

## **MEMORANDUM OF UNDERSTANDING**

**between**

**U.S. DEPARTMENT OF ENERGY  
NATIONAL ENERGY TECHNOLOGY LABORATORY**

**and**

**CHINA NATIONAL PETROLEUM CORPORATION  
INTERNATIONAL DEPARTMENT**

### **I. PURPOSE**

This Memorandum of Understanding (MOU) reflects a mutual interest on the part of the U S Department of Energy's National Energy Technology Laboratory (NETL) and China National Petroleum Corporation (CNPC) International Department (collectively the 'Parties') to pursue collaborative opportunities to advance the technical, environmental, and cost performance of fossil energy technologies.

### **II. AREAS OF COOPERATION**

Cooperative activities may include, but are not limited to, research and development on base and enabling technologies, and assessments of technology options and economics. Cooperative topics may include:

- a. Development of oil and natural gas technologies applicable to the petroleum industry, including exploration and development programs
- b. Development of methane hydrates including exploration technologies and strategies, resource assessment, and methods of production
- c. Development and assessment of technologies and processes for high-temperature, high-pressure drilling and production, including drilling fluid and cementing technologies focused on the development of advanced materials.
- d. Development and assessment of sequestration options for carbon dioxide (CO<sub>2</sub>) and other greenhouse gases from fossil fuel-based systems, including capture, storage, and utilization.
- e. Development and assessment of reservoiring mechanism and technologies to recover coal-bed methane reservoirs of different ranks, including enhanced coal bed methane (ECBM) recovery strategies

- f. Other environmental technologies for assessment, control, protection, and remediation of ground water surface waters and soils, which may be affected by oil and gas operations. Technologies to treat produced water from oil and gas operations are included in this topical area
- g. Other related technologies, such as minimization and utilization technologies for wastes resulting from fossil fuel production and use.

Other areas of cooperation may be added by mutual written agreement of each Party's Lead Coordinator

### **III. FORMS OF COOPERATION**

Specific cooperative projects will be defined in supplemental agreements between the Parties. Cooperation may include but is not limited to:

- a. Exchange of information, publications, reports, technical data, samples, materials, and instruments
- b. Exchange of scientists, engineers and other specialists for participation in training, project definition activities, research, energy analyses, and technology transfer. Each Party agrees to abide by the other's health, safety, and environmental (HSE) requirements.
- c. Technical assistance in specific projects, such as the development of CNPC's Coal-bed Methane and Gas Hydrate R&D Road Map and establishment of the Coal-bed Methane & Gas Hydrate Technology Center in CNPC/PetroChina's RIPED-Langfang Branch.
- d. Jointly funded activities in which NEIL and CNPC share the cost of performance of mutually beneficial projects.

This MOU does not and will not be construed so as to create any association, partnership or trust, or to impose any joint or collective obligation or liability and each Party will be responsible only for its individual obligations provided herein.

### **IV. LEAD COORDINATOR**

Each Party shall designate a Lead Coordinator who shall serve as that Party's principle representative for activities under this MOU.

## **V. FINANCIAL COMMITMENTS**

NETL's commitments in furtherance of this MOU are contingent on the availability of funds appropriated by the Congress of the United States. The CNPC's commitments in furtherance of this MOU are contingent on the availability of funds to pursue collaborative activities. Unless otherwise agreed by the Parties, each Party shall be responsible for its own costs incurred in furtherance of this MOU.

## **VI. INTELLECTUAL PROPERTY**

Each Party will retain rights to its own background intellectual property (IP). If the Parties agree that sharing of background IP is necessary or desirable to accomplish the goals of this MOU, such sharing may need to be made under terms of confidentiality. Thus, before background IP is shared, the Parties agree to negotiate in good faith to enter into a nondisclosure agreement if such an agreement is necessary to protect the owner's rights in its background IP.

The allocation of rights to newly generated intellectual property will be determined on a project by project basis at the inception of each specific research activity.

## **VII. EFFECTIVE DATE, AMENDMENT AND TERMINATION**

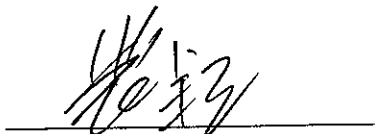
This MOU is effective upon the date of the last signature by the Parties and shall remain effective for a 5-year period unless terminated in accordance with the terms set forth herein. The MOU may be modified by mutual consent of the Parties.

Either Party may terminate this MOU by providing written notice to the other Party at least 90 calendar days in advance.

## **SIGNATORIES**



Mr. Carl O. Bauer, Director  
National Energy Technology Laboratory  
U.S. Department of Energy



Ms. Pei Ying, Deputy Director-General  
Representing  
Mr. Zhang Xin, Director-General  
International Department  
China National Petroleum Corporation

Signed this 20<sup>th</sup> day of October of 2008 in Beijing, The Peoples Republic of China