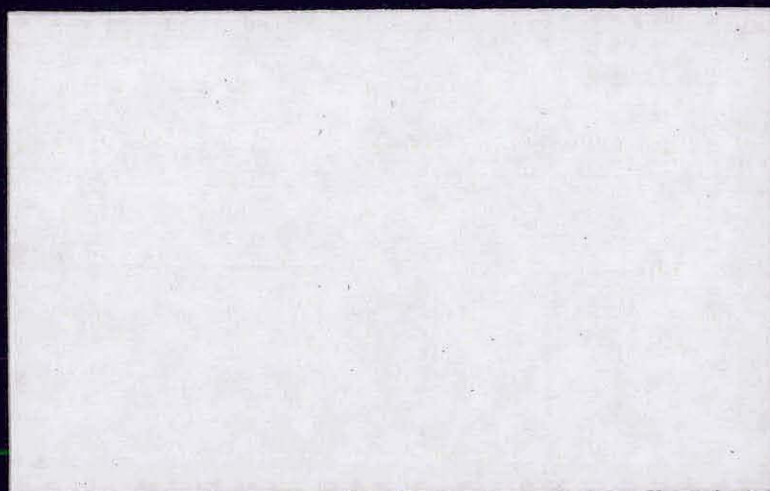
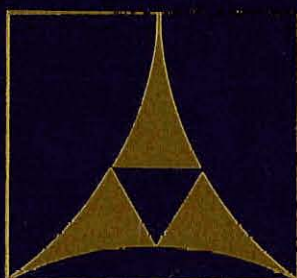


# Industrial Fuel Gas Demonstration Plant Program



Prepared For  
The Department of Energy  
Under Contract ET-77-C-01-2582



MEMPHIS LIGHT, GAS AND WATER DIVISION  
P.O. BOX 430, MEMPHIS, TENNESSEE 38101

In Association with  
FOSTER WHEELER ENERGY CORPORATION  
INSTITUTE OF GAS TECHNOLOGY  
DELTA REFINING COMPANY

## **DISCLAIMER**

**This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.**

## **DISCLAIMER**

**Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.**

# Industrial Fuel Gas Demonstration Plant Program

DOE/ET/13046-T10

LICENSE AGREEMENTS  
FOR  
PROPRIETARY PROCESSES

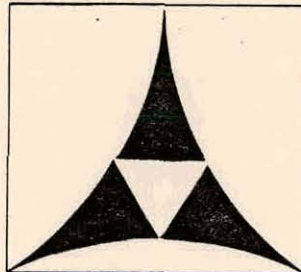
**MASTER**

DELIVERABLE NO. 30

**DISCLAIMER**

This book was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

**Prepared For  
The Department of Energy  
Under Contract ET-77-C-01-2582**



**MEMPHIS LIGHT, GAS AND WATER DIVISION  
P.O. BOX 430, MEMPHIS, TENNESSEE 38145**

**In Association with  
FOSTER WHEELER ENERGY CORPORATION  
INSTITUTE OF GAS TECHNOLOGY  
DELTA REFINING COMPANY**

**DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED**



MEMPHIS INDUSTRIAL FUEL GAS

DEMONSTRATION PLANT PROJECT

LICENSE AGREEMENTS FOR  
PROPRIETARY PROCESSES  
(Deliverable #30)

NOTICE

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use or the results of such use of any information, apparatus, product or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights.

MEMPHIS LIGHT, GAS & WATER DIVISION  
P.O. Box 430  
MEMPHIS, TENNESSEE 38101

PREPARED FOR THE  
U. S. DEPARTMENT OF ENERGY  
ASSISTANT SECRETARY OF FOSSIL ENERGY

UNDER CONTRACT DE-AC02-77ET13406  
(FORMERLY CONTRACT ET-77-C-01-2582)

MLGW/DOE INDUSTRIAL FUEL GAS  
DEMONSTRATION PLANT PROGRAM

**F**OSTER WHEELER  
LICENSE AGREEMENTS FOR  
PROPRIETARY PROCESSES

LICENSE AGREEMENTS  
FOR  
PROPRIETARY PROCESSES

DELIVERABLE NO. 30

Table of Contents

<u>Section</u>	<u>Section Title</u>	<u>Page</u>
1	Introduction	1
2	Draft License Agreements	2
	U-Gas Process (Tab I)	
	The Selexol Solvent Process (Tab II)	
	Beavon-Stretford Process (Tab III)	
	Benfield Process (Tab IV)	
	Amoco Sulfur Recovery (Tab V)	

# MLGW/DOE INDUSTRIAL FUEL GAS DEMONSTRATION PLANT PROGRAM

 FOSTER WHEELER  
LICENSE AGREEMENTS FOR  
PROPRIETARY PROCESSES

## Section 1.0

### INTRODUCTION

The United States Department of Energy (DOE) awarded a contract to Memphis Light, Gas and Water Division (MLGW) which requires MLGW to perform process analysis, design, procurement, construction, testing, operation, and evaluation of a plant which will demonstrate the feasibility of converting high sulfur bituminous coal to industrial fuel gas with a heating value of  $300 \pm 30$  Btu per standard cubic foot (SCF). The demonstration plant is to be based on the U-Gas process, with its product gas to be used in commercial applications in Memphis, Tennessee.

In order to perform this work, MLGW has established an industrial team, which includes:


- MLGW - Memphis Light, Gas and Water Division, Memphis, Tenn.  
The prime contractor and distributor of the industrial fuel gas.
- FWEC - Foster Wheeler Energy Corporation, Livingston, N.J.  
The engineer- construction manager.
- IGT - Institute of Gas Technology, Chicago, Illinois.  
The process developer.
- DRC - Delta Refining Company, Memphis, Tenn.  
To provide operating experience.

The contract specifies that the work is to be conducted in three phases. The phases are:

- Phase I - Program Development and Conceptual Design
- Phase II - Demonstration Plant Final Design, Procurement and Construction
- Phase III - Demonstration Plant Operation

Included within Task VI (Materials, Agreements, and Licenses for the Demonstration Plant), Phase I activities was the identification of required license agreements covering the use of proprietary processes necessary in the Demonstration Plant.

MLGW/DOE INDUSTRIAL FUEL GAS  
DEMONSTRATION PLANT PROGRAM

 FOSTER WHEELER  
LICENSE AGREEMENTS FOR  
PROPRIETARY PROCESSES

Section 2.0

DRAFT LICENSE AGREEMENTS

Listed below are the proprietary processes included within the Industrial Fuel Gas Demonstration Plant. Draft license agreements covering the use of these processes, with the exception of the Westfield Process (Conoco), have been included at the end of this document (see tabs below). Except for the Claus Process (Amoco) all draft license agreements will be executed directly between MLGW and the licensor.

	<u>Licensed Process</u>	<u>Licensor</u>	<u>Tabs</u>
(1)	U-Gas	The Institute of Gas Technology	I
(2)	The Selexol Solvent	Allied Chemical Corporation	II
(3)	Beavon-Stretford	Union Oil Company of California/ Ralph M. Parsons Company	III
(4)	Benfield	Benfield Corporation	IV
(5)	Amoco Sulfur Recovery	Standard Oil Company (Indiana)	V
(6)	Westfield Methanation	Conoco Methanation Company	

All the draft license agreements provided have been prepared by the licensors after preliminary discussions. Presently these agreements are being reviewed by MLGW for exceptability.

As stated above, the Amoco Sulfur Recovery Process will be covered by an existing agreement between Standard Oil and FWEC. Suitable clauses have been provided under Tab V. These clauses will be incorporated into the MLGW/FWEC subcontract for the protection of MLGW, FWEC, and Licensor.

At this writing the Industrial Team has no secrecy agreement executed with Conoco Methanation Company (Westfield Methanation Process) nor has any draft license agreement been transmitted by Conoco. The consortium involved in the Conoco Westfield Methanation Process consists of fourteen companies. Any legal action (e.g., secrecy agreements, license agreements, amendments, etc) must be approved in writing by all fourteen companies. Conoco representatives have been negotiating a license with British Gas Corporation (BGC) on this technology; with proposed drafts sent to the fourteen companies. Eleven of these companies have agreed to the document in writing. The remaining three have verbally approved; their written approval forthcoming. It appears, based upon Conoco reports, that BGC is in basic agreement with the latest draft, but was still reviewing the document. Approval from BGC is expected in the near future, permitting the licensing of the Westfield Methanation Process.





## LICENSE AGREEMENT

AGREEMENT made this 11th day of January, 1978 by and between The Institute of Gas Technology, hereinafter "IGT", 3424 South State Street, Chicago, Illinois 60616, a not-for-profit corporation organized under the laws of the State of Illinois and Memphis Light, Gas and Water Division, hereinafter MLGW, P. O. Box 430, Memphis, Tennessee 38101, a division of the City of Memphis, created under the charter of the City of Memphis and under the laws of the State of Tennessee.

WHEREAS, IGT has developed certain background technology patents and patent applications relating to the conversion of coal to a clean low-Btu fuel gas by utilizing a fluidized bed gasifier operating at moderate pressure and high temperatures, a process which is commonly known as the "U-GAS" process.

WHEREAS, MLGW has selected the IGT "U-GAS" process as the basis for a proposed fuel gas demonstration plant pursuant to United States Energy Research and Development Administration Program RFP No. E(49-18)-2043.

WHEREAS, MLGW wishes to obtain a non-exclusive license under the Patent Rights of IGT for any future low-Btu fuel gas plant, i.e. "U-GAS" plant, which it may wish to construct for its own use under the terms and conditions hereinafter set forth:

NOW, THEREFORE, in consideration of MLGW's selection of IGT's "U-GAS" process as the basis for a proposed fuel gas demonstration plant, Program RFP No. E(49-18)-2043, MLGW's concurrence in IGT's petition for advance waiver of patents in connection with Program RFP No. E(49-18)-2043 and other good and valuable consideration in hand received, IGT and MLGW agree as follows:

(a) IGT hereby grants to MLGW and MLGW accepts from IGT, a nonexclusive, nontransferable, royalty-free license to manufacture, install (or have manufactured or installed for it) and use, any composition or apparatus and to install (or have installed for it) and use, any process covered by patents and patent applications of IGT which relate to the "U-GAS" process including those patents and patent applications identified below under the designation "Background Patent Rights" to the full end of the term for which the patents have or may be issued.

BACKGROUND PATENT RIGHTS

<u>Title</u>	<u>Patent or Application</u>	<u>Status</u>
Method of Coal Pretreatment Schora and Matthews	Pat. No. 3,867,110	Issued 2/18/75
Coal Pretreater and Ash Agglomerating Gasifier Matthews	Pat. No. 3,884,649	Issued 5/20/75
Coal Ash Agglomerating Device Patel and Matthews	Pat. No. 3,935,825	Issued 2/03/76

BACKGROUND PATENT RIGHTS (Cont'd)

<u>Title</u>	<u>Patent or Application</u>	<u>Status</u>
Removal of Hydrogen Sulfide from Reducing Gases Meissner	Pat. No. 3,954,938	Issued 5/04/76
Valve for Ash Agglomeration Device Schora, Loeding and Patel	Ser. No. 685,617	Allowed 12/07/76
Method for Enriching Fuel Gas Patel and Loeding	Ser. No. 693,353	Filed 6/07/76
Improved Apparatus for Feeding Caking Coals to a Gasifier Patel, Schora and Loeding	Ser. No. 693,352	Filed 6/07/76
Coal Pretreatment and Gasification Process Patel, Schora and Loeding	Ser. No. 700,536	Filed 6/28/76
High Temperature Thermal Exchange Process Meissner and Schora	Ser. No. 414,202	Filed 11/09/73

(b) In addition, IGT hereby grants to MLGW and MLGW accepts from IGT, a nonexclusive, nontransferable, royalty-free license to manufacture, install (or have manufactured and installed for it) and use, any composition or apparatus and to install (or have installed for it) and use any process which may, in the future, be covered under any patent rights for inventions which may be conceived or reduced to practice pursuant to IGT's involvement in United States Energy Research and Development Administration Program RFP No. E(49-18)-2043.

(c) Notwithstanding any grant by IGT to MLGW contained in paragraphs (a) and (b), above, any license granted to MLGW by IGT pursuant to this agreement is subject to any terms, qualifications, conditions and bars which have or may be imposed by the United States government or any agency or department thereof including but not limited to the United States Energy Research and Development Administration.

(d) No other further dominating or different license, grant, sublicense or working right of any nature under any of IGT's patent rights, present or future, is granted by this license or to be implied from it.

ATTEST:

*James M. Field*

INSTITUTE OF GAS TECHNOLOGY

By

*B. S. Lee*  
Bernard S. Lee

MEMPHIS LIGHT, GAS AND WATER

ATTEST:

*H. R. Kuchner*

By

*Calvin R. Henze*  
Calvin R. Henze





# THE SELEXOL<sup>®</sup> SOLVENT PROCESS

## STANDARD FORM OF LICENSE AGREEMENT



GAS PURIFICATION DEPARTMENT  
ALLIED CHEMICAL CORPORATION  
P. O. BOX 1013-R, MORRISTOWN, NEW JERSEY 07960

THIS AGREEMENT, having an Effective Date of \_\_\_\_\_  
19\_\_, by and between ALLIED CHEMICAL CORPORATION, a New  
York corporation having a business office at Morris Township,  
New Jersey (hereinafter called "ALLIED CHEMICAL"), and \_\_\_\_\_  
\_\_\_\_\_, a \_\_\_\_\_ corporation with a business  
office at \_\_\_\_\_ (hereinafter called "LICENSEE").

WITNESSETH:

WHEREAS, ALLIED CHEMICAL has developed and commercially  
demonstrated a Process (hereinafter defined) for removal of  
certain components, including acid gases and trace sulfur  
containing gases, from gases containing the same, utilizing its  
proprietary solvent sold under the trademark SELEXOL ("Selexol  
Solvent");

WHEREAS, LICENSEE desires to acquire, for the purposes  
set forth herein, a license to design, engineer, construct and  
operate a single Plant (hereinafter defined) employing the  
Process at \_\_\_\_\_, and with a  
designed daily capacity for gas treatment, meeting certain  
specifications, all as set forth in Exhibit A, attached hereto  
and made a part hereof; and

WHEREAS, ALLIED CHEMICAL is willing to license LICENSEE to design, engineer, install and operate the Process solely in the Plant, under the terms and conditions herein contained:

NOW, THEREFORE, in consideration of the premises and the mutual covenants herein contained, the parties hereto agree as follows:

1. DEFINITIONS:

1.1 "Process" shall mean the Selexol Solvent process developed by ALLIED CHEMICAL for cleaning or purifying gases, such as synthesis or natural gas, by removal of certain components therefrom, including absorption of said components in lean solvent; optional release from resulting rich solvent of absorbed essentially nonacid gas components for optional recompression and recycle to absorber; and substantial removal of said absorbed components from the solvent, with return of the resulting lean solvent to the absorption step together with all intermediate steps to such absorption and removal of such components, utilizing the Selexol Solvent.

1.2 "Technology" shall mean such Process technical information and know-how, including Process design data and ancillary computer programs as are reasonably necessary to design, engineer, construct and operate the Plant, and shall include the following:

1.21 Typical SELEXOL Process applications and installations.

1.22 Curves for estimating Solvent flow including estimation of Solvent flow for  $\text{CO}_2$  and  $\text{H}_2\text{S}$  absorption.

1.23 Process design procedures including: information regarding determination of conditions; establishment of tentative flow scheme; trial assumptions; and considerations involved in: design of absorber, flashers, strippers and heat exchangers, staging of absorbers and strippers, establishing dew points and water balance and lean-semilean Solvent split.

1.24 Process specifications for major items of equipment including absorber, stripping column, flash vessels, recycle compressor, air blower, heat exchangers, and pumps and power turbines.

1.25 Physical and thermodynamic properties of SELEXOL Solvent,  $\text{CO}_2$ ,  $\text{H}_2\text{S}$ , and various other hydrocarbons and compounds.

1.26 Materials of construction.

1.27 Analytical procedures.

1.3 "Patent Rights" shall mean those patents and/or patent applications owned by ALLIED CHEMICAL which may relate to the Process including the following:

1.4 "Plant" shall mean that portion of the LICENSEE's facility which uses the Process.

1.5 "Plant Start-Up" shall mean the date on which Input Feed Gas first enters the Plant, for testing or operation.

2. LICENSE:

2.1 Effective upon execution of this Agreement and receipt by ALLIED CHEMICAL of the initial payment provided for in Subsection 4.11 hereof, ALLIED CHEMICAL grants to LICENSEE the right and license under Technology and Patent Rights to design, engineer, construct and operate the Process only in the Plant.

2.2 Other than specified herein no license or right is granted hereby to LICENSEE or any third party by implication or otherwise, with respect to or under any patent application, patent, claims of patents, or proprietary right of Allied Chemical Corporation with respect to said information or otherwise, notwithstanding expiry of the obligations of confidence as set forth herein.

3. TECHNICAL ASSISTANCE AND COOPERATION:

3.1 Promptly after execution of this Agreement and receipt by ALLIED CHEMICAL of the initial payment specified in Subsection 4.11 hereof, ALLIED CHEMICAL shall transmit to LICENSEE the Technology, to the extent that it has not theretofore been provided.

3.2 From time to time at the request of LICENSEE, and upon reasonable advance notice, ALLIED CHEMICAL shall make available the services of an engineer, for such periods as LICENSEE may reasonably request up to an aggregate maximum of thirty (30) calendar days, to advise and assist with Process design and start-up of the Plant, and thereafter in connection with the performance tests provided for in Section 7 hereof. LICENSEE shall pay to ALLIED CHEMICAL \$250 per normal work day, plus reasonable traveling and living expenses when away from home, for each such engineer while he is engaged in any such work. Such cost shall be invoiced to LICENSEE monthly and LICENSEE shall pay ALLIED CHEMICAL within thirty (30) days after transmission of invoice. Engineering services beyond thirty (30) days' maximum period may be furnished by ALLIED CHEMICAL upon request of LICENSEE on terms to be mutually agreed upon if, in its sole judgment, ALLIED CHEMICAL can do so without substantially affecting its own activities in connection with the conduct of its own business.

3.3 ALLIED CHEMICAL shall have the right to review all Process design details and reserves the right of approval of such design details insofar as they affect the Process design warranty of Section 7 and patent indemnity of Section 5 hereof. All approvals must be in writing to be binding on ALLIED CHEMICAL. Such review and approval is solely for purposes of the Process design guarantee of Section 7 and the patent indemnity of Section



5 hereof, and ALLIED CHEMICAL assumes neither liability of any kind as a result of such review and approval, except as expressly set forth in Section 7 hereof, nor responsibility for any of LICENSEE's obligations to others.

3.4 For a period of ten (10) years commencing with the Effective Date of this Agreement, LICENSEE and ALLIED CHEMICAL shall each disclose in writing to the other, promptly and without charge, any improvements in the Process which were developed or acquired (provided the terms under which such improvements were acquired do not prohibit such disclosure) by either of them and which might be of benefit to the Plant, except that neither party hereto shall have such obligation of disclosure to a defaulting party. Except as provided in Subsection 3.5 hereof, LICENSEE shall have free use of such improvements in the Plant, and ALLIED CHEMICAL shall have free use of such improvements for its own purposes, and shall have the right to transmit such improvements to third parties for their use, provided that such third parties grant a reciprocal right to ALLIED CHEMICAL to license LICENSEE to use such improvements.

3.5 In the event that improvements have been obtained by one party through purchase from a third party, then such improvements may be used by the other party only upon reasonable reimbursement which shall not be less than the payment due such third party by reason of such use, and provided that such use or transmittal of such improvements does not violate the agreement with the third party.

3.6 Except as otherwise provided in Subsection 3.4 hereof, disclosure of any improvement by either party to the other pursuant to this Agreement shall be under binder of secrecy as provided in Section 6 hereof.

4. LICENSE FEES:

4.1 As consideration for the right and license granted hereunder, including the Technology transfer provided by Subsection 3.1 hereof, LICENSEE shall pay to ALLIED CHEMICAL a lump sum paid-up license fee ("Plant License Fee") in U.S. dollars of \_\_\_\_\_ dollars (\$\_\_\_\_\_) based on the Plant Input Feed Gas Rate of \_\_\_\_\_, determined as set forth in Exhibit B. The Plant License Fee shall be paid to ALLIED CHEMICAL as follows:

4.11 Fifty percent (50%) within thirty (30) days after execution of this Agreement.

4.12 Forty percent (40%) within thirty (30) days after Plant Start-Up, but in no event later than twelve (12) months after execution of this Agreement.

4.13 Ten percent (10%) within thirty (30) days after the Process design warranty has been met or is deemed to have been met, as provided in Section 7 hereof.

4.2 If, during the period terminating fifteen (15) years from the Effective Date hereof, the Plant is in any way modified to increase the Input Feed Gas Rate over that

shown in Exhibit A, LICENSEE shall acquire the right to so modify the Process in the Plant only upon payment in advance by LICENSEE to ALLIED CHEMICAL of an additional license fee, calculated in accordance with the schedule in Exhibit B by subtracting the Plant License Fee from a license fee based on the sum of the original and the expanded Input Feed Gas Rates. The license fee for modification of the Plant is exclusive of fees for engineering design work which may be provided by ALLIED CHEMICAL. This method of calculating the license fee for Plant modification shall not be applicable when LICENSEE installs an additional plant using the Process at the same facility; in that case a new license and fee will be required.

4.3 All payments hereunder shall be made to ALLIED CHEMICAL, without discount or deduction of any kind, at the address provided for in Section 12 hereof, or at such bank or other location as ALLIED CHEMICAL shall have designated in writing. All such payments shall be net, and any taxes, including but not limited to turnover or value added taxes, and any other duties or levies of any kind outside the United States arising out of this Agreement or imposed or levied against such payments shall be paid by LICENSEE.

#### 5. PATENT INDEMNITY:

Subject to the limitations set forth in Section 8 hereof, in the event suit is brought against LICENSEE based on any claims by others that the Process licensed hereunder necessarily infrin-

ges any patent which limits LICENSEE's use of the Process, ALLIED CHEMICAL shall defend any suit and shall indemnify LICENSEE against damages assessed against LICENSEE in any judgment rendered in such suit, and against costs of such suit, including reasonable attorney's fees; provided, however, that LICENSEE shall: (a) notify ALLIED CHEMICAL in writing within thirty (30) days of receipt of any notice or claim of infringement by any third party received by LICENSEE based on construction and/or operation of the Plant, (b) provide ALLIED CHEMICAL with full information and assistance with regard to such claim or suit, and (c) take no action which would prejudice ALLIED CHEMICAL's position in defending against the alleged infringement. Nothing herein shall prevent ALLIED CHEMICAL from settling such suit on any terms acceptable to ALLIED CHEMICAL, so long as such settlement does not oblige LICENSEE to make any payment or assume any obligation or grant any license or other right by reason of such settlement.

6. CONFIDENTIALITY:

6.1 For a period of ten (10) years commencing with the expiration of the Technical Assistance and Cooperation period, LICENSEE shall hold in strict confidence and not disclose to others the Technology or other confidential information received by it from ALLIED CHEMICAL pursuant to this or other Agreement, and shall not use or permit the use of the Technology or any confidential information furnished hereunder for any

purpose other than for design, engineering, construction, operation, maintenance and repair of the Plant on which LICENSEE has paid ALLIED CHEMICAL the license fees due under this Agreement. Nothing herein shall prevent LICENSEE from receiving and using information:

- a) which is now in, or hereafter, through no breach of this Agreement, becomes part of the public domain, or
- b) which prior to disclosure by ALLIED CHEMICAL was in the possession of LICENSEE without obligation of secrecy, or
- c) acquired from any third party under the conditions acquired, if any, provided that LICENSEE does not know or have reason to know that such information was acquired by such third party directly or indirectly from ALLIED CHEMICAL under binder of secrecy.

The above exceptions from LICENSEE's obligations of confidence and non-use apply only if the identical information or portions of information in combination are available by virtue of (a), (b), or (c) above or would be obvious to an individual skilled in the art. Disclosures by ALLIED CHEMICAL which are specific as to equipment size and design, operating conditions and product yields for a specific feed stock shall not qualify for these exclusions by reason of general information which is available or becomes available to LICENSEE as above.

6.2 Nothing herein shall prevent LICENSEE from communicating such confidential information to its employees, con-

sultant, or to any contractor of the Plant to the extent necessary for the purposes hereof, provided that each such consultant, employee or contractor, as the case may be, is advised of the confidential nature of the information and has assumed an obligation to maintain such information in confidence at least to the extent that LICENSEE is bound hereunder.

7. PROCESS DESIGN WARRANTY:

7.1 ALLIED CHEMICAL warrants to LICENSEE that the process design (as distinct from mechanical design, for which ALLIED CHEMICAL shall in no way be responsible, notwithstanding the fact that typical mechanical design details may be disclosed or reviewed), of the Plant is sufficient to enable production of Product Gas meeting Product Gas Specifications at designed Input Feed Gas Specifications, as set forth in Exhibit A, provided that the Plant is installed and operated properly and in accordance with a process design approved by ALLIED CHEMICAL.

7.2 Within thirty (30) days after Plant Start-Up, but in no event more than fourteen (14) months from the Effective Date hereof, if LICENSEE desires the benefit of the Process design warranty set forth in Subsection 7.1 hereof, LICENSEE shall conduct a performance test of twelve (12) hours' duration using ALLIED CHEMICAL's Selexol brand Solvent because of Selexol Solvent's particular composition and resultant unique ability to efficiently handle a range of varying feed stream compositions and to selectively absorb and desorb desired components. If,



in such test, the Plant fails to meet the Process design warranty as specified herein, then LICENSEE shall conduct additional performance tests, each of twelve (12) hours' duration at a time requested by ALLIED CHEMICAL, within thirty (30) days from the date the Plant has failed to meet such performance test as reasonably required by LICENSEE. Such additional performance tests shall, at ALLIED CHEMICAL's option, be conducted in the presence of an ALLIED CHEMICAL engineer, and operating conditions employed must meet with his approval. If necessary, the above-noted time periods may be modified by mutual agreement.

7.3 In the event that the Process design warranty has not been met within a test period of sixty (60) days from the initial performance test, then LICENSEE and ALLIED CHEMICAL shall consult as to what action to take or as to the necessity or desirability of paying to LICENSEE a sum as liquidated damages in lieu of making corrections to meet the Process design guarantee. ALLIED CHEMICAL shall be required to pay damages in lieu of making corrections only if it advises that corrections should not be made. In the event it has agreed to make corrections to the Process design, ALLIED CHEMICAL shall promptly submit Process design recommendations to LICENSEE for its review and written approval. The cost of such corrections or the sum as liquidated damages shall be paid by ALLIED CHEMICAL, subject to the limitations of Section 8 hereof.

7.4 The Process design warranty shall be deemed to have been met: (a) if Product Gas Specifications have been met

during any of the performance tests conducted pursuant to Subsection 7.2 hereof, or (b) if Selexol Solvent has not been used for the initial performance test, or (c) if the initial performance test provided for in Subsection 7.2 above has not been conducted within fourteen (14) months of the Effective Date hereof, or (d) if the Plant fails to meet Product Gas Specifications within fourteen (14) months of the Effective Date hereof by reason of:

7.41 failure to meet design plant Input

Feed Gas Specifications, as specified in Exhibit A; or

7.42 failure to meet all of the pressure, temperature, flow and other Process requirements as specified in ALLIED CHEMICAL's final recommended Process design; or

7.43 the Plant not having been engineered and constructed in accordance with ALLIED CHEMICAL's final recommended Process design; or

7.44 mechanical failure or deficiency in the Plant.

7.5 During the performance test, Plant Feed Gas Input Specifications shall be as consistent with the specifications shown in Exhibit A as is reasonably possible. It is recognized by the parties that exact duplication of design conditions may not be possible during the performance test. Under such condi-

tions, data obtained during the performance test shall be recomputed by ALLIED CHEMICAL in accordance with established engineering practices, and based on such recomputed data, ALLIED CHEMICAL shall determine whether warranties would have been met had the performance test been conducted under specified design conditions.

8. LIMITATION OF LIABILITY:

Anything in this Agreement to the contrary notwithstanding, ALLIED CHEMICAL's combined total maximum liability hereunder, including, without limitation, any liability in connection with a breach or alleged breach by ALLIED CHEMICAL of either its performance hereunder, or under the Patent Indemnity (Section 5) or the Process Design Warranty (Section 7), or any warranties (express or implied), or for any type or kind of damages whatsoever, and whether alleged to be due to negligence or otherwise shall in no event exceed fifty percent (50%) of the Plant License Fee received by ALLIED CHEMICAL as provided for in Subsection 4.1 hereof, and in no event shall ALLIED CHEMICAL be liable for indirect, consequential or punitive damages, whether alleged to be due to negligence or otherwise.

9. OPERATING DATA:

ALLIED CHEMICAL shall have the right of inspection of the Plant at reasonable hours, and of access to the operating data of the Plant for a period of ten (10) years from the Effective Date hereof. On advance written notice to LICENSEE, ALLIED CHEMICAL shall also have the right to bring

visitors and prospective clients to observe the Plant.

10. TERMINATION:

In the event that LICENSEE shall at any time default in any payment due hereunder, or shall commit any breach of any of the terms and conditions hereof, and shall fail to remedy such default or breach within thirty (30) days after written notice thereof from ALLIED CHEMICAL, ALLIED CHEMICAL may, at its option, and in addition to any other remedies which ALLIED CHEMICAL may have at law or in equity, terminate this Agreement and revoke the license hereunder granted by notice in writing to such effect, but such termination shall not relieve LICENSEE from its obligations under Section 6 (Confidentiality), Section 9 (Operating Data) and Section 3.4 hereof, or its obligation to make any payment due at the time of such termination or thereafter coming due. Failure on the part of ALLIED CHEMICAL to notify LICENSEE of any breach of this Agreement, or to terminate this Agreement because of such breach, shall not constitute a waiver of ALLIED CHEMICAL's right to terminate this Agreement because of that or any subsequent breach.

11. ASSIGNMENTS:

This Agreement shall be binding upon and inure to the benefit of ALLIED CHEMICAL and its successors and assigns. This Agreement may not be assigned by LICENSEE without the prior written consent of ALLIED CHEMICAL, and no assignment will relieve LICENSEE from any of its obligations hereunder. Any purported assignment by LICENSEE contrary hereto shall be void.

12. COMMUNICATIONS:

All notices pertaining to this Agreement shall be mailed by Registered or Certified Mail addressed to the party to receive the same, at the address set forth below or such other address as such party shall have specified by written notice hereunder:

If to ALLIED CHEMICAL:

Allied Chemical Corporation  
Attention: Manager, Gas Purification Department  
P. O. Box 1013R  
Morristown, New Jersey 07960

If to LICENSEE:

13. FORCE MAJEURE:

Failure of either party to perform or accept performance of any duties or obligations hereunder (or portions thereof) when due, if occasioned by act of God or the public enemy, fire, explosion, perils of the sea, flood, drought, war, riot, sabotage, accident, embargo, government priority, requisition or allocation, or any circumstance of like character beyond the reasonable control of the party so failing, or by interruption of or delay in transportation, labor trouble from whatever cause arising and whether or not the demands of the employees involved are reasonable and

within said party's power to concede, partial or complete suspension of a party's obligation, compliance with any order or request of any governmental officer, department, agency, or committee thereof, shall not subject said party to any liability to the other. The party affected by the force majeure shall forthwith give written notice thereof to the other party (such notice briefly to describe the circumstance causing such inability to perform or accept performance) and, thereupon, to the extent that the party giving such notice is unable to perform or accept performance, such duty or obligation shall be suspended during, but no longer than, the continuance of such circumstance; provided, however, that notwithstanding the provisions of this Section 13, LICENSEE shall in no event be relieved of its obligations to make any payment due to ALLIED CHEMICAL at the time of such force majeure.

14. GOVERNING LAW:

This Agreement shall be governed by and construed in accordance with the internal laws of the State of New York, U.S.A., without regard to its conflict of laws.

15. ENTIRE AGREEMENT:

This Agreement contains the entire agreement and understanding between the parties hereto with respect to



the subject matter hereof, and merges and supersedes all prior discussions and writings with respect thereto, except for that certain secrecy agreement accepted by \_\_\_\_\_ on \_\_\_\_\_, as supplemented by that certain letter agreement accepted by \_\_\_\_\_ on \_\_\_\_\_. Unless expressly set forth in this Agreement, no warranties, express or implied, are made; and no statements, promises or inducements made or offered by either party or by any agent or representative of either party shall be valid or binding. No modification or alteration of this Agreement shall be effective unless made in writing and signed by both parties hereto.

IN WITNESS WHEREOF, the parties hereto have executed and delivered this Agreement, effective as of the date first above written.

ALLIED CHEMICAL CORPORATION

BY: \_\_\_\_\_

LICENSEE

BY: \_\_\_\_\_

EXHIBIT "A"  
PLANT DESIGN BASIS

INPUT FEED GAS SPECIFICATIONS:

VOLUME:

PRESSURE:

TEMPERATURE:

COMPOSITION:

PRODUCT GAS SPECIFICATIONS:

When operated at Allied Chemical specified process design conditions, the product gas shall contain:

EXHIBIT "B"  
LICENSE FEE SCHEDULE

The Plant License Fee payable by LICENSEE to ALLIED CHEMICAL is established according to the following Schedule and is based on the guaranteed design Input Feed Gas Rate measured at 14.7 psia and 60° Fahrenheit.

The Plant License Fee is based on Plant Input Feed Gas Rate expressed as MMSCFD (Millions of Standard Cubic Feet per day).

<u>When The Plant Input Feed Gas Rate Is</u>	<u>The Paid-Up License Fee Is</u>
From 0 to 50 MMSCFD	\$50,000 + \$2500 per MMSCFD
From 50 to 200 MMSCFD	\$175,000 + \$1000 per MMSCFD in excess of 50 MMSCFD
More than 200 MMSCFD	\$325,000 + \$600 per MMSCFD in excess of 200 MMSCFD

The above-noted License Fee Rate Schedule is effective December 1, 1978 and is subject to adjustment based on changes in the "CE Plant Cost Index (as published in Chemical Engineering, a McGraw-Hill publication) from a base of 225." The Fee for a particular license shall be determined by multiplying the fee calculated from the above Schedule by a fraction, the numerator of which is the last "final" Index figure published prior to the date of execution of such license and the denominator of which is 225.

When a SELEXOL Plant is comprised of multiple sections (Example: One section for selective H<sub>2</sub>S removal followed by a second section for CO<sub>2</sub> removal), then the License Fee for the Plant shall be the sum of the fee calculated for the first section plus one half ( $\frac{1}{2}$ ) of the fee calculated for each succeeding section.





WHEREAS, LICENSEE desires to obtain a license under the foregoing Patent Rights and Technical Information to construct, operate, modify, revamp, repair and maintain a plant for carrying out the Beavon-Stretford Process, said plant (hereinafter termed the "Licensed Unit") to be located in

, and to be designed to treat the effluent gas from a Claus plant designed to process                      Annual Long Tons (              tons, each of 2240 lbs avoirdupois, per stream day times 330) of sulfur;

NOW, THEREFORE, in consideration of the premises and of the mutual covenants herein contained, the parties hereto agree as follows:

#### ARTICLE I - DEFINITIONS

1.01 The terms defined in Schedule I annexed hereto shall, for all purposes of this Agreement, have the meanings specified in said Schedule I.

#### ARTICLE II - LICENSE TO USE TECHNICAL INFORMATION

2.01 UNION hereby agrees to disclose UNION's Technical Information to LICENSEE, either directly or indirectly through PARSONS, and UNION hereby grants to LICENSEE a nonexclusive right to use UNION's Technical Information for the construction, operation, modification, revamping, repair

and maintenance of the Licensed Unit and for replacing any portion of Licensed Unit from any source.

2.02 Any services to be provided to LICENSEE in connection with the design and construction of the Licensed Unit and LICENSEE's placing it in operation shall be set forth in, and be subject to the terms and conditions of, such further agreement as may be entered into by UNION and/or PARSONS and LICENSEE.

2.03 Neither this Agreement nor the grants herein made confer upon LICENSEE any right to use UNION's Technical Information for any purpose whatsoever other than the construction, operation, modification, revamping, repair and maintenance of the Licensed Unit and for replacing any portion of the Licensed Unit from any source.

### ARTICLE III - CONFIDENTIALITY OF INFORMATION

3.01 LICENSEE agrees that with respect to each increment of UNION's Confidential Technical Information furnished directly or indirectly to LICENSEE by UNION hereunder, for a period of fifteen [15] years from the date of its receipt of each such increment, it will maintain the same in confidence and will prevent duplication and disclosure thereof to others, and that it will not, without the prior written permission of UNION, use the same for any purpose other than the construction, operation, modification, revamping, repair

and maintenance of the Licensed Unit and for replacing any part of the Licensed Unit from any source; provided, however, that to the extent necessary for said construction, operation, modification, revamping, repair and maintenance of the Licensed Unit and for replacing any portion of the Licensed Unit from any source, LICENSEE may disclose UNION's Confidential Technical Information to such parties as shall have undertaken with respect thereto the obligation of confidence and limited use undertaken by LICENSEE hereunder.

3.02 UNION and PARSONS each agrees that it will maintain in confidence and prevent duplication and disclosure of LICENSEE's Confidential Technical Information, and will make no use thereof, except that to the extent necessary for the performance of its obligations hereunder UNION and PARSONS may use said Confidential Technical Information and may disclose the same to such parties as shall have undertaken an obligation of confidence with respect thereto.

#### ARTICLE IV - PATENT IMMUNITIES

4.01 In connection with the use of UNION's Technical Information in the practice of the Beavon-Stretford Process by LICENSEE as provided for herein, UNION hereby grants to LICENSEE a nonexclusive, nontransferable immunity from suit for infringement of UNION's Patent Rights applicable to the construction, operation, modification, revamping, repair and



maintenance of the Licensed Unit and for replacing any portion of Licensed Unit from any source, and to the exportation to, or sale or use in, any country of the products produced by the Licensed Unit. It is expressly understood, however, that neither this Agreement nor the grants herein made confer upon LICENSEE any immunity, implied or otherwise, from suit under any patent rights not included in UNION's Patent Rights as defined. It is further understood that UNION makes no representation as to the right of LICENSEE to use UNION's Technical Information under the patent rights of others not included in UNION's Patent Rights, and that the grant by UNION to LICENSEE of the right to use the Technical Information of UNION shall in no way be construed as an inducement to LICENSEE to infringe such patent rights of others.

#### ARTICLE V - FEES

5.01 LICENSEE hereby agrees to pay to UNION the sum of  
Dollars

[\$ ] in installments as follows:

- \$ within thirty [30] days after the complete execution of this Agreement;
- \$ within thirty [30] days after LICENSEE's execution of a firm contract for construction of the Licensed Unit;
- \$ within thirty [30] days after the initial startup of the Licensed Unit; and
- \$ within thirty [30] days after (i) LICENSEE's acceptance of the Li-

censed Unit, or (ii) the completion of a successful performance test of the Licensed Unit, whichever of (i) and (ii) is the earlier but in no event later than the first anniversary of the initial startup of the Licensed Unit.

Upon making the second of the foregoing payments LICENSEE shall be deemed to have acquired a fully paid license to construct the Licensed Unit and to operate, modify, revamp, repair and maintain the same until the last of said payments is due, and upon making the last of said payments LICENSEE shall be deemed to have acquired a fully-paid license to modify, maintain, revamp and repair and operate the Licensed Unit to the extent that the design capacity of the Claus sulfur plant(s) which provide feed gas to the Licensed Unit does not, in any calendar year during the term hereof, exceed           Annual Long Tons.

5.02 If, at any time during the term of this Agreement, the Claus sulfur plant(s) which provide feed gas to the Licensed Unit shall be enlarged (as by the addition of a major piece of equipment) or increased in number so that the design capacity of said Claus sulfur plant(s) exceed that with respect to which LICENSEE has previously acquired fully-paid licenses hereunder, LICENSEE shall notify UNION to that effect and within thirty [30] days of startup of such enlarged or additional Claus sulfur plant(s) LICENSEE shall acquire a fully-paid license for such excess by paying an additional fee calculated as follows:

Additional Fee = A - B, wherein:

A is equal to: (i)  $\$30,000 + \$2.60(X)$  where X represents the aggregate design capacity (expressed in Annual Long Tons) of the Claus sulfur plant(s) as so enlarged or increased in number and has a value less than 66,000; or (ii)  $\$201,600 + \$1.30 (X-66,000)$  where X as so defined has a value greater than 66,000 but not greater than 132,000; or (iii)  $\$287,400 + \$0.65 (X-132,000)$  where X as so defined has a value greater than 132,000;

and

B represents the total fee(s) previously paid or payable by the LICENSEE for the acquisition of fully-paid licenses hereunder.

#### ARTICLE VI - DEFENSE and HOLD HARMLESS

6.01 LICENSEE hereby agrees to advise UNION promptly and in writing of: (i) any claim made by any third party that LICENSEE's operation of the Licensed Unit hereunder constitutes infringement of a U.S. Letters Patent owned by such third party, and (ii) any suit or action based on such claim of infringement. If LICENSEE's operation of the Licensed Unit is, with respect to the alleged infringement, in accordance with process and equipment designs and operating conditions supplied to LICENSEE by UNION or PARSONS or approved in writing from a patent standpoint by UNION and PARSONS (which approval will not be unreasonably withheld) UNION will upon receipt of the foregoing notice, and at LICENSEE's written request undertake or have undertaken, at no expense to LICENSEE, the defense of such suit or action. In the event UNION shall undertake such defense, UNION or

its representative shall have charge of the defense of such suit or action, but if LICENSEE desires it may at its own expense be represented by advisory counsel of its own selection. LICENSEE agrees to render UNION whatever reasonable assistance it can in such defense. Neither UNION nor LICENSEE shall settle or compromise any such suit or action without the written consent of the other if the settlement or compromise obliges the other to make any payment or part with any property or assume any obligation or grant any licenses or other rights or be subject to any injunction by reason of such settlement or compromise. In the event that a judgment should be rendered in any such suit or action requiring LICENSEE to pay any sum either as royalty or damages to the plaintiff in any such suit or action, UNION shall hold LICENSEE harmless against such judgment to the extent of one-half [1/2] of the fee payable under Article V hereof which UNION has received in cash from LICENSEE hereunder up to the date of such judgment and in respect of operations on which such judgment is based. In the event LICENSEE shall undertake the defense of any such suit or action, UNION shall not be obligated to contribute toward such expense or indemnify LICENSEE against any judgment; but UNION shall have the right to retain counsel of its own selection and at its own expense to advise and consult with LICENSEE's counsel.

## ARTICLE VII - ASSIGNMENT and EXTENSION

7.01 This Agreement shall be binding upon and inure to the benefit of the parties hereto and the successors to substantially the entire assets and business of the respective parties hereto, or, in the case of LICENSEE, the successor in interest of the Licensed Unit, but shall not otherwise be assignable by either party without the prior written consent of the party.

## ARTICLE VIII - TERMINATION

8.01 If LICENSEE shall be in default of any obligation hereunder, UNION may give written notice to LICENSEE specifying the claimed particulars of such default and in the event LICENSEE shall not have remedied such default within sixty [60] days after the date of such notice, UNION shall have the right thereafter to terminate this Agreement by giving ten [10] days' prior written notice to LICENSEE to that effect.

8.02 LICENSEE shall have the right to terminate this Agreement at any time subsequent to August 14, 1990 upon giving six [6] months prior written notice to UNION; provided, however, that so long as the Licensed Unit or any modification thereof shall embody one or more features covered by one or more valid claims of any United States patent included within UNION's Patent Rights, LICENSEE shall have no right to terminate this Agreement until such patent shall have expired.

8.03 Termination of this Agreement shall not:

- (a) release LICENSEE from any claim of UNION accrued hereunder prior to the effective date of such termination;
- (b) release LICENSEE or UNION and PARSONS from their obligations under Paragraphs 3.01 and 3.02 hereof, respectively;
- (c) release LICENSEE from its obligations under Paragraph 9.03 hereof;
- (d) affect or impair LICENSEE's rights and immunities with respect to operation of the Licensed Unit and any modification thereof to the extent that LICENSEE, prior to such termination, may have acquired from UNION a fully-paid license to construct and operate the Licensed Unit and any modification thereof, but otherwise none of the rights and immunities enjoyed by LICENSEE under this Agreement shall survive termination.

#### ARTICLE IX - MISCELLANEOUS

9.01 The validity and interpretation of this Agreement and the legal relations of the parties to it shall be governed by the laws of the State of California.

9.02 Nothing in this Agreement shall be construed so as to require the commission of any act contrary to law, and wherever there is any conflict between any provision of this Agreement and any material statute, law or ordinance, the latter shall prevail; but in such event the provision of this Agreement affected shall be curtailed and limited only to the extent necessary to bring it within the legal requirements.

9.03 LICENSEE agrees that before UNION, in performing any of its obligations under Article II, shall be required to export any of its Technical Information from the United States, LICENSEE shall first provide UNION with any letter or letters of assurance which may be required to comply with the Export Control Regulations of the United States Department of Commerce. LICENSEE further agrees that it will comply with said Regulations in respect of any exportation of UNION's Technical Information which LICENSEE may be authorized to make hereunder.

9.04 The addresses of the parties hereto are as follows, but either party may change its address for the purpose of this Agreement by notice in writing to the other party:

LICENSEE:

UNION: Union Oil Company of California  
P. O. Box 76  
Drea, California 92621

PARSONS: The Ralph M. Parsons Company  
100 West Walnut Street  
Pasadena, California 91124

In the event notices, statements, and payments received under this Agreement by a party hereto are sent by certified or registered airmail to the party entitled thereto at its above address, they shall be deemed to have been given or made as of the date so mailed.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed in their respective corporate names by their respective officers thereunto duly authorized.

UNION OIL COMPANY OF CALIFORNIA

By \_\_\_\_\_  
R. J. Stegemeier  
Vice President

ATTEST: \_\_\_\_\_

\_\_\_\_\_  
Secretary Date \_\_\_\_\_

By \_\_\_\_\_  
(Title)

ATTEST: \_\_\_\_\_

\_\_\_\_\_  
Secretary Date \_\_\_\_\_

Confirming representations and commitments involving  
The Ralph M. Parsons Company.

THE RALPH M. PARSONS COMPANY

By \_\_\_\_\_  
(Title)

ATTEST: \_\_\_\_\_

\_\_\_\_\_  
Secretary Date \_\_\_\_\_



## SCHEDULE I

### DEFINITIONS

1. The term "Beavon-Stretford Process" shall mean a process for reducing the sulfur content of a sulfur dioxide-containing feed gas constituting Claus Plant effluent in which said feed gas is enriched (if necessary) with hydrogen to a level which is at least 70% of the stoichiometric amount required to convert contained sulfur dioxide to hydrogen sulfide, hydrogenating the enriched gas stream at a temperature of 300-1200° F. in the presence of a catalyst to convert contained sulfur dioxide to hydrogen sulfide, cooling the hydrogenated stream at least to the dew point of water and treating the cooled gas stream to remove hydrogen sulfide therefrom by the Stretford Process.

2. The term "Stretford Process" shall mean a process for the removal of hydrogen sulfide from a gas stream which includes the step of washing the stream containing hydrogen sulfide with an aqueous alkaline solution containing one or more anthraquinone disulfonic acids and a compound of a metal having at least two valency states and which does not contain added thiocyanate ion.

3. The term "Patent Rights" shall mean patents and patent applications of all countries of the world, to the extent, but only to the extent, that they or the claims thereof cover one or more features of the Beavon-Stretford

Process (including, but not limited to, claims to apparatus and catalysts to the extent these cover the process and claims to products therefrom, but not claims to methods for manufacturing catalysts or catalyst supports) which patents and patent applications are based on inventions made prior to termination of this Agreement, or prior to January 1, 1980, whichever occurs first, and as to which inventions the designated party shall have the right, prior to said date, to make the grants provided for in this Agreement without accounting to others; provided, however, that as applied to UNION, the term "Patent Rights" shall include its rights under certain patents and/or patent applications of PARSONS and BRITISH GAS, the claims of which cover one or more features of the Beavon-Stretford Process.

4. The term "UNION's Technical Information" shall mean technical information owned or acquired by UNION and/or PARSONS prior to January 1, 1980, and which is useful in the construction, operation, modification, revamping, repair and maintenance of commercial plants for operation of the Beavon-Stretford Process, or which in UNION's opinion has been developed to a stage that substantial work is being carried out or planned with a view toward developing the same for the construction, operation, modification, revamping, repair and maintenance of commercial plants for operation of the Beavon-Stretford Process, to the extent that UNION is free

to disclose such information without accounting to parties other than PARSONS and BRITISH GAS. Such Technical information shall include technical information on apparatus specifically adapted for carrying out the Beavon-Stretford Process but shall not include information on the manufacture of catalysts.

5. The term "LICENSEE's Technical Information" shall mean such technical data and information pertaining to LICENSEE's plans, programs, plants, processes, equipment, costs, operations or customers as UNION and/or PARSONS may become cognizant of in the course of performing their obligations hereunder.

6. The term "Confidential Technical Information" shall mean all Technical Information of the designated party made available and disclosed by it, directly or indirectly, to the other party pursuant to the provisions of this Agreement, except:

- (a) Technical Information which at the time of its disclosure is, or which thereafter becomes, part of the public domain by publication or otherwise except by recipient's wrongful act;
- (b) Technical Information which the recipient can show was in its possession at the time of disclosure and was not acquired, directly or indirectly, from the other party hereto;

- (c) Technical Information which was received by the recipient after the time of disclosure hereunder from a third party who had a lawful right to disclose it to the recipient and who did not require the recipient to hold it in confidence; and
- (d) Technical Information which the recipient can prove was developed independently by one or more of its employees who did not have access to the Technical Information received by said recipient hereunder.

For the purposes of this Paragraph 6, specific technical information constituting an improvement embraced by more general information shall not be deemed to be within any of the above four exceptions merely because said more general information is within one of said exceptions; nor shall a combination of features be deemed to be within any of said exceptions merely because the individual features, separately considered, are within said exceptions.

7. The term "Startup" shall mean the completion of forty-eight [48] hours of continuous operation of the Beavon-Stretford Process in Licensed Unit.



1. PROCESS LICENSE AGREEMENT - Benfield Process for CO<sub>2</sub> Removal

THIS AGREEMENT, effective as of the \_\_\_\_\_ day of \_\_\_\_\_, 1979, between BENFIELD CORPORATION, a Pennsylvania corporation having offices at 615 Washington Road, Pittsburgh, Pennsylvania 15228 (hereinafter referred to as "BENFIELD", "Licensor" or "Subcontractor"), and \_\_\_\_\_ (hereinafter called "\_\_\_\_\_", "Licensee" or "Contractor"), a \_\_\_\_\_ corporation having an office at \_\_\_\_\_

2. BACKGROUND OF THIS AGREEMENT

(a) BENFIELD possesses certain technical information, as hereinafter defined, relating to methods for the removal of carbon dioxide and hydrogen sulfide from gas streams by means of hot aqueous potassium carbonate solutions (hereinafter referred to as the "BENFIELD PROCESS"), and BENFIELD warrants that it has the right to disclose the technical information and to grant licenses hereunder; and

(b) \_\_\_\_\_, pursuant to a contract (No. \_\_\_\_\_) between \_\_\_\_\_ and Department of Energy ("DOE") of the United States Government (hereinafter referred to as "Government Contract"), is planning to design, engineer, construct, erect, operate, maintain, repair and replace a gas purification unit for CO<sub>2</sub> removal in the Demonstration Project under the Government Contract utilizing BENFIELD's technical information, as hereinafter defined; and

(c) \_\_\_\_\_ wishes to obtain from BENFIELD information concerning the BENFIELD process and a right and license to use the BENFIELD Process in the performance of the Government Contract, including but not limited to the right to use such information to design, engineer, construct, operate and maintain a Demonstration Plant under the Government Contract, and in subsequent operation of the Demonstration Plant; and

(d) \_\_\_\_\_ has contracted with Foster Wheeler Energy Corporation (hereinafter referred to as "FWEC") to perform certain engineering services for \_\_\_\_\_ under the Government Contract.

(e) BENFIELD under the terms of a contract with FWEC will provide FWEC certain engineering services in connection with the Benfield Process for the demonstration plant under the Government Contract.

(f) BENFIELD is willing to provide and grant to \_\_\_\_\_ under the terms and conditions of this Agreement, the information, rights and licenses referred to above for practice of the BENFIELD Process; and

(g) The parties recognize that the BENFIELD Process is a valuable proprietary process and are in accord that it shall be kept in strict confidence pursuant to the relationship established by this Agreement.

3. THEREFORE, in consideration of the premises and of the mutual covenants and conditions herein contained, the parties agree as follows:

#### ARTICLE I - DEFINITIONS

1. "BENFIELD's Technical Information" means certain patent rights and secret and confidential technical data, information and experience, which are trade secrets and are licensable by BENFIELD, relating to methods for the removal of carbon dioxide and hydrogen sulfide from gas streams by means of hot aqueous potassium carbonate solutions.

2. "Licensed Facility" or "Plant" means a gas purification unit for CO<sub>2</sub> Removal in the Demonstration Plant constructed by \_\_\_\_\_ utilizing BENFIELD's Technical Information, having a design capacity for removal of \_\_\_\_\_ pound mols per hour CO<sub>2</sub> ( \_\_\_\_\_ million \_\_\_\_\_ Normal Cubic Feet CO<sub>2</sub> per Day) from a feedgas from the \_\_\_\_\_ section of the plant.

3. "BENFIELD Process" means a process for the removal of carbon dioxide and hydrogen sulfide from gas streams by means of hot aqueous potassium carbonate solutions which utilizes BENFIELD's Technical Information.

4. "Patent Rights" means unexpired patents and patent applications effective in the United States of America to the extent, but only to the extent, that such applications and patents or the claims thereof cover one or more features of the BENFIELD Process as originally installed or the operation thereof, which applications and patents the party in question now has or hereafter acquires the right to license without accounting to others based on inventions conceived and under the control of said party prior to the Effective Date of this Agreement.

BENFIELD Patent Rights as they exist on the Effective Date of this Agreement are listed in Schedule B which is attached to and made a part of this Agreement.

5. The term "Licensee's Technical Information" shall mean such technical data and information pertaining to Licensee's plans, programs, plants, processes, equipment, costs, operations or customers as BENFIELD may become cognizant in the course of performing its obligations hereunder.

6. The term "Confidential Technical Information" shall mean all Technical Information of the designated party made available and disclosed by it, directly or indirectly, to the other party pursuant to the provisions of this Agreement, except:

- (a) Technical Information which at the time of its disclosure is, or which thereafter becomes, part of the public domain by publication or otherwise except by the recipient's wrongful act;
- (b) Technical Information which the recipient can show was in its possession at the time of disclosure and was not acquired, directly or indirectly, from the other party hereto;
- (c) Technical Information which was received by the recipient after the time of disclosure hereunder from a third party who had a lawful right to disclose it to the recipient and who did not require the recipient to hold it in confidence; and
- (d) Technical Information which the recipient can prove was developed independently by one or more of its employees who did not have access to the Technical Information received by said recipient hereunder.

7. The term "Contracting Officer" means the person administering the Government Contract between DOE and \_\_\_\_\_ on behalf of the U.S. Government and his duly authorized representative.

8. The term "Demonstration Plant" shall mean the pipeline gas demonstration plant to be designed, engineered, constructed, operated and maintained by . . . . .

9. The term "DOE" shall mean the United States Department of Energy or any successor federal agency.

10. The term "Engineer" shall mean the person designated by \_\_\_\_\_ to act as its technical representative.



11. The term "Government Contract" means contract number between            and DOE, and any amendments and modifications thereto, and follow-on contracts for that project.
12. The term "License" means the non-exclusive, irrevocable license to use the BENFIELD Process granted by this Agreement.
13. The term "Plant Start Up" means the date on which Input Feed gas first enters the Licensed Facility, for testing or operation.
14. The term "Commencement of Construction" means the pouring of the first footing for a permanent piece of equipment for the Licensed Facility.
15. The terms "Subcontractor", "Licensor" or "BENFIELD" shall mean Benfield Corporation.
16. The term "Authorized Contractor" means any responsible engineering or construction contractor selected by            which shall agree to preserve BENFIELD's Confidential Technical Information in secrecy and confidence in accordance with conditions substantially equivalent to those agreed upon between BENFIELD and

## ARTICLE II - GRANTS BY LICENSOR

1. BENFIELD, warranting that it has the right to do so, hereby grants to            a non-exclusive right and license under BENFIELD's Technical Information to design, engineer, construct, operate and maintain the Licensed Facility, said license to extend throughout the entire life of said Facility, and to use and sell all products produced in or processed by the Licensed Facility throughout the world.
2. BENFIELD hereby agrees to grant to            a non-exclusive right and license, of the same scope as granted under Paragraph (1), next above, under all improvements, including modifications and additions to the equipment in the Licensed Facility, on BENFIELD's Technical Information which BENFIELD is obligated to disclose to            as provided in Article VIII below and which            shall desire to use in the Licensed Facility, and under all United States patents issuing at any time on any such improvement. Such further license shall be available to            for the same price and on the same terms as such license is available to other licensees of BENFIELD's Technical Information.

### ARTICLE III - LICENSE FEE

1. As consideration for the right and license granted hereunder, Licensee shall pay to BENFIELD a lump sum paid-up license fee ("Licensed Facility License Fee") in U.S. dollars of

based upon a design acid-gas removal capacity of approximately  
\_\_\_\_\_ pound mols per hour

Normal Cubic Feet per Day, water-free basis, determined in accordance with the Formula for License Fee set forth in Schedule E. This License Fee will be reviewed upon completion of the detailed engineering for the Licensed Facility and, if necessary, modified to reflect any change in the design capacity. The Licensed Facility License Fee shall be paid to BENFIELD as follows:

- (a) Fifty percent (50%) of the Licensed Facility License Fee thirty (30) days after commencement of Licensed Facility construction by Licensee.
- (b) Twenty-five percent (25%) of the Licensed Facility License Fee within thirty (30) days after Plant Start Up.
- (c) Twenty-five percent (25%) of the Licensed Facility License Fee within thirty (30) days after the Process Performance Warranty has been met, or is deemed to have been met, as provided in Article IX, and Paragraph 7 of Schedule A hereof.
- (d) Payments due in accordance with subsections (a), (b), and (c) above shall be escalated by multiplying such amounts by a factor, the denominator of which shall be the most recent monthly final Chemical Engineering Plant Cost Index (McGraw-Hill Publishing Company) available on Effective Date, and the numerator of which shall be the most recent monthly final Chemical Engineering Plant Cost Index (McGraw-Hill Publishing Company) available at the time payment of each such amount is due. In the event that this index has been discontinued, the parties will use a mutually acceptable index.

2. At such time as the total sum paid by Licensee to BENFIELD under this Article III shall equal the lump sum paid-up license fee as determined in Section 1 hereof, Licensee shall have an irrevocable, fully-paid license to process an unlimited quantity of gas in Licensed Facility. If Licensee makes an equipment change in the Licensed Facility to increase its capacity, Licensee shall pay to Licensor, as an additional fee, the difference between the Licensed Facility License Fee paid under Paragraph 1 of this Article III and the license fee determined in accordance with the Formula for License Fee for a Licensed Facility with the increased design capacity, escalated in accordance with Section 1(d).

#### ARTICLE IV - PATENT INDEMNITY

1. shall promptly advise BENFIELD in writing of any claims or threats, or of service upon it of any process in any suit or action, made or brought against and based upon infringement of U.S. patents of third parties covering the BENFIELD Process as incorporated by in the Licensed Facility according to BENFIELD's recommendations (but not including suits for infringement of Patents covering equipment for carrying out said process.) Upon receipt of such notice, BENFIELD may elect to take full charge and direction of the defense of any such suit at its expense in which case shall render to BENFIELD all reasonable assistance, at BENFIELD's expense, that may be required in defense of any such suit, and shall have the right to be represented therein by advisory counsel of its own selection at its expense. If BENFIELD does not thus elect to take charge of the defense, may defend the suit at BENFIELD's expense, in which case BENFIELD shall have the right to be represented therein by advisory counsel of its own selection at its expense. BENFIELD agrees to hold harmless against costs and damages which may be assessed against in any such suit. Any damages or costs awarded to in the successful defense of any such suit carried on at the expense of BENFIELD shall accrue to the benefit of BENFIELD to the extent that the amount thereof exceeds 's cost of litigation not reimbursed or paid by BENFIELD. It is agreed that the total liability of BENFIELD under the Patent Indemnity set forth in this Article shall not in any event exceed one-half of the total Licensed Facility License Fee payable by to BENFIELD for the accused Licensed Facility pursuant to this Agreement.

ARTICLE V - NON-DISCLOSURE

1.           , for the period of 10 years after the Licensed Facility goes on stream in full-scale or continuous operation, shall restrict the disclosure of BENFIELD's Confidential Technical Information obtained directly or, to the best of       's knowledge, indirectly from BENFIELD hereunder to such persons in its own organization who are involved in the design, engineering, construction, operation and maintenance of the Licensed Facility, and, except as provided in Paragraphs 2 and 3 of this Article,       shall make no further disclosure of such Confidential Technical Information, nor shall       make use of BENFIELD's Confidential Technical Information, except in connection with the design, engineering, construction, operation, maintenance, repair and replacement of the Licensed Facility as initially constructed, or as expanded as provided in Paragraph 2 of Article III; provided, however, that the foregoing shall not apply to any information which is or hereafter may become publicly known through no fault of       ; nor shall the foregoing apply to information already in       's possession at the time it was received from BENFIELD; nor shall it apply to information which is furnished to       by a third party who has the right to do so without violating any obligation of confidence to BENFIELD.
2.           shall have the right to disclose BENFIELD's Confidential Technical Information to the following parties:       's engineering contractors and consultants as may be required for the design, construction, operation, maintenance, repair and replacement of the Licensed Facility, on the condition that each such party be previously bound, in writing, to non-disclosure obligations no less strict than those assumed by       under this Agreement.
3.           The Department of Energy shall have the following rights in technical data of BENFIELD:
  - (a)   "Proprietary Data" means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes or treatments, including minor modification thereof, provided that such data:
    - (1)   Are not generally known or available from other sources without obligation concerning their confidentiality;

- (2) Have not been made available by the owner to others without obligation concerning their confidentiality; and
  - (3) Are not already available to the Government without obligation concerning their confidentiality.
- (b) Licensee may disclose BENFIELD's Proprietary Data which are furnished to Licensee under this Agreement to representatives of the Department of Energy ("DOE"), which issued U.S. Government Contract No. \_\_\_\_\_ under which Licensee is the Contractor; provided, however, that such representatives have signed a Non-Disclosure Statement in the manner set out in Paragraph (d) below. The Proprietary Data shall be delivered to DOE only upon written request by the DOE Contracting Officer and the Proprietary Data shall be delivered with the specific "LIMITED RIGHTS IN PROPRIETARY DATA" legend, attached hereto as Schedule D, applied thereto, no other legend being authorized to be affixed on any "Proprietary Data" delivered pursuant to this paragraph unless hereinafter specified by the mutual agreement of the parties, including DOE.
- (c) BENFIELD agrees that the DOE Contracting Officer or his authorized Government representative may at all reasonable times inspect BENFIELD Proprietary Data and any such technical data, whether proprietary or not, necessary to evaluate Proprietary Data at a facility of Licensee, FWEC or BENFIELD. Licensor may choose the facility at which the DOE Contracting Officer or his authorized Government representative may inspect such data.
- (d) Prior to inspection of "Proprietary Data" pursuant to this Article, the Contracting Officer shall identify his duly authorized representatives. If said representatives are Government employees, they shall execute a Non-Disclosure Statement as set forth in Schedule C. If said representatives are not Government employees, they shall execute an appropriate secrecy agreement with BENFIELD.
- (e) Notwithstanding the provisions of the Paragraph (a) above, DOE shall not disclose to any third party the connection between any "Proprietary Data" of BENFIELD and data obtained independent of BENFIELD unless such connection itself falls within the said exception above.

- (f) Notwithstanding any provisions of this Article, it is understood that the Government cannot waive any statutory obligation to disclose any information which it may be obligated to disclose under 5 U.S.C. 552 (the Freedom of Information Act). However, the Government agrees that should any demand be made of it under the Freedom of Information Act to disclose technical data and information which DOE believes it may be obligated to disclose under the Act, the Government will promptly so notify BENFIELD. The Government agrees that it will use its best efforts to prevent disclosure of such information until the notified party has had an opportunity to participate in any decisions concerning disclosure and the Government agrees that it will not disclose such information pending the outcome of any legal action initiated by the notified party in a timely manner and pursued in a United States District Court for the purpose of preventing such disclosure.
4. BENFIELD agrees that, with respect to \_\_\_\_\_'s Confidential Technical Information disclosed by \_\_\_\_\_ to BENFIELD pursuant to this Agreement, BENFIELD will observe the same secrecy restrictions and for the same term as those undertaken herein by \_\_\_\_\_ with respect to BENFIELD's Confidential Technical Information.
5. Nothing in this Agreement shall obligate BENFIELD or \_\_\_\_\_ to disclose, as hereinabove provided, any information received in confidence from another party, or to grant licenses, as hereinabove provided, under information acquired from another party and for which license the acquiring party would be obligated to pay a fee to such other party.

#### ARTICLE VI - FUTURE PLANTS

1. BENFIELD agrees, so long as it continues to offer to license the BENFIELD process or modifications, refinements or improvements therein, for commercial operations, to make such licenses available to \_\_\_\_\_, the U.S. Government or any agency thereof (including DOE) or any responsible applicant for the practice of said Process in conjunction with or as a part of future plants for the utilization or practice of the coal gasification process that is the subject of the Government contract.

2. BENFIELD agrees that licenses for future plants, pursuant to Paragraph 1 above, shall be made available at royalty rates and on terms and conditions no less favorable than those that BENFIELD is then including or offering to include in its license agreements for other commercial applications of the BENFIELD Process to the treatment of coal gasification process gases.
3. BENFIELD further agrees that licenses for such future plants, pursuant to Paragraphs 1 and 2 above, shall be made available on the basis of BENFIELD's best available BENFIELD process technology and all feasible alternatives then offered for license by BENFIELD and, in any assignment, extension or transfer of its BENFIELD Process licensing rights to a third party, BENFIELD shall use its best efforts to require said third party to agree to license said BENFIELD Process technology in accordance with the provisions of this paragraph.
4. In the event BENFIELD should hereafter determine to refrain from further licensing of the BENFIELD Process for commercial operations, BENFIELD agrees to license its background patents pertaining to said Process at fair and reasonable royalties to responsible applicants desiring to practice the processes covered by such patents in conjunction with or as a part of future plants for the utilization or practice of the coal gasification process technology that is the subject of the DOE contract or modifications, refinements or improvements therein.

#### ARTICLES VII - REPRESENTATIONS AND WARRANTIES

1. BENFIELD represents and warrants that the making available of its Technical Information hereunder does not constitute, involve or require any research, development or demonstration work to be conducted by BENFIELD. Any preliminary feedstock evaluations or testing carried out, or to be carried out, or any customary technical service relating to the BENFIELD Process are for the sole purpose of assuring compatibility of said Process with 's requirements pertaining to said Demonstration Plant, not demonstration of BENFIELD's Process as such, and thus are not construed as and likewise do not constitute, involve or require any research, development or demonstration work to be conducted by BENFIELD.
2. DOE hereby acknowledges, by its concurrence to the execution of this Agreement at the place provided below, that the Patent Rights and Data provisions of Appendix B, General Provisions, as amended of the DOE Contract are not applicable to this License Agreement.

The provisions of this Agreement, therefore, constitute the sole applicable provisions pertaining to the license rights granted by BENFIELD with respect to or in association with the BENFIELD Process covered by this Agreement.

ARTICLE VIII - FUTURE IMPROVEMENTS; DISCLOSURE

1. For a period of fifteen (15) years commencing with the Effective Date of this Agreement, Licensee and BENFIELD shall each disclose in writing to the other, promptly and without charge, any improvements in the Process which were developed or acquired (provided the terms under which such improvements were acquired do not prohibit such disclosure) by either of them and which might be of benefit to the Demonstration Plant, except that neither party hereto shall have such obligation of disclosure to a defaulting party. Except as provided in Article II, Section 2 and Article V hereof, Licensee shall have free use of such improvements in the Demonstration Plant, and BENFIELD shall have free use of such improvements for its own purposes, and shall have the right to transmit such improvements to third parties for their use, provided that such third parties grant a reciprocal right to Licensee to use without charge any Process Improvements developed by such third parties.
2. , when planning to file a patent application on any Licensed Facility improvement which would disclose Confidential Technical Information which should still be maintained in confidence in accordance with Article V above, shall obtain prior written approval therefor from BENFIELD. Such approval shall not be unreasonably withheld.

ARTICLE IX - PERFORMANCE GUARANTEE; LIMITATION OF LIABILITY

1. BENFIELD and agree that the performance of the BENFIELD Process Design for the Licensed Facility shall be guaranteed by BENFIELD to under the terms and conditions defined in the Process Performance Warranty attached hereto as Schedule A.
2. The total cumulative liability of BENFIELD under Article IV (Patent Indemnity) and this Article IX and all causes of any nature arising under this Agreement and/or related Benfield services shall not exceed one-half of the license fee payable by Licensee in accordance with Article III hereof. Neither party to this Agreement shall be liable for consequential damages, e.g., loss of use, profits or business.



ARTICLE X - RIGHTS AND OBLIGATIONS ON TERMINATION AND DEFAULT

1. Subject to       's payment to BENFIELD of the license fee herein provided,       shall have a perpetual, paidup, non-exclusive and unrestricted license under BENFIELD's Technical Information and improvements thereon, patented and unpatented, for the Licensed Facility, as shall have been licensed hereunder to
2. Upon the default of any provision herein by either party, the injured party may give to the defaulting party written notice of intent to terminate this Agreement, specifying the alleged default, and if the default is not cured within ninety (90) days after the giving of such notice, then the injured party may terminate this Agreement forthwith by written notice to such effect to the defaulting party. Such termination shall not relieve either party of the obligation to hold in confidence information received from the other party hereunder.

ARTICLE XI - APPLICABLE LAW

1. This Agreement is executed and delivered in the State of Pennsylvania, and it is expressly agreed by the parties that it shall be construed and the legal relations between the parties hereto shall be determined in accordance with the laws of the State of Pennsylvania.
2. In the event that any one or more of the provisions of this Agreement shall for any reason be held to be void, invalid, illegal or unenforceable in any respect, the remainder of the Agreement shall remain binding upon the parties hereto. The parties shall in good faith negotiate to modify the void, invalid, illegal or nonenforceable provisions of this Agreement and only those others which are seriously affected by such modifications, to bring the provisions within the legal requirements with due regard to equitable considerations.

ARTICLE XII - MISCELLANEOUS PROVISIONS

1. Succession and Assignment. This Agreement shall be binding upon and inure to the benefit of the parties hereto and the successors to substantially the entire assets and business of the respective parties hereto or, in the case of Licensee, the successor in interest of the Licensed Facility.       shall have the right without BENFIELD's prior written consent to assign this Agreement to DOE or to DOE's designee, in the event that       terminates its participation in the Demonstration Plant project, if DOE

or such designee assumes the obligations of under the Government Contract and of to BENFIELD under this Agreement, but this Agreement shall not otherwise be assignable by either party without the prior written consent of the other party.

2. Agency. Neither party is nor shall be deemed to be an agent of the other party as a result of or in any transaction under or relating to this Agreement nor shall either party incur any obligations on behalf of the other.
3. Non-waiver. The failure of either party to this Agreement to enforce at any time any provisions of this Agreement or to exercise any right hereunder shall not be construed as a waiver of such provisions or of the performance of any other term, covenant, or condition of this Agreement, but the obligations of the respective parties with respect to such future performance shall continue in full force and effect.
4. Notice. All written notices, reports, and other communications required by this Agreement shall be given by mail to the respective addresses as set forth in the preamble to this Agreement, unless another address is substituted by written notice by either party prior to the dispatch of any communication. In the event notices received under this Agreement by a party hereto are sent by registered mail to the party entitled thereto, they shall be deemed to have been given or made as of the date so mailed.
5. Modifications. This Agreement embodies and sets forth the entire understanding between the parties with respect to the subject matter hereof. No modifications of this Agreement shall be effective unless in writing and signed by the party to be charged and specifically stating that it is a modification hereof.
6. Impossibility of Performance. In the event that acts of God or the public enemy, strikes, fires, floods, wars or insurrection, accidents, prohibitions, and/or lack of material, equipment, transportation, and the like, or any other causes beyond the control of the parties, including Government action, render performance under this Agreement impossible, failure of performance on that account during such period shall be excused.
7. Reporting of Royalties. If this Agreement is in an amount which exceeds \$10,000 and if any royalty payments are directly involved in the agreement or are reflected in the agreement price to Licensee, BENFIELD agrees to report in writing to the Licensee during the performance of this contract and prior to its completion.

or final settlement the amount of any royalties or other payments paid or to be paid by it directly to others in connection with the performance of this contract together with the names and addresses of licensors to whom such payments were made and either the patent numbers or such other information as will permit identification of the patents or other basis on which the royalties are to be paid. The approval of DOE of any individual payments or royalties shall not stop Licensee at any time from contesting the enforceability, validity or scope of, or title to, any patent under which a royalty or payments are made.

ARTICLE XIII - TERMINATION

1. This agreement shall terminate ten (10) years after the Licensed Facility goes on stream in full-scale or continuous operation, unless the two (2) parties mutually agree to extend this.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed in their respective names by their respective officers thereunto duly authorized.

BENFIELD CORPORATION

BY \_\_\_\_\_  
Title

DATE \_\_\_\_\_

Attest:

\_\_\_\_\_  
(Secretary)

By \_\_\_\_\_  
Title

Date \_\_\_\_\_

Attest:

\_\_\_\_\_  
Acknowledged this \_\_\_\_\_ day of \_\_\_\_\_, 1979 by

\_\_\_\_\_  
Contracting Officer  
United States Department of Energy

## SCHEDULE A

### PROCESS PERFORMANCE WARRANTY

1. This Warranty forms part of the Agreement between BENFIELD and that includes the license for the Licensed Facility and shall be effective as of the date of said Agreement.
2. The Licensed Facility, the subject of this warranty, is a gas scrubbing plant designed to employ the BENFIELD Process to remove CO<sub>2</sub> from a gas feedstream of . . . . . pound mols per hour ( Million Normal Cubic Feet per Day, water-free basis). The process design for the Licensed Facility is summarized on the flowsheet to be prepared by BENFIELD and identified as Drawing No.
3. The Licensed Facility, as identified in Paragraph 2, shall meet the following performance specifications during a performance test conducted by . . . . . in which the Licensed Facility operates continuously under stable nonfoaming conditions for a period of 72 hours:
  - (a) The Licensed Facility shall have the capacity to scrub at least . . . . . Million Normal Cubic Feet per day of a gas feedstream as defined on the flowsheet PS-
  - (b) The Licensed Facility shall scrub said gas feedstream at the feedrate defined on the flowsheet PS- . . . . . to a product gas containing not more than . . . . . mol percent (water free basis) CO<sub>2</sub> with a lean carbonate solution circulation rate of not more than . . . . . U.S. Gallons per minute measured at operating conditions and with a regeneration external heat input of not more than . . . . . MM BTU's per hour provided that at least . . . . . million BTU's/hr are produced in the condensate reboiler (# . . . . . on flowsheet PS- . . . . . ) and at least . . . . . MM BTU are produced and reintroduced to the regenerator by temperature reduction of lean solution in the flash vessel ( . . . . . on the flowsheet . . . . . ). BTU's produced in the flash tank are defined as the pounds of steam flashed multiplied by the difference in enthalpy between the flashed vapor at flash tank exit temperature and water at the regenerator base temperature.
4. Should the Licensed Facility fail to perform as above provided and it is determined that such failure is due to an error or inadequacy in the process design provided by BENFIELD as distinguished from mechanical failure or an error in detailed engineering, manufacture or erection, then BENFIELD shall make, at its expense, such changes, modifications or additions to the Licensed Facility as BENFIELD shall deem necessary to permit the Licensed Facility to perform as above specified.

5. It is understood and agreed that this Process Performance Warranty shall be subject to the following terms and conditions:

- (a) The Licensed Facility shall have been constructed in accordance with the process designs recommended and approved by BENFIELD and shall be operated in accordance with Benfield's operating instructions.
- (b) The final detailed engineering design of the Licensed Facility prepared by \_\_\_\_\_ or their contractor, shall have been submitted to BENFIELD for review and comment. BENFIELD's review and comment on such detailed design shall not enlarge BENFIELD's responsibility or constitute acceptance of liability for detailed engineering or manufacture.
- (c) The inlet conditions to the Licensed Facility (temperature, pressure, composition, and flow rate of the raw gases) shall approximate those on which BENFIELD's process design was based.
- (d) The operating solution shall be free of impurities which promote foaming such as condensed hydrocarbons and particulate matter.
- (e) BENFIELD shall be given full access to the Licensed Facility and to all operating data and information as required to determine the cause of any failure to operate as specified in this Warranty.
- (f) If there is a failure of the Licensed Facility to operate as specified, BENFIELD shall have the right to modify the operating instructions for the Licensed Facility and shall perform reasonable operating tests of the Licensed Facility at the modified operating conditions. If, in a test at the modified operating conditions, within safe and stable operation of the equipment, the Licensed Facility demonstrates the guaranteed performance, or if such test is not started by \_\_\_\_\_ within ninety (90) days after BENFIELD provides the modified operating instructions, BENFIELD's obligations under this Process Performance Warranty shall terminate.
- (g) Nothing in this Process Performance Warranty shall be construed as a representation or warranty that the actual operating conditions of the Licensed Facility shall necessarily conform to all of the operating conditions shown on the process flowsheet approved by BENFIELD.

- (h) If BENFIELD determines pursuant to Paragraph 4 hereof that certain changes, modifications or additions to the Licensed Facility should be made to correct a failure for which BENFIELD is responsible,                      shall make such changes, modifications or additions at BENFIELD's expense within a reasonable time and thereafter shall perform reasonable operating tests of the Licensed Facility. If                      decides not to make or permit BENFIELD to make such changes, modifications or additions, BENFIELD's total obligation under this Process Performance Warranty shall be limited to the reasonable cost of making such changes, modifications or additions subject to the limit of BENFIELD's liability defined in Paragraph 6.
6. It is understood and agreed that BENFIELD's total liability under this Process Performance Warranty for the Licensed Facility including the cost to BENFIELD of any changes, modifications or additions to the Licensed Facility pursuant to Paragraph 4 hereof and the expenses and per diem charges of a BENFIELD engineer sent to the Demonstration Plant site by BENFIELD to determine and correct the cause of failure (to the extent that such expenses and charges are not paid by                      ) shall not in any case exceed fifty percent (50%) of the license fee payable to BENFIELD under Article III of this Agreement.
7. BENFIELD's obligations under this Process Performance Warranty shall terminate upon demonstration by a performance test that the warranted performance has been achieved or upon expiration of a period of twelve months after the initial startup of the Licensed Facility in the event that no performance test has been conducted by                      , whichever occurs earlier.
8. This Process Performance Warranty expresses all of the obligations of BENFIELD for the performance of the Licensed Facility.

SCHEDULE B

PATENT RIGHTS

Benfield Patent Rights as they exist on the Effective Date of the Agreement are:

1. U. S. Patents

<u>Docket/Title</u>	<u>Pat. or Appl'n No.</u>	<u>Exp. Date</u>
Separation of CO <sub>2</sub> and H <sub>2</sub> S from Gas Mixtures	3,563,695	2/16/88
Separation of CO <sub>2</sub> and H <sub>2</sub> S from Gas Mixtures	3,563,696	2/16/88
Separation of Carbon Dioxide & Hydrogen Sulfide from Gas Mixtures	3,642,430	2/15/89
Separation of CO <sub>2</sub> and H <sub>2</sub> S from Gas Mixtures	3,685,960	8/22/89
Separation of CO <sub>2</sub> and H <sub>2</sub> S from Gas Mixtures	3,823,222	7/9/91
Corrosion Inhibition	3,863,003	1/28/92
Separation of CO <sub>2</sub> from Gas Mixtures	3,907,969	9/23/92

2. U.S. Pending Applications

<u>Docket/Title</u>	<u>Pat. or Appl'n. No.</u>
Removal of Acid Gases from Hot Gas Mixtures	884,200

SCHEDULE C

NON-DISCLOSURE AGREEMENT FOR U. S. GOVERNMENT EMPLOYEES

PROGRAM MANAGEMENT TASK FORCE

PIPELINE GAS DEMONSTRATION PLANT CONTRACT

CONCEPT DEVELOPMENT, DESIGN, CONSTRUCTION, TEST, EVALUATION AND  
OPERATION OF A DEMONSTRATION PLANT

DISCLOSURE OF INFORMATION

As a U.S. Government employee, subject to 18 U.S. Code 1905, I, the undersigned, understand that during the course of evaluating contractor performance I might obtain access to proprietary information, and I agree that I shall not then or subsequently reveal any information designated or marked "Proprietary" submitted for Government evaluation to anyone who is not also participating in the same evaluation proceedings, and then only to the extent that such information is required in connection with such proceedings. Further, I understand that the right to such information on this need-to-know basis does not normally extend to the chain of supervision of Task Force members or any other participants. I certify that I will not disclose such information except as provided herein, and that I will take adequate precautions to assure against disclosure concerning any technical data and/or documents designated or marked "proprietary", which may come into my custody.

CONFLICT OF INTEREST

I have received a copy of Chapter 4124, "Conduct of Employees", of the ERDA Manual, and have duly filed (or will file prior to participating in the proceedings of this Program Management Task Force) a current ERDA Form 269 "Confidential Statement of Employment and Financial Interest" in accordance with the requirements of the ERDA Manual. I certify that I have complied or will comply with all provisions of the above-referenced Chapter 4124 of the ERDA Manual, and that I will promptly advise the Task Force Chairman, if I now or at any time during the evaluation have any definable conflict of interest concerning this contract performance.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
(Name in block letters)

United States  
Energy Research and Development Administration  
Washington, DC 20545



SCHEDULE D

LIMITED RIGHTS IN PROPRIETARY DATA

This "proprietary data" furnished under Contract No. \_\_\_\_\_ between \_\_\_\_\_ and the United States Energy Research and Development Administration may be duplicated and used by the Department of Energy or its representatives with the express limitations that the "proprietary data" may not be disclosed outside the Department of Energy or its representatives, nor be used for purposes of manufacture, without prior permission of the Contractor.

These restrictions do not limit rights to use or disclose any data obtained from another source without restriction. This legend shall be marked on any reproduction of this data in whole or in part.

## SCHEDULE E

### FORMULA FOR LICENSE FEE

(For Diethanol Amine-Activated K<sub>2</sub>CO<sub>3</sub> Solution)

1. BENFIELD's fee is a lump-sum, fully paid-up fee, payable in U. S. Dollars, calculated according to the following general formula:

$$\begin{aligned} &\text{Fee for each} \\ &\text{Benfield Plant} = (\text{Base Fee}) \times 1.4 \end{aligned}$$

where "Base Fee" is calculated as follows, but is not less than twenty thousand dollars (\$20,000.00):

- (a) For the first ten million cubic feet of nominal rated scrubbing capacity <sup>\*</sup>/ of the Benfield Plant or enlargement thereof, a fee of six dollars (\$6.00) for each one thousand cubic feet; and in addition,
  - (b) For the next five million cubic feet of nominal rated scrubbing capacity of the Benfield Plant or enlargement thereof, a fee of three dollars (\$3.00) for each one thousand cubic feet; and in addition,
  - (c) For all nominal rated scrubbing capacity of the Benfield Plant or enlargement thereof in excess of fifteen million cubic feet, a fee of two dollars (\$2.00) for each one thousand cubic feet.
2. For each Benfield Plant in which a portion of the stripping steam is produced by flashing of low-pressure steam from the scrubbing solution and/or from water employed in the Benfield Plant, with compression of the low-pressure, flashed steam and injection thereof into the stripping column, a fee equal to that specified in Paragraph 1 hereof plus an incremental fee equal to \$.0015 H; where "H" is equal to the design heat content of the flashed steam expressed in BTU's per hour. The "design heat content of the flashed steam" shall be taken as equivalent to the calculated difference in the heat content of the scrubbing solution and/or water before and after flashing.

---

<sup>\*</sup>/ The "nominal rated scrubbing capacity" of the Benfield Plant, as that term is used in this Schedule, means the scrubbing capacity of the plant expressed as the number of cubic feet of CO<sub>2</sub> and/or H<sub>2</sub>S (on an anhydrous basis and measured at 0° Centigrade and 760 mm. Hg absolute) with the plant is designed to remove from the gas being treated per twenty-four (24) hour day when operating at its normal maximum design capacity.



DRAFT1.0 SUBLICENSE

FOSTER WHEELER represents and warrants that by virtue of its Agreement with STANDARD OIL COMPANY (INDIANA) it has the right to furnish process information, grant a nontransferrable, nonexclusive license in and to the AMOCO Sulphur Recovery Process and does hereby grant to MLGW, subject to payment in full of the amounts specified in Sections \_\_\_\_\_ to \_\_\_\_\_ inclusive, and in accordance with the terms and conditions set forth herein, a nontransferrable, nonexclusive, irrevocable sublicense to practice the AMOCO Sulphur Recovery Process in the Plant.

2.0 PRICE

MLGW agrees to pay to FOSTER WHEELER in and at the times designated in this Article 2.0 as full and complete compensation for the Work the sum of:

2.1 [Compensation for the services, equipment and materials]

2.2 MLGW agrees to pay FOSTER WHEELER in the manner and as designated in Article 2.0 as full and complete compensation for the sublicense rights herein granted, related know-how fees and technical services, a Lump Sum of Twenty-One Thousand Two Hundred Ninety-Nine Dollars (\$21,299).

3.0 TERMS OF PAYMENT

3.1 The amount payable to FOSTER WHEELER pursuant to Section 2.1 shall be due and payable . . . . .  
[in accordance with the services, equipment and materials method of compensation].

3.2 The amount payable to FOSTER WHEELER pursuant to Section 2.2 shall be due and payable as follows:

3.2.1 Eight Thousand Five Hundred and Twenty Dollars (\$8,520) upon delivery of the basic process design criteria to MLGW (the receipt of which is hereby acknowledged).

