contribution from future waste. Results from radiological calculations for the Buryakovka repository (Ukraine).

For further information visit our website www.dbe-technology.de or scan the QR code below.

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