

Implementing Memorandum

To the Memorandum of Understanding Between the Government of
the United States and the Government of the Italian Republic
Concerning Energy Research and Development Cooperation
in
a Laboratory Project for Direct Liquefaction of Coal

WHEREAS, the Government of the United States of America represented by the Department of Energy (DOE) and the Government of the Italian Republic represented by the Ministry of Industry, Commerce, and Handicraft (MOI) have entered into a Memorandum of Understanding in energy research and development signed on December 5, 1985, (hereafter referred to as the "Agreement").

WHEREAS, MOI has designated by letter of April 4, 1986 Eniricerche S.p.A. (hereinafter referred to as Eniricerche) as "Designee", with the consent of Eniricerche by letter of April 7, 1986, and

WHEREAS, DOE and Eniricerche (hereinafter referred to as the "Parties") recognize that it would be beneficial to both parties to cooperate in the field of direct liquefaction of coal. Therefore, the Parties agree as follows:

ARTICLE I

SCOPE

1. The Parties agree to cooperate in carrying out a bench-scale research program for the conversion of coal to liquid hydrocarbons (hereinafter call "the Project").
2. The Project shall consist of the following tasks which shall be the responsibility of Eniricerche.

Task 1 - Investigate the effect of operating variables and appropriate catalysts on conversion of coal in the CO/H₂ system.

Coals selected by mutual agreement between the Parties, shall be converted via formate ions - CO/water system according to the following five subtasks:

- 1.1 Perform CO/water microreactor runs on selected coals to establish a baseline data base.

- 1.2 Conduct a detailed study of conversion with microreactors and appropriate heating baths.
 - 1.3 Investigate buffering systems (chemical or mechanical) to maintain a proper level of reactive species during liquefaction and in turn increase coal conversion.
 - 1.4 Vary the quantities of water addition to verify whether the limitation of added water increases conversion and oil yield.
 - 1.5 Conduct experiments replacing CO with Syngas at various CO/H₂ ratios, as produced in coal gasification plants.
- Task 2 - Evaluate the upgrading of products from Task 1, using both catalytic hydrotreating and the CO/H₂ system.
- 2.1 Carry out experiments on first stage products, using conventional catalytic upgrading techniques. Catalytic hydrotreating of the reaction shall be performed in batch microreactors, with subsequent evaluations of both feedstock reactivity and the composition of the products.
 - 2.2 Compare the results of the upgraded first state CO/water products with similar products derived from conventional donor solvent systems.
 - 2.3 Perform upgrading experiments on first stage products using CO/water system at higher temperatures and/or with the addition of transition metal salts.
 - 2.4 Conduct detailed analyses of the products using advanced analytical techniques and assess product yield distribution in relation to the upgrading conditions used.
- Task 3 - Develop a conceptual process design based on the results from Tasks 1 and 2.
- Develop a conceptual process design based on the results obtained in Task 1 and 2. Task 3 shall include the following subtasks:
- 3.1 Preparation of a conceptual simplified process scheme.
 - 3.2 Preparation of preliminary material and energy balances.
 - 3.3 Provision of guidelines for technical and economical feasibility studies related to the overall process.

ARTICLE II

MANAGEMENT

1. In order to provide guidance and technical advice to the Project, a Management Committee shall be established consisting of four members, two designated by each Party. Each Party shall inform the other Party in writing of all designations under this paragraph. The Committee shall elect a chairman and the chairmanship shall alternate between the Parties each year.
2. Up to two persons designated by each Party may, without further consent of the other Party, attend meetings of the Management Committee.
3. The Management Committee shall have the following responsibilities:
 - A. Review annually the status of the Project and adopt any changes in technical direction to the Project Plan relating to scientific, technical, schedule or financial items.
 - B. Consider any matters submitted to it by the Parties.
4. The Management Committee shall carry out its responsibilities in accordance with the following procedures:
 - A. The Management Committee shall meet at least once each year. A special meeting shall be convened upon the request of any member which can demonstrate the need for such a meeting. The first meeting of the Management Committee shall take place within eight (8) weeks after signing the Implementing Memorandum.
 - B. Unless otherwise agreed, meetings of the Management Committee shall be held in the Italian Republic on a date announced to all members by the chairman and mutually agreed upon.
 - C. One member of each Party shall be present to produce a quorum for the transaction of business in meetings of the Management Committee.
 - D. The Management Committee shall make its decisions by unanimity. This shall require the agreement of each member or alternate member present and voting at the meeting at which the decision is made.
 - E. The Management Committee shall report annually to the

joint Working Group established under the MOU regarding the status of the Project.

ARTICLE III

EXPENSES

1. The total cost of the Project is estimated at 1,136,000,000 Italian Lira which corresponds to \$757,000 based upon the current exchange rate of 1,500 Lira = \$1.00. The exchange rate stated herein is for purposes of establishing the estimated cost to the Department of Energy. Notwithstanding the exchange rate stated herein, the Department of Energy agrees to provide funding equal to 38% of the actual cost of the Project. These costs shall be shared as follows:

DOE	38%
MOI (Eniricerche)	62%
2. The yearly contributions of the Parties within the above paragraph shall be fixed by the Management Committee reflecting the need for the Project to have funds to meet commitments as and when they arise in accordance with the tasks in Article I to be performed within a given year.
3. Payments are to be forwarded to Eniricerche on a quarterly basis as approved by DOE officials based upon an estimate of the costs to be expended in the subsequent quarter's proposed activity which is derived from the estimated yearly cost of the Project. The quarterly payment will be adjusted upward or downward based upon the previous quarter's actual expenses (over or under the estimate). Eniricerche will submit a quarterly report to DOE which indicates actual expenses for the prior quarter from which the amount of the adjustment will be determined. In the initial payment DOE shall recognize costs incurred by Eniricerche in performance of this project after January 1, 1986.
4. The financial year of the Project shall correspond to the calendar year.
5. Eniricerche shall maintain complete and separate financial records which shall clearly account for all funds in the custody or possession of Eniricerche in connection with the Project.
6. Contributions pursuant to paragraph 1 above shall be paid in Italian Lira. Contributions received by Eniricerche

shall be used solely in accordance with the Project plan as provided in Article I and Article III.1. above.

7. Each Party shall bear all costs of its participation in the Project other than the common costs funded by the budget of the Project.
8. Eniricerche shall transmit to DOE a copy of the approved actual annual expenditures within six months following the end of each calendar year. Overpayments of DOE within a calendar year determined on the basis of the proofs for the use of funds are to be credited to the following year. Overpayments at the end of the Project are to be repaid within six months after completion.

ARTICLE IV

INFORMATION

1. DOE shall provide to Eniricerche publicly available information concerning conversion of coal to liquid hydrocarbons.
2. Eniricerche shall provide to DOE five copies each in English of quarterly reports, topical reports as requested by DOE, and a final report; in addition, Eniricerche shall provide to DOE all information provided to or arising from the tasks set forth in Article I.
3. The Parties support the widest possible dissemination of information provided, exchanged, or arising from this Implementing Memorandum, subject to the provisions of Article V. Such information may be made available to the public by either Party through customary channels and in accordance with normal procedures of the Parties.

ARTICLE V

INVENTION OR DISCOVERY

1. With respect to any invention or discovery made or conceived in the course of or under this Implementing Memorandum:
 - A. Eniricerche shall acquire all right, title and interest in and to any such invention or discovery in its own country and third countries, subject to a nonexclusive, irrevocable, royalty-free license to DOE, its Government and its nationals designated by it; and

B. DOE shall acquire all right, title and interest in and to any such invention or discovery in its own country subject to a nonexclusive, irrevocable, royalty-free license to Eniricerche, its Government and its nationals designated by it.

2. Information regarding inventions on which patent protection is to be obtained by a Party shall not be published or publicly disclosed by the other Party until a patent application has been filed, provided, however, that this restriction on publication or disclosure shall not extend beyond six months from the date of receipt of such information. It shall be the responsibility of the inventing Party to appropriately mark reports which disclose inventions that have not been appropriately protected by the filing of a patent application.
3. Each Party shall, without prejudice to any rights of inventors under its national laws, take all necessary steps to provide the cooperation from its inventors required to carry out the provisions of this Article. Each Party shall assume the responsibility to pay awards or compensation required to be paid to its own nationals according to its own laws.

ARTICLE VI

Paragraph 4 of the Memorandum of Understanding and Articles 3 and 9 of Annex I to the MOU are hereby incorporated by reference.

ARTICLE VII

TERM

This Implementing Memorandum shall enter into force upon signature and shall remain in force until December 31, 1988. It may be amended or extended by mutual written consent of the Parties.

ARTICLE VIII

TERMINATION

This Implementing Memorandum may be terminated at any time at the discretion of either Party, upon six (6) months advance notification in writing to the other Party by the Party seeking to terminate the Implementing Memorandum. Such termination

shall be without prejudice to the rights which have accrued under this Implementing Memorandum to either Party up to the date of such termination.

Done at Atlanta, Georgia in duplicate this 11th
day of April, 1986.

Keith N. Frye
For the Department of Energy of
the United States of America

Franco Blasi
For Eniricerche S.p.A. of
Italy