

PROGRAM ARRANGEMENT

between

THE DEPARTMENT OF ENERGY
OF THE UNITED STATES OF AMERICA

and

THE COMMONWEALTH SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANIZATION OF AUSTRALIA

ON THE EXCHANGE OF INFORMATION

CONCERNING OIL SHALE RESEARCH

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RECOGNIZING THAT:

The United States Department of Energy and the Australian Department of Primary Industries and Energy, having a mutual interest and desire to co-operate, in the area of energy research and development, entered into a Memorandum of Understanding regarding co-operation in that area signed on the Eleventh day of April 1988 (hereinafter referred to as "the MOU");

The Department of Energy of the United States of America (hereinafter referred to as "DOE") and the Commonwealth Scientific and Industrial Research Organization of Australia (hereinafter referred to "CSIRO") which has been designated by the Australian Department of Primary Industries and Energy under section 1 of the MOU (hereinafter collectively referred to as the "Parties") have a mutual interest and desire to co-operate in the above area;

DOE has been defining the process chemistry and kinetics for certain "Western and Eastern" oil shales in terms of kerogen conversion and yield loss mechanisms under gas/solid heat transfer regimes and has developed analytical techniques to better measure the process parameters and characterise product and waste streams;

DOE also has research underway to develop models for optimising blasting results and to incorporate mining data into a systems modelling framework so that different oil shale mining scenarios can be evaluated;

The Division of Fuel Technology being a part of CSIRO (hereinafter referred to as "the Division") has been conducting oil shale research with the aim of characterising Australian oil shale resources and adapting existing technologies to better suit them to these properties, with primary emphasis on mining near surface deposits for surface retorting; and

The Parties have agreed to enter into this program for the mutual benefit of both Parties in the following four areas of oil shale research and development:

1. Oil loss mechanism (especially coking and cracking);
2. Mineral reactions and their relationships to air pollution issues;
3. Mining Studies; and
4. systems Analysis.

THE PARTIES make the following Program Arrangement under Section 3.1 of the MOU:

Objectives

- 1.(1) DOE will continue to study vapor phase cracking of shale oils. These results will be compared with previous experiments on several Australian shale oils. Experiments will also be conducted by DOE to study vapor phase cracking on materials with more active surfaces. A new technique for measuring oil shale pyrolysis under fluidized bed conditions will also be compared by DOE with previous results using flame ionization detectors.
- (2) The Division will continue to investigate the factors which influence the coking reactivity of shale oils and recycle solids, as well as determining the stoichiometry of the coking reactions. Models will be developed by CSIRO to relate kinetic studies to the operation of larger reactor systems in which the effects of integrating retort and combustion units will be investigated.
- 2.(1) DOE will conduct process studies that include measurement of gases generated under a variety of conditions. These studies will include isothermal pyrolysis experiments and small-scale flash pyrolysis studies with mass spectrometer analysis of gas-phase products.
- (2) The Division will continue to study reactions occurring during shale retorting and spent shale combustion, which give rise to products which could pollute the environment and, in particular, will study the reactions which produce NO_x and SO_x and the means by which the emission of these materials can be controlled.
- 3.(1) DOE will provide modelling support for blasting studies with the goal of optimizing blast results as a function of rock type, explosive selection, blastwell timing, spacing, burden thickness, etc. The end result of this modelling work will be the development by DOE of

validated computation design tools that can attain widespread use in the blasting industry. DOE will also provide a demonstration of a water jet assisted continuous miner.

- (2) The Division will conduct characterisation studies of engineering properties of clayrock oil shales and typical overburden materials and investigate their implications for diggability and mining methods, transport and handling systems, mine slope design and dewatering and stabilisation techniques.
- 4.(1) DOE will incorporate the mining data developed in paragraph 3 above into a systems modelling framework where different mining scenarios will be evaluated for cost versus performance. Optimum methods will be incorporated into conceptual shale oil production plant designs being developed by the DOE for various surface processes.
 - (2) The Division will assess geotechnical implications of mining options for typical case studies and will analyse the response of oil shale and overburden to design options for mining configurations and techniques. The demands of mining systems for specified production targets will also be investigated by CSIRO.
5. The Parties view the fulfilling of the objective above of this Program Arrangement as also providing the information to identify possibilities for collaboration on other specific aspects of oil shale. Such additional collaboration will be the subject of a separate Program Arrangement or a Project Agreement under Section 4 of the MOU as appropriate.

Implementation

6. As soon as practicable after signature of this Program Arrangement each Party will, to the best of its ability, provide to the other Party all information generated by

it in the research described in paragraphs 1-4. This will include available information on studies and programs in those areas that are underway or planned but will exclude information generated under co-operative effort through the International Energy Agency.

7. Each Party will ensure, wherever reasonable, that no charges will be levied for the information provided.

Management

8. The Technical Coordinators for Oil Shale appointed under Section 5.1 of the MOU will supervise the operation of this Program Arrangement. The Technical Coordinators will keep contact with each other to oversee the progress of the exchange of information under this Program Arrangement and report to the Lead Coordinator appointed under the MOU in their respective countries at least on an annual basis. The Technical Coordinators will determine the procedures for the exchange of information within 90 days from the entry into effect of this Program Arrangement.

Exchange of Personnel

9. Should an exchange of personnel be contemplated under this Program Arrangement, each such exchange shall be the subject of a separate, written Personnel Exchange Agreement between the Parties.
10. Each separate Personnel Exchange Agreement shall include appropriate "Intellectual Property" provisions.
11. Under the Personnel Exchange Agreement, the sending Party shall assure the qualifications of its participating staff and shall be responsible for all direct support required by its representative(s) including family members, and other expenses as may be called for by the particular Agreement.

12. The host Party shall provide assistance to the assigned staff (and family) as regards administrative formalities, and making accommodations and travel arrangements.
13. The assigned staff of each Party shall conform to the general and special rules of work and safety regulations in force in the host Party's country and establishment, or as agreed in the separate Personnel Exchange Agreement.

Copyright Protection

14. Copyrights of the Parties or of co-operating organisations and persons will be accorded treatment consistent with internationally recognized standards of protection. Each Party will make efforts to arrange for a grant to the other Party of an appropriate licence, if requested by the other Party, in copyrighted material exchanged under this Program Arrangement. The terms and conditions of any such licence will be agreed between the relevant parties.

Exchange of Information

15. The Parties support the widest possible dissemination of information exchanged under this Program Arrangement subject to any need to protect information exchanged hereunder which is required under the laws of the country of the transmitting Party.
16. The information to be exchanged under this Program Arrangement is not intended to include proprietary information as described below.
17. Although "proprietary information" is not intended for normal exchange under this Program Arrangement, the following definitions shall be applied in determining whether a projected or actual exchange of information requires protection as "proprietary information".

Proprietary Information

18.(1) In this Program Arrangement:

- (a) "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 Program Arrangement; and
- (b) "proprietary information" means information developed prior to or outside this Program Arrangement which contains trade secrets or commercial or financial information which is privileged or confidential, and may only include such information which:
 - (i) has been held in confidence by its owner;
 - (ii) is of a type which is customarily held in confidence by its owner;
 - (iii) has not been transmitted by the transmitting Party to other entities (including the recipient Party) except on the basis that it be held in confidence; and
 - (iv) is not otherwise available to the recipient Party from another source without restriction on its further dissemination.

- (2) Nothing contained in this Program Arrangement will preclude the use or dissemination of information received by a Party through arrangements other than those provided for under this Program Arrangement.

19.(1) The application or use of any information accessed, exchanged or transferred under this Program Arrangement will be the responsibility of the recipient Party. Neither Party warrants the suitability of information

for any particular use or application, nor does it provide warranty or assurances as to the accuracy of the information so exchanged or transferred.

- (2) Information transmitted by one Party to the other Party under this Program Arrangement will be accurate to the best knowledge and belief of the transmitting Party. The transmitting Party does not warrant the suitability of the information transmitted for any particular use or application by any third party.
- (3) Information developed jointly by the parties shall be accurate to the best knowledge and belief of both parties. Neither party warrants the accuracy of the jointly developed information or its suitability for any particular use of application by either party or by any third party.

Funding

- 20. Except if subsequently agreed in writing, all costs resulting from co-operation under this Program Arrangement will be borne by the Party that incurs them. It is understood that the ability of each Party to carry out its obligations under this Program Arrangement is subject to the availability of appropriated funds.

General Provisions

- 21. In acting under this Program Arrangement each Party will comply with all the applicable laws and regulations in its country.
- 22. All questions related to the Program Arrangement arising during its term will be settled by the Parties by mutual consent.

Effective Date and Termination

23. This Program Arrangement will come into effect upon signature by the Parties. Unless terminated pursuant to paragraph 24, this Program Arrangement will continue in effect until the expiration or termination of the MOU.
24. Either Party may terminate this Program Arrangement to take effect after six months advance written notice of such termination.

SIGNED IN DUPLICATE at .LUCAS HEIGHTS RESEARCH LABORATORIES.....

this .ELEVENTH..... day ofMAY.....1989.

FOR THE DEPARTMENT OF ENERGY
OF THE UNITED STATES OF
AMERICA

FOR THE COMMONWEALTH
SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANIZATION OF
AUSTRALIA

Richard H. Williamson

(Signature)

P. G. Alfredson

(Signature)

RICHARD H. WILLIAMSON

(Printed Name)

PETER G. ALFREDSON

(Printed Name)

DEPUTY ASSISTANT SECRETARY FOR
INTERNATIONAL AFFAIRS, USDOE

(Title)

CHIEF, DIVISION OF FUEL TECHNOLOGY

(Title)