Agreement Between

The Department of Energy

of the United States of America

and

The Comision Federal de Electricidad

of the Mexican United States

in the Field of Geothermal Energy

CONTENTS

The Parties agree to institute the following generally accepted definitions to be applied to the present agreement.

GLOSSARY OF TERMS

ERDA	Energy Research and Development Administration of the United States of America
The Comision	Comision Federal de Electricidad of the Mexican United States
DOE	Department of Energy of the United States of America
Remote Sensing	Optical and electronic devices located in aircraft or satellites with the purpose of obtaining information regarding the surface of the Earth
Non Electric Applications	Use of geothermal energy for other than power production. Example: Processing of potassium chloride as fertilizer with waste heat
Geothermal Brine	Geothermal waters that contain dissolved salts
Fracture Tracing and Mapping	Techniques used for identifying and locating faults and fractures accurately
Scaling	Deposition or adhesion of chemical substances on ducts where geothermal fluids circulate
Corrosion	Chemical attack with the consequent degradation of materials entering in direct contact with geothermal fluids
Isotopic	Related to chemical elements which differ by neutron content of the nucleus

Monitoring	Measurement of a given parameter during a certain time period with the aim of understanding the behavior of a natural system
Reinjection	Injection of separated water from production wells
Geothermal Fluid	Hot subsurface water.
Proprietary Information	Information that contains trade secrets or commercial or financial information which is privileged or confidential, and may only include such information which: a) Has been held in confidence by its owner; b) Is of a type which is customarily held in confidence by its owner; c) Has not been transmitted by the transmitting Party to other entities (including the receiving Party) except on the basis that it be held in confidence; and d) Is not otherwise available to the receiving Party from another source without restriction on its further dissemination
Transmitting Party	As used in Article VII, the term means the Party who gives or delivers, verbally or in writing, any kind of information, technical or otherwise
Receiving Party	As used in Article VII, the term means the Party who is given or receives, verbally or in writing, any kind of information, technical or otherwise
Assigning Party	As used in Article IX, the term means the Party who sends its personnel (scientists, engineers or other specialists) or personnel of its contractors, subcontractors or licensees to the facilities of the other Party, its contractors, subcontractors or licensees
Receiving Party	As used in Article IX, the term means the Party to whose facility or the facilities of its contractors, subcontractors, or licensees the other Party sends its personnel (scientists, engineers or other specialists) or the personnel of its contractors, subcontractors, or licensees

Agreement Between the Department of Energy of the United States of America and the Comision Federal de Electricidad, Decentralized Organization of the Mexican Federal Government in the Field of Geothermal Energy

Background

Whereas: On July 21, 1977, the Comision Federal de Electricidad and the Energy Research and Development Administration, presently the Department of Energy, signed an agreement for research and technological development in the field of geothermal energy. That Agreement which lasted five years and was applied to the geothermal field of Cerro Prieto in Baja California, ended on July 21, 1982;

(A) The Comision Federal de Electricidad, hereinafter referred to as the Comision, of the Mexican United States, hereinafter referred to as Mexico, and the Department of Energy, hereinafter referred to as DOE, of the United States of America, hereinafter referred to as the U.S., have a mutual interest in pursuing the development and modern application of geothermal energy and the exchange of information on the Mexicali Valley and Laguna Salada, Baja California, as well as on Los Azufres, Michoacan, Mexico.

(B) The Comision and DOE, hereinafter referred to as the Parties,

recognize that technological cooperation in research and development in the area of geothermal energy will benefit their respective countries through the exchange of technology and by means of human and material resources;

(C) The Parties desire to cooperate in the area of geothermal energy research and development, in accordance with the principles set forth in the Science and Technology Agreement signed by both countries on June 15, 1972; and

(D) The Parties recognize that the July 20, 1976, decision by the U.S./Mexico Mixed Commission on Scientific and Technical Cooperation includes geothermal energy as an area of cooperation;

It is agreed as follows:

Article I

Objectives

The major objectives of this Agreement are to achieve a thorough understanding of the nature of geothermal reservoirs in sedimentary and fractured igneous rocks, to investigate how the geothermal resources can best be explored and exploited, and to exchange information on geothermal topics of mutual interest as set forth in Article II "Areas of Cooperation" and Article III "Tasks."

Article II

Areas of Cooperation

The Parties shall make every effort to achieve an intensive program of cooperation in research, development, and demonstration of applications of geothermal energy in the Mexicali Valley and Laguna Salada, B.C. and Los Azufres, Mich., Mexico in the following areas:

(1) Geologic and hydrogeologic studies, including field mapping and analysis of core samples, cuttings, and well logs. Field mapping shall include the application of remote sensing as well as data interpretation techniques applied to Mexicali Valley and Laguna Salada, B.C. and to Los Azufres, Mich., Mexico

(2) Geophysical studies, including geophysical surveys and downhole mapping of natural fractures.

(3) Geochemical and isotopic studies of geothermal fluids, as ground and surface waters.

(4) Sampling, monitoring, and modeling of reservoir behavior.

(5) Reinjection of waste water, including isotopic tracer tests.

(6) Characterization of subsidence and induced seismicity.

(7) High temperature materials testing, scaling and corrosion study and control.

(8) Conversion technology.

(9) Technology for drilling and completion of geothermal production and reinjection wells.

(10) Non-electrical applications as a secondary benefit for steam production.

(11) Brine utilization.

(12) Other related areas as mutually agreed upon in writing.

Article III

Tasks

The specific obligations and conditions for carrying out the specific research and development projects and programs mutually agreed upon shall be called "Tasks" and shall be conducted in accordance with this Agreement and with any laws and regulations that are applicable.

Cooperation under this Agreement shall include the following activities:

A. Task 1. Geology and Hydrogeology

Objective

This Task shall involve the development and testing of geologic and hydrogeologic models as well as the conceptual techniques for defining the 3-dimensional structures of the geothermal systems, including faults and stratigraphy, in order to estimate the influence of these structures on subsurface fluid flow.

Responsibilities of DOE and the Comision

DOE, with the assistance of the Comision, shall be responsible for the refinement of the Cerro Prieto, B.C. and Los Azufres, Mich. geological models on the basis of information from core samples, well cuttings, geophysical well logs, and other data and analyses provided by the Comision.

The Comision shall be responsible for providing DOE with samples, cores, geophysical logs, and preliminary analyses of data from the Cerro Prieto, B.C. and Los Azufres, Mich. fields as well as providing, if the Comision so desires, persons to collaborate with DOE researchers in performing the above-mentioned analyses and studies.

B. Task 2. Geophysics

Objective

This Task shall involve defining the dimensions, limits, and structure of hydrothermal reservoirs and the monitoring of changes in reservoir properties during production and reinjection.

Responsibilities of DOE and the Comision

DOE, with the assistance of the Comision, shall be responsible for monitoring geophysical changes in the Cerro Prieto, B.C. field and establishing microearthquake and resistivity baselines in Cerro Prieto II and III as well as testing at Los Azufres, Mich. techniques for delineation and mapping of natural fractures in reservoirs.

The Comision shall be responsible for providing access to the wells and providing the support equipment and personnel necessary for testing geophysical techniques of fracture mapping at the Los Azufres, Mich. reservoir in addition to providing access to the Cerro Prieto, B.C. field as well as providing surveys and personnel in support of DOE monitoring activities.

C. Task 3. Geochemistry

Objective

This Task shall be an attempt to determine the origin of geothermal fluids and their sources and rates of recharge, as well as the changes produced in fluids by production and reinjection activities.

Responsibilities of DOE and the Comision

1. DOE, with the assistance of the Comision, shall be responsible for collection of samples and information relating to geothermal fluids, ground water, and surface water as well as the chemical and isotopic analyses thereof and for studies of geochemical changes associated with production and reinjection of geothermal fluids.

The Comision shall be responsible for providing DOE access to the Cerro

Prieto, B.C. and Los Azufres, Mich. wells and for providing baseline data and support personnel for DOE sampling and monitoring activities in Mexico. If the Comision so desires, it may provide personnel to work on the above-mentioned analyses and studies.

2. Both Parties agree that isotopic studies shall be conducted mainly in deep ground waters rather than surface waters.

D. Task 4. Reservoir Engineering

Objective

This Task shall consist of research to determine the size, hydraulic and thermal properties, fluid and heat capacities, optimum production, and longevity of geothermal reservoirs.

Responsibilities of DOE and the Comision

1. DOE, with the assistance of the Comision, shall be responsible for the development and application of reservoir engineering techniques through both laboratory and field studies in the Cerro Prieto, B.C. field (porous, sedimentary rock) and in the Los Azufres, Mich. field (fractured volcanic rock) in order to examine reservoir behavior as the development of the geothermal fields progresses. It shall also be responsible for a computer simulation of the behavior of the geothermal field both before and after the initiation of fluid production. The simulation shall be performed by using numerical models of the field to calculate heat and mass transfer through the geothermal system.

The Comision shall be responsible for providing DOE access to and data from the Cerro Prieto, B.C. and Los Azufres, Mich. fields as well as providing

personnel for DOE monitoring activities in Mexico. If the Comision so desires, it may participate in the above-mentioned modelling activities.

2. Both Parties agree that the main purpose of modelling shall be its practical application to the prediction and analysis of actual reservoir performance.

E. Task 5. Reinjection

Objective

The purpose of this Task is to understand fluid migration in a reservoir and thus be able to locate production and reinjection wells in order to obtain optimum heat extraction from reservoir rocks over the lifetime of a field.

Responsibilities of DOE and the Comision

DOE, with the cooperation of the Comision, shall be responsible for providing an analysis of fluid migration in a reservoir by using reservoir engineering and geochemical and geophysical data gathered jointly with the Comision as well as providing analyses and predictions of the interaction between the fluids injected and the rocks in the reservoir.

The Comision shall be responsible for providing DOE with data from and access to the Cerro Prieto, B.C. and Los Azufres, Mich. fields and for providing support personnel and equipment for joint field projects. If the Comision so desires, it may provide personnel to work with the DOE researchers performing the above-mentioned analyses.

F. Task 6. Subsidence and Induced Seismicity

Objective

This Task shall involve the characterization of subsidence and induced seismicity as related to withdrawal of geothermal fluids.

Responsibilities of DOE and the Comision

DOE, with the assistance of the Comision, shall be responsible for the development of a predictive model of subsidence caused by the extraction of geothermal fluid applicable to the Heber, California, U.S.A., and Cerro Prieto, B.C. fields. It shall also develop a predictive model to characterize seismicity induced by fluid production and injection.

The Comision shall be responsible for providing DOE with data from the Cerro Prieto, B.C. field to test the model developed in this Task. If the Comision so desires, it may provide personnel to DOE to cooperate in developing the above-mentioned model.

G. Task 7. Geochemical Engineering and Materials

Objective

This Task is aimed at high-temperature materials testing as well as scaling and corrosion control.

Responsibilities of DOE and the Comision

DOE, with the assistance of the Comision, shall be responsible for field testing in Mexico of high temperature materials chosen by the mutual agreement of the Comision and DOE. Initial testing shall include testing of cements as

well as the development of improved techniques for brine handling to reduce scaling and corrosion.

The Comision shall be responsible for providing DOE access to the Cerro Prieto, B.C. and/or the Los Azufres, Mich. fields as well as field support personnel and equipment. If the Comision so desires, it may provide DOE with personnel to assist in performing the laboratory work.

H. Task 8. Conversion Technology

Objective

This Task is concerned with collection and analysis of data on the design, start-up, and long-term development of geothermal energy conversion systems for the generation of electricity and for direct heat applications. Specific areas of interest are:

(a) Long-term performance of Cerro Prieto, B.C. and start-up of additional electrical generation capacity.

(b) Binary demonstration in the plant at Heber, California, U.S.A.

(c) Performance of well-head generators at Los Azufres, Mich. and transition to a permanent power plant.

(d) Direct heat application design and start-up at Cerro Prieto, B.C., including potash fertilizer production, and

(e) Testing of high temperature downhole pumps at Cerro Prieto, B.C..

Responsibilities of DOE and the Comision

DOE shall be responsible for collection and exchange of Heber, California,

U.S.A. data and the joint analysis of the Comision data. This responsibility shall not be interpreted as affecting access to the Heber data provided under existing agreements between the Comision and private U.S. companies.

The Comision, with the assistance of DOE, shall be responsible for the collection, analysis, and exchange of Cerro Prieto, B.C. and Los Azufres, Mich. data.

I. Task 9. Information Exchange

Objective

The Comision and DOE shall exchange non-proprietary information, which includes technical performance and field experience data, and technical reports in the following areas of mutual interest:

(a) Geology and hydrogeology

(b) Geophysics

(c) Geochemistry

(d) Reservoir engineering

(e) Reinjection

(f) Subsidence and induced seismicity

(g) Geochemical engineering and materials

(h) Conversion technology

(i) Drilling and completion of wells, including information on the use of air, foam, and chemically-modified muds as well as the different problems and procedures associated with drilling of igneous, sedimentary, and metamorphic rocks

(j) Non-electrical applications as a side benefit for steam production

(k) Brine utilization

(l) Hot dry rock energy extraction

(m) Other areas mutually agreed upon in writing by the Parties.

Responsibilities of DOE and the Comision

1. The Comision and DOE shall organize workshops and symposia on topics and on programs as mutually agreed by both Parties. The workshops shall include informal technical meetings of small groups which shall address specific technical subjects. The symposia shall be held approximately every 18 months for the purpose of evaluating work under this Agreement.

With the assistance of the Comision, DOE shall be responsible for the organization of workshops and symposia to be held in the U.S. With the assistance of DOE, the Comision shall be responsible for the organization of workshops and symposia to be held in Mexico.

2. In planning future Tasks under this Agreement, the Parties shall take into consideration the objectives of their respective national geothermal programs.

3. Both Parties agree that the exchange of information on geothermal fields, reservoirs, and installations shall not be limited to the Heber and Baca fields in the U.S. and the Cerro Prieto, B.C. and Los Azufres, Mich. fields in Mexico, but shall include other non-proprietary information that furthers the objectives of this Agreement.

Article IV

Third Party Participation

It is anticipated that agencies, institutions, and individuals other than the Parties will participate in the activities to be undertaken under this Agreement. Their participation through the Parties shall be subject completely to the terms and conditions in this Agreement.

Article V

Coordinators

The Parties shall each designate a Principal Coordinator who shall be responsible for the overall supervision of this Agreement and the Tasks thereunder. Each Party shall designate an Alternate Coordinator who shall represent the Party in case the Principal Coordinator is unable to do so and shall have the same powers as the Principal Coordinator. Each Party shall inform the other Party in writing about the designations referred to in this paragraph. The Coordinators shall appoint persons and establish subsidiary bodies and rules of procedure as required for their suitable performance. The Coordinators or their representatives shall meet periodically as they deem necessary to review the progress of the cooperative activities under this Agreement. The Coordinators shall issue progress reports every six months or as mutually agreed. Any controversies that might arise regarding technical matters shall be settled equitably by the Coordinators. If necessary, any controversy shall be submitted to the higher authorities of the Parties.

Article VI

Finance

In carrying out the various cooperative activities, the Parties shall be subject to the amounts budgeted for that purpose by the appropriate governmental authority and to the laws and regulations applicable to the Parties, including but not limited to any laws that ban the payment of commissions, percentages, broker's fees, and incidental fees to persons contracted to apply for government contracts as well as any involvement in such contracts by government officials. Each Party shall pay the costs of its participation in activities under this Agreement as set forth in the Tasks in Article III.

Article VII

Information

1. General

The Parties shall support the widest possible dissemination of information provided, exchanged, or arising under this Agreement subject to the need to protect proprietary information provided hereunder, and to the provisions of Article IX.

2. Use of Proprietary Information

A. Definitions as Used in This Agreement

(i) The term INFORMATION means scientific or technical data,

results or methods of research and development, and any other information intended to be provided, exchanged, or arising under this Agreement.

(ii) The term PROPRIETARY INFORMATION means information that contains trade secrets or commercial or financial information which is privileged or confidential and may only include information which:

(a) Has been held in confidence by its owner;

(b) Is of a type which is customarily held in confidence by its owner;

(c) Has not been transmitted by the transmitting Party to other entities, including the receiving Party, except on the basis that it be held in confidence, and

(d) Is not otherwise available to the receiving Party from another source without restrictions on its further dissemination.

B. Procedures

(i) A Party receiving proprietary information pursuant to this Agreement shall respect the privileged nature thereof. Any document that contains proprietary information shall be clearly marked with the following or substantially similar restrictive legend: "This document contains proprietary information furnished in confidence under an Agreement dated April 7, 1986 between the Department of Energy of the United States of America and the Comision Federal

de Electricidad, of the Mexican United States and shall not be disseminated outside of those organizations, their contractors, licensees, and the concerned departments and agencies of the Governments of the U.S. and Mexico without the prior approval of the Parties." "This notice shall appear on any reproduction thereof, in whole or in part. These limitations shall automatically terminate when this information is disclosed by the owner without restriction."

(ii) Proprietary information received in confidence under this Agreement may be disseminated by the receiving Party to:

(a) Persons within or employed by the receiving Party or government departments and agencies of the country of the receiving Party; and

(b) Contractors and subcontractors of the receiving Party located within the geographical limits of the receiving Party's nation for use only within the framework of their contracts with the receiving Party in work relating to the subject matter of the proprietary information, provided that any proprietary information so disseminated shall be pursuant to an agreement of confidentiality and be marked with a restrictive legend substantially identical to that appearing in subparagraph 2 B(i).

(iii) With the prior written consent of the Party providing the proprietary information covered by this Agreement, the

receiving Party may disseminate such proprietary information more widely than permitted in the foregoing section (ii). The Parties shall cooperate with each other in developing procedures for requesting and obtaining approval for such wider dissemination, and each Party shall grant such approval to the extent permitted by its national policies, regulations, and laws.

C. Each Party shall exercise its best efforts to ensure that proprietary information received by it under this Agreement is controlled as provided herein. If one of the Parties becomes aware that it will be or may reasonably be expected to become unable to meet the non-dissemination provisions of this Article, it shall immediately inform the other Party. The Parties shall thereafter consult to define an appropriate course of action.

D. Information arising from seminars and other meetings held under this Agreement and information arising from the attachments of staff shall be treated by the Parties according to the principles specified in this Article provided, however, that no proprietary information orally communicated shall be subject to the limited disclosure requirements of this Agreement, unless the individual communicating such information places the recipient on notice as to the proprietary character of the information communicated.

E. Nothing contained in this Agreement shall preclude the use or dissemination of information received by a Party other than pursuant to this Agreement.

Article VIII

Responsibility

Information transmitted by one Party to the other Party under this Agreement shall be accurate to the best knowledge and belief of the transmitting Party, but the transmitting Party does not warrant the suitability of the information transmitted for any particular use by the receiving Party or by any third Party.

Information developed jointly by the Parties shall be accurate to the best knowledge and belief of both Parties. Neither Party warrants the accuracy of the jointly developed information or its suitability for any particular use or application by either Party or by any third Party.

Article IX

Patents

1. With respect to any invention or discovery made or conceived in the course of or under this Agreement:

(a) If made or conceived by the personnel of one Party or its contractors, subcontractors, or licensees, while they are assigned

to the other Party, or its contractors, subcontractors, or licensees, in connection with exchanges of scientists, engineers, and other specialists:

(1) The receiving Party shall acquire all rights, titles, and interests in and to any invention or discovery in its own country and in third countries, subject to a non-exclusive, irrevocable, royalty-free license in all such countries to the assigning Party and to its nationals designated by it.

(2) The assigning Party shall acquire all rights, titles, and interests in and to any such invention or discovery in its own country, subject to a non-exclusive, irrevocable, royalty-free license to the receiving Party and to its nationals designated by it.

(b) If made or conceived by a Party, its contractors, subcontractors, or licensees as a direct result of employing information communicated to it under this Agreement by the other Party or its contractors, subcontractors, or licensees or during seminars or other joint meetings, the Party making the invention shall acquire all rights, titles, and interests in and to such invention or discovery in all countries, subject to a grant of a royalty-free, non-exclusive, and irrevocable license to the other Party and to its nationals designated by it.

(c) With regard to other inventions or discoveries made or conceived in the course of or under this Agreement, each Party shall acquire all rights, titles, and interests in and to such invention or discovery in its own country, subject to a grant of a non-exclusive, irrevocable, royalty-free license to the other Party and to its nationals designated by it. Rights to inventions or discoveries in other countries shall be agreed upon in writing by the Parties on an equitable basis.

2. Each Party shall assume the responsibility to pay awards or compensation required to be paid to its nationals according to its own laws.

3. Each Party shall provide all necessary cooperation by its inventors to carry out the provisions of this Article.

Article X

Arbitration

Should a dispute arise between the two Parties, they shall appoint a committee consisting of an equal number of representatives from each side. Any conclusions reached by the Committee shall be submitted to both the Comision and DOE who, after reviewing them, shall agree mutually on the final arrangement.

In the event that one or more of the Parties' workers or employees

suffers an accident or is exposed to an occupational risk, relief shall be provided and the case shall be handled in accordance with Mexican laws in force if the matter involves a Mexican employee or worker, regardless of whether the accident or risk occurred in Mexican or U.S. territory. Conversely, if a U.S. worker or employee is involved in an accident or a hazardous work-related situation, the matter shall be handled and relief shall be provided in accordance with U.S. laws, regardless of the place where the incident occurs. Each Party shall therefore assume the responsibility arising from accidents involving its personnel. In no case shall legal relations be established between one of the Parties and personnel of the other Party. Each Party shall assist, when necessary, the other Party in dealing with the appropriate authorities concerning any legal matters related to personnel claims.

Each Party shall be responsible for damages it causes during the carrying out of the studies and work covered by this Agreement under the applicable laws and regulations of each Party.

Article XI

Obligations and Services

A. Each Party shall undertake measures to facilitate the entry into and departure from its country of the scientists, technicians, and equipment of the other Party, that have been previously selected with the consent of both Parties and are, by specific agreement, going to be utilized in joint activities under this Agreement.

B. Each Party shall provide assistance, in accordance with the laws and regulations of its respective country, to obtain clearance in matters that include, but are not necessarily limited to, customs, driver's permits, exit and entry visas.

Article XII

Registration of Agreement

The Comision is under the obligation to register the present agreement in the Registro Nacional de Transferencia de Tecnologia, Secretaria de Comercio y Fomento Industrial within 30 days of its signature.

Article XIII

Direct Contact and Cooperation

Both Parties shall, as appropriate, encourage the establishment of direct contacts and cooperation between agencies, organizations, and firms of both countries with respect to cooperation on research and development in the area of geothermal energy.

Article XIV

Acts of God

The Comision and DOE shall not be held responsible for not fulfilling their obligations derived from this Agreement when such non-compliance is due

to events unforeseen and unavoidable acts caused by man or nature or when they are foreseen and cannot be avoided by the Parties. When an event or act of God occurs, the Party who is the victim shall provide notification to the other Party within two working weeks after the event has taken place.

Article XV

Legal Address for Notification

For the purpose of notification related to this Agreement, the legal addresses of the Parties shall be as set forth below. The same addresses shall be utilized for general correspondence.

The Comision: Reforma 509 - 8° Piso, Colonia Cuauhtemoc, C.P. 06500,
Ciudad De Mexico, Distrito Federal, Mexico.

DOE: U. S. Department of Energy
Director, Geothermal Division, CE-342
Washington, D.C. 20585,
USA.

Article XVI

Final Provisions

A. This Agreement shall enter into force on the date on which it is signed by both Parties and shall remain in force for a period of three years.

Through a written agreement of both Parties, this Agreement may be extended or amended, including the addition of other tasks for a further specified period of time.

B. This Agreement may be terminated at any time at the discretion of either Party by means of six months advance written notification by the Party seeking to terminate this Agreement. Such termination shall be without prejudice to any rights that may have been accrued under this Agreement to either Party up to the date of such termination.

C. The termination, expiration, or amendment of this Agreement shall not affect the completion of the Tasks started in accordance with this Agreement that have not yet been completed on the date in question.

This Agreement is entered into in Mexico City, Federal District, on April 7, 1986, and is signed in six copies in Spanish and six copies in English. It is agreed that both texts, the Spanish and the English are valid and binding for both Parties, and the two Parties to this Agreement certify that the two texts are equally authentic as to meaning and, in the event of a dispute, the two texts shall be used to determine the intention of the Parties.

FOR THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA:

FOR THE COMISION FEDERAL DE ELECTRICIDAD OF THE MEXICAN UNITED STATES: