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Development of Borehole Seals for High-Level Radioactive Waste

Fact Sheet

Project Information

DEBORA

Grant agreement ID: FI2W0048

Project closed

Start date

1 January 1991

End date

30 September 1995

Funded under

Specific research and technical development programme (Euratom) in the field of management and storage of radioactive waste, 1990-1994


Total cost

€ 1 015 400,00

EU contribution

€ 507 700,00

Coordinated by

GSF-Forschungszentrum für
Umwelt und Gesundheit GmbH
 Germany

Objective

The overall objective of a nuclear repository is to protect man and his environment against ionizing radiation from radioactive waste emplaced in this underground repository.

According to section 45 of the German Radiation Protection Ordinance the individual dose to man, caused by radionuclides passing out of the repository, is to be limited to 0.3 mSv/year. In order to achieve this objective within the multiple barrier system of the repository, suitable sealing systems like borehole seals, drift seals and shaft seals are to be developed.

The objective of the DEBORA-project is the "Development of Borehole Seals for High-Level Radioactive Waste".

The DEBORA-project consists of two phases. During the first phase (1991-1994) a test plan for a subsequent in situ verification test will be developed in form of a desk study. This study will include an evaluation of literature, a performance of model calculations, and discussions of experts to identify the requirements for and the tasks of HAW-borehole seals under normal repository conditions. Altered repository conditions will be considered at a later stage of the project.

During the second phase, to be started in 1995, in situ tests will be performed and the sealing techniques elaborated during the first phase will be verified.

The overall objective of a nuclear repository is to protect man and his environment against ionizing radiation from radioactive waste emplaced in this underground repository.

According to section 45 of the German Radiation Protection Ordinance, the individual dose to man, caused by radionuclides passing out of the repository, is to be limited to 0.3 millisieverts/year. In order to achieve this objective within the multiple barrier system of the repository, suitable sealing systems like shaft seals, drift seals, and borehole seals are to be developed.

The objective of the DEBORA-project is the development of borehole seals for high level radioactive waste. Because the technical boundary conditions of a repository represent the most important basis for all further works, a compilation of these conditions has been made initially, together with a definition of the tasks of high level radioactive waste (HAW) borehole seals. An important item is the thermomechanical load on the HAW borehole seal. In the discussion on this loading, the filling strategy of the borehole seemed to be an important aspect. It was decided to try to determine by numerical analysis which aspects of the filling strategy would have a large influence on the thermomechanical loading and which would have a small influence. Having identified the most sensitive aspects one can concentrate on these items for further research in this project.

The first thermal and structural analyses have been made to determine the influence of the stack length on the area where the borehole seal is situated. Also, structural analyses have been made to determine the area around a gallery influenced by the excavation activities.

Work programme:

B.1 Compilation of the technical boundary conditions important for the design of HAW-borehole seals

B.2 Definition of the tasks of HAW-borehole seals

B.3 Analysis of events affecting the design of the borehole seal

B.4 Performance of model calculations

B.5 Elaboration of sealing techniques
B.6 Development of an in situ test plan

Fields of science (EuroSciVoc)

[engineering and technology](#) > [other engineering and technologies](#) > [nuclear engineering](#) > **[nuclear waste management](#)**

[natural sciences](#) > [physical sciences](#) > **[nuclear physics](#)**

[natural sciences](#) > [chemical sciences](#) > [nuclear chemistry](#) > **[radiation chemistry](#)**

[natural sciences](#) > [mathematics](#) > [applied mathematics](#) > **[numerical analysis](#)**



Programme(s)

[FP2-RADWASTOM 4C - Specific research and technical development programme \(Euratom\) in the field of management and storage of radioactive waste, 1990-1994](#)

Topic(s)

[A.4.2 - Research on gas flow](#)

Call for proposal

Data not available

Funding Scheme

[CSC - Cost-sharing contracts](#)

Coordinator



GSF-Forschungszentrum für Umwelt und Gesundheit GmbH

EU contribution

No data

Total cost

No data

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Participants (1)



Netherlands Energy Research Foundation

 Netherlands

EU contribution

No data

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Total cost

No data

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