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_2) 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 assi n stance ispecific 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 NETL 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

Carl O Bauer

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 20th day of October of 2008 in Beijing, The Peoples Republic of China