

**MEMORANDUM OF UNDERSTANDING**

**BETWEEN**

**THE BUREAU DE RECHERCHES  
GÉOLOGIQUES ET MINIÈRES**

**AND**

**THE REGENTS OF THE UNIVERSITY OF  
CALIFORNIA**

**To Promote Cooperation in Energy Resource  
Recovery and Environmental Protection**

This Memorandum of Understanding (MOU) is between:

The Bureau de Recherches Géologiques et Minières (hereinafter referred to as "BRGM"), a state-owned company with a commercial and industrial purpose organized and existing under the laws of France, registered on the Company and Commercial Registry of Paris, under number 582 056 149, having its registered office at Tour Mirabeau, 39-43 Quai André Citroën, 75739 Paris cedex 15, France,

and

The Regents of the University of California, in its capacity as the manager and operator of the Lawrence Berkeley National Laboratory ("LBNL"), including its Earth Sciences Division ("ESD"). LBNL is a U.S. Department of Energy ("DOE") National Laboratory managed and operated by The Regents of the University of California pursuant to Contract No. DE-AC02-05CH11231.

BRGM and LBNL are collectively referred to as "Participants" or separately as "Participant."

**Section 1: The Participants**

BRGM is France's leading public institution involved in geoscientific research. Its five key roles are: scientific research focused on furthering geological knowledge and understanding surface and subsurface phenomena; support to public policy development; international cooperation on projects that promote protection for people and resources; responsibility in France for all mine safety engineering; and training in higher education in the geosciences.

ESD is a division of LBNL and is engaged in applied and basic research activities in support of the DOE's missions in energy resource recovery and environmental protection.

## **Section 2: Objective**

The objective of this MOU is the promotion of cooperation between the Participants with a view to contributing to scientific research and technological development in energy resource recovery and environmental protection.

## **Section 3: Areas of Planned Cooperation**

The Participants express their intention to explore future collaboration in the following areas:

- a) Geologic storage of carbon dioxide (CO<sub>2</sub>)
- b) Advanced concepts for producing geothermal energy
- c) Nuclear waste and clay barriers
- d) Water resources
- e) Subsurface energy storage (e.g., compressed air energy storage)
- f) Groundwater contamination
- g) Geochemical, poromechanical, and reactive transport processes in confined/nanoporous environments
- h) Hydrogeophysical processes and non-destructive characterizations of dynamic and reactive systems
- i) Geophysical monitoring techniques for CO<sub>2</sub> sequestration
- j) Numerical model development and testing

The scope of the above areas of cooperation may be changed by written consent of the Participants, with any future collaborative research to be undertaken pursuant to an appropriate agreement therefor.

## **Section 4: Proposed Forms of Cooperation**

Forms of proposed cooperation may include:

- a) Exchange of personnel, including scientists, graduate students and post-doctoral fellows
- b) Joint organization of conferences, workshops, seminars, and similar activities;
- c) Exchange of numerical simulation tools and other information;

- d) Collaboration on large field projects;
  - e) Collaborator licenses for computer code sharing on a case by case basis,
- all such activities to be undertaken pursuant to appropriate written agreements therefor, as appropriate..

### **Section 5: Designated Scientific Coordinators**

- a) Each Participant should designate one scientific coordinator in charge of the collaboration, through whom all requests and plans of that Participant are to be made.
- b) The designated scientific coordinators may hold meetings when necessary to discuss matters related to cooperation under this MOU.
- c) For purposes of this MOU, the following are the designated scientific coordinators:

**From BRGM :**

Mohamed AZAROUAL  
3, avenue Claude Guillemin  
B.P. 36009  
45060 ORLÉANS Cedex 2  
FRANCE  
Phone : 33-2-38-64-32-54  
Fax : 33-2-38-64-37-19  
E-mail : [m.azaroual@brgm.fr](mailto:m.azaroual@brgm.fr)

**From ESD:**

Nicolas SPYCHER  
Lawrence Berkeley National  
Laboratory  
MS 84-171 One Cyclotron Road,  
Berkeley, CA 94720,  
United States of America  
Phone: 510-495-2388  
Fax: 510-486-7897  
E-mail : [nspyscher@lbl.gov](mailto:nspyscher@lbl.gov)

- d) Any communication which is not related to a scientific purpose should be directed to:

**For BRGM :**

Moussa HOUMMADY  
3, avenue Claude Guillemin  
B.P. 36009  
45060 ORLÉANS Cedex 2  
FRANCE  
Phone : 33-2-38-64-31-62  
Fax : 33-2-38-64-39-90  
E-mail : [m.hoummady@brgm.fr](mailto:m.hoummady@brgm.fr)

**For ESD:**

Peter K. Lau  
1 Cyclotron Rd..  
MS : 74-316C  
Berkeley, CA 94720  
United States of America  
Phone : 510-486-5570  
Fax: 510-486-7897  
E-mail : [PKLau@lbl.gov](mailto:PKLau@lbl.gov)

In case of change of scientific coordinator or representative, a Participant should notify, the other Participant of such a change by registered letter at least within fifteen (15) days before its effectiveness.

## Section 6: Commencement, Modification and Discontinuation

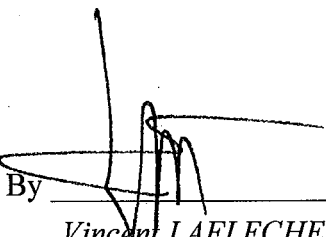
- a) Cooperative activities under this MOU may commence upon signature and continue for a four (4) year period, unless discontinued in accordance with paragraph b. of this Section 6.
- b) The Participants may discontinue this MOU at any time in writing. A Participant that wishes to discontinue its participation in this MOU should endeavor to provide at least thirty (30) days written notice to the other Participant.
- c) This MOU may be modified in writing by mutual consent of the Participants, and may be extended for additional periods.

## Section 7: General Considerations


- a) Each Participant should conduct the activities contemplated by this MOU in accordance with all applicable laws, regulations and other requirements to which it is subject, including, without limitation, export control laws and environment, health and safety laws and regulations.
- b) The conduct of cooperative activities contemplated by this MOU is subject to the availability of funding, personnel, and other resources.
- c) Each Participant is to be responsible for the costs it incurs in participating in cooperative activities under this MOU.
- d) This MOU does not create any legally binding obligations.

Signed in duplicate.

**For The Bureau de Recherches  
Géologiques et Minières**

By   
\_\_\_\_\_  
*Vincent LAFLECHE*  
*Chief Executive Officer*

**For The Regents of the University of  
California, Management and Operating  
Contractor for Lawrence Berkeley  
National Laboratory**

By   
\_\_\_\_\_  
*Horst D. Simon*  
*Deputy Laboratory Director,*  
*Lawrence Berkeley National Laboratory*

Date: 09 AVR. 2014

Date: 3/12/2014