Project Agreement II
between
the United States Department of Energy (DOE)
and the
National Cooperative for the Storage of Radioactive Waste in Switzerland (NAGRA) in the Field of Flow and Transport in Fractured Media

1. This Project Agreement recognizes that the DOE and NAGRA both have a direct interest in improving methods for analyzing the safety of nuclear waste disposal in fractured crystalline rocks, that DOE's Lawrence Berkeley Laboratory (LBL) has extensive experience in this field and that the NAGRA program is producing appropriate data from field measurements in boreholes, underground caverns and an underground rock laboratory. All terms of the Agreement of April 19, 1985 between DOE and NAGRA in the field of Radioactive Waste Management (hereinafter the "Waste Management Agreement") shall apply to this Project Agreement unless specifically changed by this Project Agreement. This Project Agreement is of the type contemplated by Section 7 of Article 3 of the Waste Management Agreement of April 19, 1985.

2. The objective of this Project Agreement is to provide a framework for collaboration on a technical project (hereinafter "Joint Project") concerning modelling of flow and transport through fractured rock in general, and the interpretation and modelling of field data required for assessment of potential geologic waste disposal facilities. The results from the Joint Project shall be used in both the United States and Switzerland. This Project Agreement shall help support different tasks included within on-going studies in the Earth Sciences Division of the Lawrence Berkeley Laboratory in Fracture Hydrology related to nuclear waste geologic disposal programs.

3. Each Party shall name a Technical Manager. The Technical Managers shall normally meet annually to review the past year's activities, to evaluate the status of cooperation, including the balance of exchanges, and to approve plans for the following year's activities.

4. A Technical Committee shall be established with representatives from both the U.S. and Switzerland as designated by the Technical Managers. This committee shall meet on a semi-annual basis or as required by the Technical Managers to review proposed and ongoing activities under the Joint Project and shall make recommendations to the Technical Managers.

5. The Technical Managers have the authority to approve and implement changes to the scope of work, provided that such changes do not significantly affect the Joint Project or the Parties' total financial contributions thereto.

6. The tasks shall be carried out using data obtained from test sites, underground rock laboratories and potential waste disposal sites in Switzerland with special emphasis on crystalline rock. The output of these studies shall generally be reports on the work performed, computer program listings and examples of applications. The detailed scope of the project work is defined in a series of subtasks set forth in Appendix A.

7. As its contribution to the Joint Project, DOE shall provide funding for the services of LBL staff members, the use of appropriate facilities at LBL, necessary equipment costs and ancillary staff services, as required to support the tasks outlined in Appendix A. The U.S. will contribute in total $1,800,000 to this Project. It is understood that the U.S. $1,800,000 cost of work as well as the costs of individual tasks are estimates only. The estimated break down (in thousands) by U.S. fiscal years (FY) is as follows:

FY 1987	$ 440
FY 1988	$ 680
FY 1989	$ 680

8. As its contribution to the Joint Project, NAGRA shall provide the services of necessary NAGRA or contractor staff to support the tasks outlined in Appendix A. These services shall include the cost of the required drilling contractor valued approximately at $100,000 and manpower valued approximately at a total of $400,000 over a three year period under this Project Agreement. Data already acquired to date by NAGRA to be used under this project agreement have been collected at a cost of over $10,000,000. Additional field costs, laboratory time, and additional manpower may be contributed in addition to the above at the discretion of NAGRA.

9. Neither the government, nor DOE, nor persons acting on their behalf guarantee the correctness of any cost estimate for the performance of work (either for this Project Agreement or for individual tasks, hereunder) and there shall be no liability on the part of the Government, DOE or persons acting on their behalf by reason of errors in the computation of estimates or differences between sub-estimates and the actual cost of the work.

10. The ability of both Parties to cooperate under this Project Agreement, including the ability to contribute funds, is subject to the availability of funds appropriated by both Parties.

subject to a non-exclusive, irrevocable, royalty-free license to NAGRA, its Government and its nationals designated by it. Information regarding inventions on which patent protection is to be obtained shall not be published or publicly disclosed by NAGRA or DOE until a patent application has been filed in either the United States or Switzerland; provided, however, that this restriction on publication or dissemination shall not extend beyond six months from the reporting of the invention. It shall be the responsibility of DOE to report the invention and to mark appropriately reports which disclose inventions that have not been appropriately protected by the filing of a patent application. DOE and NAGRA shall each, without prejudice to any rights of inventors or authors under its national laws, take all necessary steps to provide the cooperation from its inventors and authors required to carry out the provisions of paragraph 10 and 11 paragraph of this Project Agreement.

11. For Exchange of Information

General:

The Parties agree that information provided, exchanged, or arising under this Agreement may be given wide distribution, subject to the need to protect proprietary information, to copyright restrictions, and to the provisions of paragraph 10 above which supercedes Article 7 of the Waste Management Agreement. Such information may be made available to the public by either Party through customary channels and in accordance with normal procedures of the Parties.

Use of Proprietary Information:

A. Definitions as used in this Agreement

(i) The term "information" means scientific or technical data, results or methods of research and development, and any other information intended to be provided, exchanged, or arising under this Agreement.

(ii) The term "proprietary information" means information developed prior to or outside of this agreement, provided or exchanged which contains trade secrets or commercial or financial information which privileged or confidential, and may only include such information which:

(a) has been held in confidence by its owner;

(b) is of a type which is customarily held in confidence by its owner;

(c) has not been transmitted by the transmitting Party to other entities, including the receiving Party, except on the basis that it be held in confidence; and

(a) has been held in confidence by its owner;

(b) is of a type which is customarily held in confidence by its owner;

(c) has not been transmitted by the transmitting Party to other entities, including the receiving Party, except on the basis that it be held in confidence; and

(d) is not otherwise available to the receiving Party from another source without restriction on its further dissemination.

B. Procedures

(i) A Party receiving proprietary information pursuant to this Agreement shall respect the privileged nature thereof. Any document which contains proprietary information shall be clearly marked with the following, or substantially similar, restrictive legend:

"This document contains proprietary information furnished in confidence in an Agreement dated _____ between the United States Department of Energy and National Cooperative for the Storage of Radioactive Waste of Switzerland and shall not be disseminated outside these organizations, their contractors, and the concerned departments and agencies of Governments of the United States and Switzerland without prior approval of _____.

This notice shall be marked on any reproduction hereof, in whole or in part. These limitations shall automatically terminate when this information is disclosed by the owner without restrictions."

(ii) Proprietary information received in confidence under this Agreement may be disseminated by the receiving Party to:

(a) persons within or employed by the receiving Party, and concerned Government departments in the country of the receiving Party; and

(b) prime or subcontractors of the receiving Party working on projects within the geographical limits of the receiving Party's country, for the use only within the framework of their contracts with the receiving Party in work relating to the subject matter of the proprietary information;

provided that any such proprietary information shall be disseminated pursuant to an agreement of confidentiality and shall be marked with a restrictive legend substantially identical to that appearing in sub-section B(i) above.

(iii) With the prior consent of the Party providing proprietary information under this Agreement, the receiving Party may disseminate such proprietary information more widely than otherwise permitted in the foregoing sub-section (ii). The Parties shall cooperate with each other in developing procedures for requesting and obtaining prior written consent for such wider dissemination, and each Party shall grant such approval to the extent permitted by its national policies, regulations, and laws.

C. Each party shall exercise its best efforts to ensure that proprietary information received by it under this Agreement shall be controlled as provided herein. If one of the Parties becomes aware that it will be, or may reasonably be expected to become, unable to meet the non-dissemination provisions of this Article, it shall immediately inform the other Party. The Parties shall thereafter consult to define an appropriate course of action.

D. No proprietary information orally communicated shall be subject to the limited disclosure requirements of this Agreement unless the individual communicating such information places the recipient on notice as to the proprietary character of the information communicated at the time of such communication.

13. Prior to the attachment of staff under this Project Agreement, both Parties agree to put in place a separate attachment agreement as outlined in Article 5 of the Waste Management Agreement.

14. Unless otherwise explicitly noted at the time of transfer, all information provided, exchanged or arising under this Project Agreement may be given wide distribution subject to the need to protect inventions or discoveries as provided in paragraph 11 above. Such information may be made available to the public by either DOE or NAGRA through its customary channels and in accordance with its normal procedures.

15. This Project Agreement shall enter into force upon the later date of signature, and shall continue in force for a period of 3 years.

16. This Project Agreement may be terminated at any time at the discretion of either Party, upon six months advance notification in writing. Such termination shall be without prejudice to the rights which may have accrued to either Party up to the date of such termination.

Done in duplicate.

FOR THE UNITED STATES DEPARTMENT OF ENERGY

Signature

Name Ben C. Rusche

Title Director, Office of Civilian Radioactive Waste Management

Date June 1, 1987

FOR THE NATIONAL COOPERATIVE FOR THE STORAGE OF RADIOACTIVE WASTE IN SWITZERLAND

Signature

Name H. Issler C. McCombie

Title Managing Director, NAGRA. Deputy Managing Director, NAGRA.

Date 8th June, 1987.

ATTACHMENT A

DOE - NAGRA Joint Project #2
List of Tasks

Task 1: Determination of Fracture Hydraulic Parameters by Means of Fluid-Logging in Boreholes

The purpose of this study is to develop well test interpretation methods to determine key fracture hydraulic parameters. If sucessful, the results will be important for the characterization of subsurface fractured media and for site investigations of a nuclear repository in such medium.

The work will include, but not be limited to (1) investigating the approach and if necessary developing an appropriate theory of the analysis of electric conductivity logs in a single borehole intercepted by one or more waterbearing fracture zones; (2) if possible, develop solution techniques to estimate the hydraulic parameters of these water-bearing fracture zones; and (3) apply the methodology to actual field data and study the advantages and limitations of the applied methodology.

Task 2: Determination of Fracture Hydraulic Parameters by Means of Hydraulic Testing in Boreholes

The purpose of this study it to investigate and, if necessary, to develop well test interpretation methods to determine formation hydraulic properties. If successful, these methods will be important for the characterization of subsurface fractured media and will be applicable to site investigations of a nuclear repository in such medium.

The work will include, but not limited to (1) investigate the approach and if necessary, developing an appropriate theory for the analysis of hydraulic packer test in a single borehole; (2) if possible, develop solution techniques to estimate the hydraulic parameters of the surrounding formation; and (3) applying the method to actual field data and studying the advantages and limitations of the applied methodology.

Task 3: Flow and Transport in Fractured Media

The purpose of this study is to develop stochastic methods to model flow and transport through fractured media. If successful, these methods will be important for the characterization of the behavior of subsurface fractured media and will be applicable to the performance assessment of a nuclear repository in such a medium. The work will include, but not limited to (1)

investigating the approach and if necessary, develop an appropriate theory for the analysis of flow and transport in fractured media; (2) developing solution techniques readily applicable for modelling of flow and transport in fractured media; and (3) applying the methodology to actual data and studying the advantages and limitation of the applied methodology.

Task 4: Investigations on the Influence of Gas Flow on Solute Transport in Fractured Media

In nuclear waste repositories considerable amounts of gas can be produced due to corrosion, microbiologic degradation and hydrolysis by radiation. The purpose of the study is to develop methods to investigate and to model the influence of gas flow on solute transport through fractured media. If successful, these methods will be important for performance assessment of a nuclear repository in such a medium.

The work will include, but not limited to (1) investigating the approach and if necessary, developing an appropriate theory for the analysis of solute transport induced by gas flow in fractured media; (2) developing solution techniques readily applicable for modelling purposes in fractured in fractured media; and (3) applying the methodology and studying the advantages and limitation of the applied methodology.

Task 5: Design of Methodologies to Determine Relevant Host-Rock Hydraulic Paramenters by Means of a underground Rock Laboratory

The purpose of this study is to investigate and, if necessary, to develop methodologies to determine formation hydraulic properties to be applied in an underground rock laboratory. If successful, these methods will be important for the characterization of subsurface fractured media and will be applicable to site investigations for a nuclear repository in such a medium by means of a underground rock laboratory.

The work will include the study of the advantages and limitations of the investigated methodologies.

Task 6: Coupling of Transport and Geochemistry

The purpose of this study is to extend the capabilities of the TIP code to include chemical reactions. The TIP code is the only code in existense that models heat and mass transport by thermodynamically coupled processes. Chemical osmosis, thermal osmosis and ultrafiltration are the coupled processes most prominent in clay-like materials. Therefore it is expected that they could significantly affect solute transport in bentonite, which is currently being considered by both DOE and NAGRA as a backfill material.