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FINAL REPORT

TWELVE MONTH FOLLOW-UP REPORT
OF THE
CONFERENCE TO PROMOTE INTERNATIONAL
SALES OF U.S. GEOTHERMAL EQUIPMENT
(CORECT PROJECT)

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PRODUCED UNDER THE
U.S. DEPARTMENT OF ENERGY
GRANT NO. DE-FG07-

87ID12709

DECEMBER 1988

MASTER

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FINAL REPORT

DOE/ID/12709--1

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TWELVE MONTH FOLLOW-UP REPORT
OF THE
CONFERENCE TO PROMOTE INTERNATIONAL
SALES OF U.S. GEOTHERMAL EQUIPMENT
(CORECT PROJECT)

PRODUCED UNDER THE
U.S. DEPARTMENT OF ENERGY
GRANT NO. DE-FG07-871012709
DECEMBER 1988

BY

DAVID N. ANDERSON
EXECUTIVE DIRECTOR
GEOTHERMAL RESOURCES COUNCIL
P.O. BOX 1350
DAVIS, CALIFORNIA 95616

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Executive Summary

The reverse trade mission "Conference to Promote International Sales of U.S. Geothermal Equipment" was organized and managed by the Geothermal Resources Council (GRC) in collaboration with the California Energy Commission (CEC). The mission was held in late September/October of 1987 and was well received by the 23 participants from 18 different countries. Approximately \$275,000 in immediate sales can be attributed directly to the program and the estimate of potential future sales runs as high as \$4,765,000.

It was felt by the attendees that the program was well organized and executed and that the caliber of persons invited to attend was optimum. All of the attendees stated that the function was very informative and beneficial and that they would recommend to others that they attend similar functions.

In order to be really effective in exporting a company, a country must be highly visible to potential purchasers. Although this function lasted only two weeks it was considered as a prime first step in the development of a strong U.S. geothermal technology export base program.

As part of the effort to maintain this presence the GRC recommends that this function be followed by other similar functions, courses, seminars, and specific field trips. In addition every effort should be made for U.S. government and

industry representatives to visit various countries as often as possible. The GRC is working toward developing an international information-dissemination program, which would include the development of courses for geothermal units in foreign countries.

TWELVE MONTH FOLLOW-UP REPORT
OF THE
CONFERENCE TO PROMOTE INTERNATIONAL SALES OF
U.S. GEOTHERMAL EQUIPMENT

This report was prepared in conformance with task No. 4 of the U.S. Department of Energy Grant No. DE-FG07-871012709. As per the stipulations in the grant, this follow-up report has been prepared by the Geothermal Resources Council (GRC), and includes the following information: a list of the attendees, a list of the vendors that attended, the briefing notes, the conference events, venues and workshops, foreign business opportunities, market development methodology and the amount of potential and actual sales generated as a result of the project.

As required, the GRC prepared and sent questionnaires to the 46 specific U.S. vendors who participated in the program. The questionnaires were designed to determine the sales of goods and services following the completion of the project. We also asked for the dollar equivalent of the projected sales during the same time period.

A blank copy of the questionnaire has been attached to this report as Appendix A, and a list of the participating vendors has been attached Appendix B. Also included in this report is a list of the international attendees (Appendix C), a copy of the itinerary (Appendix D), an appendix to the itinerary (Appendix E)

and a list of the program staff (Appendix F).

Of the 46 vendors who participated in the project, 30 responded to the questionnaire and the others were polled by phone. The following are the vendors reactions to the questions on the questionnaire:

QUESTIONS AND ANSWERS

1. What was your reaction to the CORECT Program?

The vendors were unanimous in praise of the effort and they felt that similar programs should be developed. All of them felt that the exposure of U.S. technology and the related products and services was well worth the cost and effort.

From the standpoint of the Geothermal Resources Council, the function was extremely beneficial:

1. It allowed the GRC to finally utilize many of the contacts that it made during the 1985 International Symposium.
2. It strengthened the GRC's ties with international geothermal scientists and developers.
3. It established the GRC as a source of information and a

training center on geothermal energy.

4. It was an excellent introduction for the National Geothermal Association.

2. What are your actual sales to date as a direct result of the program?

Two companies responded positively to this question. Their responses and sales are listed below:

DRILEX SYSTEMS (GRANT OIL TOOL)

Jim Hanson, Geothermal Operations Manager

1402 Grove Street

Healdsburg, CA 95448

707/433-6969

<u>Hardware Sold</u>	<u>Sales Value</u>
Large diameter reamers	\$ 25,000
Large hole enlargers	45,000
Liner hangers	125,000
Torque Systems (drilling equip.)	20,000
Drilling head equipment	<u>30,000</u>
Total	\$ 245,000

HALLIBURTON SERVICES

Lanier Lohn

P.O. Box 10988

Bakersfield, CA 93389

805/327-0148

805/327-0486

Hardware Sold

Sales Value

Cement

\$ 6,000

Service Sold

Pumping and personnel

\$ 25,000

Total

\$ 31,000

GRAND TOTAL OF DIRECT SALES

\$ 276,000

3. What are your projected sales from now to one year?

Three companies responded positively to this question. The first two also had direct sales. The third is a small power-plant manufacturer who is now negotiating with a Central American country (Guatemala) to sell a small flash power plant. The details of the projected sales from these three firms are as follows:

DRILEX SYSTEMS (address above)

Hardware

Sales Value

Reamers

\$ 30,000

Hole enlargers 30,000

Torque systems 20,000

Drilling heads 100,000

Total \$ 180,000

HALLIBURTON SERVICES (address above)

<u>Hardware</u>	<u>Sales Value</u>
-----------------	--------------------

Casing equipment	\$ 15,000
------------------	-----------

Cement	30,000
--------	--------

Services

Pumping personnel	<u>\$ 40,000</u>
-------------------	------------------

Total	\$ 85,000
-------	-----------

GEO THERMAL POWER COMPANY

Gary Shulman

1460 W. Water Street

Elmira, NY 14905

607/733-1027

<u>Hardware</u>	<u>Sales Value</u>
-----------------	--------------------

Guatemala	
-----------	--

1.6 MW Noncondensing, modular	\$ 4.5 million
-------------------------------	----------------

single flash power plant	
--------------------------	--

GRAND TOTAL PROJECTED SALES \$ 4,765,000.00

Note: It is hoped that small power plants can be sold as permanent power generation facilities. It would be to the advantage of the U.S. vendors to use a sales strategy that praises the numerous advantages of small power plants both technically and financially. Such a strategy is now under development and will be presented at a course on Export Financing and Marketing scheduled for late February of 1989.

4. If follow-up CORECT programs were developed, what do you think they should cover?

REVERSE TRADE MISSION ON SMALL POWER PLANTS

Of the total number of those companies that responded, 47 percent requested that a reverse trade mission on small power plants be developed for 1989. It should include formal presentations and inspections in the field at actual power-plant sites on the following subjects:

- Turbine/generators - hydrocarbon and steam
- Condensers - contact and surface
- Cooling Towers - wet and air cooled
- Controls - motorized valves, pressure regulators, sensors, meters, etc.
- Pumps - downhole, transfer, injection, feed, etc.
- Computers and programs - hardware and software for power plant operations

- H₂S scrubbers - various types and best applications
- Switching equipment - transformers, switches, insulators etc.
- Powerlines - towers, lines, installations, etc.

REVERSE TRADE MISSION - DRILLING, COMPLETION AND PRODUCTION

A second group representing 23 percent of the companies involved, requested a reverse trade mission on the drilling, completion and production services and required equipment. This sector of geothermal development has great potential for export due to the relatively lower costs of various components and the strong need for top quality work. It is desired that this mission would be held in 1989 and would include the following topics:

- Rig selection
- Bits and tools
- Casing
- Cementing
- Completion technology
- Wellheads
- Valves
- Piping
- Pumps
- Separators
- Meters and controls

One company responded to this question by requesting that a reverse trade mission that would cover exploration, reservoir evaluation and development, planning and well testing.

A reverse trade mission on small power plants has already been funded and will be convened in June of 1989.

A reverse trade mission on drilling, completion and production will be convened in May of 1989.

5. Would you participate in another CORECT project?

The response to this question was a unanimous yes. All who were involved thought that the project was well planned, managed and very worthwhile.

6. General Comments

1. That any follow-up reverse trade missions should be focused on a particular subjects (for example, drilling or small power plants) to make them most effective.

FOREIGN BUSINESS OPPORTUNITIES

The data listed below were developed directly from the international attendees through a questionnaire that was

completed at the end of the program. Although this information is over 1 year old it still adequately depicts the situation in the countries listed. These questions and answers were published in February, 1988 in the "Summary of the Content and Reaction to the Conference to Promote International Sales of U.S. Geothermal Equipment," which was the first report from this project.

The question, What U.S. geothermal technologies could you use or are you interested in? brought the following answers in order of highest preference:

1. Binary cycle power plant technology was mentioned the most, but interest in other types of plants was high.
2. Cooling systems, both water and air cooling.
3. Drilling, both with air and mud.
4. Logging of wells, injection technology, and reservoir engineering.
5. Well completion, production technology, and hardware, including down-hole pumps.
6. Corrosion and scaling technology.
7. Computerized control systems.
8. Environmental control technology and regulatory structure.
9. Exploration

What U.S. geothermal technology could apply to specific areas of your country?

Djibouti, Assal - crystalizer/clairifier technology, exploration, and field-development expertise.

Jordan, Zerga Main and Zara Geothermal Projects - deep exploration drilling and well testing (pressure and temperature); Northern Basalt Plateau - air drilling, heat flow, and gradient expertise.

St. Lucia, Soufere - drilling expertise, directional survey tools, environmental monitoring, and H₂S abatement.

Chile, El Tatio - well-drilling and testing expertise, hardware, and reservoir engineering; Puchuldiza - prospecting with remote sensing and modular binary cycle power plants.

Guatemala, Zunil I - reservoir engineering, drilling, and reworking of wells, power plant design, and construction (15 MW of flash or possibly binary units); Zunil II - same as above; Amatitlan - exploration (geological, geophysical, and geochemical); Tecuamburro - exploration as above; Otros Area - exploration as above.

Bolivia, Laguna Colorado - drilling (air), wellhead

equipment, and single flash power plants.

Costa Rica, Miravalles I - air drilling, cooling towers (wet); Other areas - exploration, and future field equipment.

Argentina, Copahue (Neuquen) Arg. - drilling, reservoir engineering, production technology, hardware, and financing; Domuyo (Neuquen) - same as above; Tuzgle (Jujuy) - same as above.

Republic of China, Yang Ba Jain Area (Tibet) - corrosion and scaling technology, downhole pumps, and injection technology.

Mexico, Cerro Prieto - computer control technology, directional drilling technology and bottom hole directional technology; La Primavera, Los Azufres, and Los Humeras - computer-aided production-control systems, binary power plants, and downhole-production pumps.

Ecuador, Chatupces, Imbabura and other areas - preliminary exploration technology.

Hungary - the country is thinking about power generation; binary technology should fit best.

El Salvado, Ahuachapan - well testing and evaluation,

reservoir engineering, well perforation, and computer control technology; Chipilapa - small power plant design and construction, and injection technology.

Panama, El Valle de Anton - drilling of slim hole exploration wells and production wells, design of power-production system, and power-generation equipment; Chitra Calobre - well drilling, design of power-production systems, and power generation equipment.

Indonesia, Dieng - well-cementing technology, well testing, reservoir assessment, power plant design and construction, H₂S abatement, and mineral recovery; Ranado and Kamojang - power plants (large and small), and production gathering systems.

Venezuela, Pilar - Casanay - exploration expertise, equipment and financing.

Philippines, Makban, Tiwi and other areas with power plants environmental, chemical, and metallurgical technology; Direct-use areas - crop processing center (food dehydration plant).

Thailand, Fang - Small binary cycle technology.

GEOHERMAL RESOURCES COUNCIL

DAVID N. ANDERSON
Executive Director

CORECT PROGRAM TWELVE MONTH FOLLOW-UP REPORT QUESTIONNAIRE

OPTIONAL

Name of Company _____

Contact Person _____

Address _____

Phone _____

1. What was your reaction to the CORECT Program?

2. What are your actual sales to date as a direct result of the Program?

Hardware (brief discription)

Sales Value

_____	_____
_____	_____
_____	_____
_____	_____

Total

Services (brief discription)

_____	_____
_____	_____
_____	_____
_____	_____

Total
Grand Total

3. What are your projected sales from now to one year?

Hardware

Sales Value

Goods

4. If follow-on CORECT programs were developed, what do you think they should cover? (provide some detail)

5. Would you participate in another CORECT Project?

Yes _____ No _____

If not why?

6. General comments

Please return to:

Geothermal Resources Council
P.O. Box 1350
Davis, CA 95617

LIST OF VENDORS

The following list of vendors participated in the field tours and workshops during the program.

ANADRILL-SCHULUMBERGER
Roger Ross-Smith
4000 Easton Drive, No. 21
Bakersfield, CA 93309
805/325-0271

Downhole Logging Tools

BARBER NICHOLS ENGINEERING
John Ferrero
6325 West 55th Avenue
Arvado, CO 80002
303/421-8111

Binary Cycle Power Plants

BEN HOLT CO., THE
Clem Giles
201 South Lake Avenue
Pasadena, CA 91101
213/684-2541
Fax: 818/584-9210

Power Plant Design &
Construction

BRIDWELL CONTROLS
Barbara Bridwell
1733 Center Avenue
Martinez, CA 94553
415/228-5084

Computer Well Field Control
Programs

COMPLETION TECHNOLOGY CO.
Robert Johnson
7444 Getty Road
Houston, TX 77086
713/961-3336
Telex: 775 781

Downhole Completion Tools

COOPER INDUSTRIES, INC.
WKM Division
Ray Sied
P.O. Box 2117
Houston, TX 77001
713/499-8511
Fax: 713/499-5211

Well Heads and Production
Valves

DRAVO CONSTRUCTORS INC.
Jean Bodylski
226 Airport Parkway
Suite 200
San Jose, CA 95110
408/291-2757
Fax: 408/298-2107

Power Plant Design &
Construction

DRESSER
Boyd Green
P.O. Box 644
Healdsburg, CA 95448
707/433-9446

Drilling Mud

DRESSER-RAND
Robert M. Hicks
Electric Machinery
1661 No. Raymond Avenue
Anaheim, CA 92801
714/879-2490

Generators

DRILEX SYSTEMS
Jim Hanson
P.O. Box 1231
Healdsburg, CA 95448
707/433-6969
Fax: 713/880-0873

Drilling Tools

EASTMAN CHRISTENSEN CO.
Nic Nickels
320 Tesconi Circle, Unit P.
Santa Rosa, CA 95401
707/523-1751
Fax: 707/523-1398

Directional Drilling

ELLIOTT COMPANY
Albert Zoba
P.O. Box 384
City Of Industry, CA 91749-0384
818/810-2121
Fax: 818/964-0506

Turbine/Generators

ENERGYLOG CORPORATION
Randy Palmer
P.O. Box 162580
Sacramento, CA 95816
916/452-7541

Mud Logging Service

EXLOG SMITH
Alan Frazer
P.O. Box 1349
Healdsburg, CA 95448
707/431-1700

Mud Logging Services

FOSTER/WLG SYSTEMS DIVISION
Robert Hayes
3600-C Standish Avenue
Santa Rosa, CA 95407
707/585-1981
Telex: 384 556

Valves and Well Heads

FLOUR DANIEL
William Sullivan
3333 Michelson Drive
Irvine, CA 92730
714/975-4034
Fax: 714/975-6549

Power Plant Design &
Construction

GEOTHERMAL POWER CO., INC.
Gary Shulman
1460 W. Water Street
Elmira, NY 14905
607/733-1027

Flash Steam Power Plant

GEOTHERMEX, INC.
James Koenig
5221 Central Avenue
Suite 201
Richmond, CA 94804
415/527-9876
Fax: 415/527-8164

Exploration-Reservoir
Evaluation Engineering

GRACE DRILLING
William Summers
6804 Fishback
Bakersfield, CA 93308
805/589-6581
Fax: 805/589-5115

Drilling Services

HALLIBURTON SERVICES
Lanier Lohn
P.O. Box 10988
Bakersfield, CA 93389
805/327-0148
Telex: 472 0177

Well Cementing Services

H & H OIL TOOL, CO., INC.
Joe Turk
1000 Church Road
Rio Vista, CA 94571
707/374-6493

Blow-Out Prevention Equipment

HONEYWELL INC.
IASD Systems Division
Dennis Lajoie
16404 No. Black Canyon Hwy.
Phoenix, AZ 85023
602/997-3757
Fax: 602/863-5692
Telex: 667448 HPCD

Control Systems

JOHNSTON PUMP CO.
Jack Frost
16021 Acilolante Avenue
Azusa, CA 91702
818/969-5927
Telex: 67-0316

Downhole Line Shaft Production
Pumps

LOFFLAND BROTHERS COMPANY
James Cox
P.O. Box 2847
Tulsa, OK 74101-2847
918/622-9330
Fax: 918/664-0828

Drilling

MAFI-TRENCH CORPORATION
James Trotter
3037 Industrial Parkway
Santa Maria, CA 93455
805/928-5757
Fax: 805/925-3861

Turbine/Generators

MAGMA POWER COMPANY
Richard Dalton
11770 Bernardo Plaza Court
Suite 366
San Diego, CA 92128
619/487-9412

Crystalizer/Clarifier Systems
for High Dissolved Solids

M-I AIR DRILLING
Ken Deakins
14800 Grove Street
Healdsburg, CA 95448
707/579-5401

Air Drilling

MESQUITE GROUP INC.
Don Campbell
P.O. Box 1283
Fullerton, CA 92632
714/738-8224

Exploration-Reservoir
Evaluation

NASH ENGINEERING
Ronald Machens
2100 E. Howell Avenue
Unit 211
Anaheim, CA 92806
714/978-9622
Fax: 714/978-1525

NCG Air Removal Equipment

N.L. BAROID/POLY PLUG
Ken Baughman
Box 280
Sandia Park, NM 87047
505/281-5191

Lost Circulation Control

PIPE RESTORATION SYS. INC.
James Dodd
136 Forster Avenue
Mt. Vernon, NY 10552
914/664-6867

Brine Line Cleaning Systems

PRUETT LOGGING SERVICES
Eddy Pruett
8915 Rosedale Highway
Bakersfield, CA 93312
805/589-2768
Telex: 499 2440

Downhole Logging Equipment

J.R. SCHNEIDER CO., INC.
Gene Pecci
849 Jackson Street
Benicia, CA 94510
707/745-0404
Telex: 34 0545

Brine Filters

SECURITY ROCK BITS
Carl Naterstad
195 Dry Creek Road
Healdsburg, CA 95448
707/433-5568

Drilling Bits

UNOCAL Geothermal Division
Harry Bain
P.O. Box 6854
Santa Rosa, CA 95406
707/545-7600

Major Geothermal Operator

CORECT PROGRAM

LIST OF INTERNATIONAL ATTENDEES

ARGENTINA

Ing. Alfredo Esteves-Epen
LaRioja 385
(8300) Neuquen, Argentina
Telex: 84182 DPTNQ AR

BOLIVIA

Gonzalo R. Calderon
Empresa Nacional De Electricidad S.A.
P.O. Box 565
Cochabamba, Bolivia
Phone: (042) 46721
Telex: 6251 ENDE BV

CHILE

Ing. Sr. Claudio Cadiz
Corporacion De Fomento De La Produccion
Moneda 921
Santiago, Chile
Telex: 392 240421

CHINA

Wu Fangzhi, Gen. Eng.
Yang Ba Jain Geothermal Exploriting
Headquarters Tibet Autonomous Region
Room 5 No. 2 Building
Electric Power Scientific Res. Institute
Qinhe, Beijing CHINA
Telex: 444361 547

COSTA RICA

Manuel Corrales
Chief of Electric Planning
Instituto Costarricense de Electricidad
Apartado 10032-1000
San Jose, Costa Rica
Telex: CR2140 ICE

Alfredo Mainieri
Chief of Electric Planning
Instituto Costarricense de Electricidad
Apartado 10032-1000
San Jose, Costa Rica
Telex: CR2140 ICE

DJIBOUTI

M. Anis Abdallah Kamra
Directeur de l' Institut Supérieur B (ISS ERT)
E'Etudes Et De Recherches St Scientifiques
B.P. 486
Djibouti, Republic of Djibouti
Telex: 979 5850

ECUADOR

Ing. Nelson Moncayo
Projects Superintendent
INECEL
P.O. Box 565-A
Quito, Ecuador
Telex: 2243 INECEL ED

EL SALVADOR

Alejandro Quintanalla C.
Chief of Eng. G/T Exploration
Comission Ejecutiva Hidroelectrica del Rio Limpa
Apartado Portal #3
Ahuachatan, El Salvador
Telex: 20669 El Salvador

Gustavo Cuellar
Cel-Geothermal Advisor
Comission Ejecutiva Hidroelectricia del Rio Limpa
9a Calle Poniente #950
Entre 15a Y 17a Avenida Nort
San Salvador, El Salvador
Telex: 20303 El Salvador

GUATEMALA

Edgar Tobias G.
Sub-Director of Geothermal
Central Com. Zona 4
6a Avenida 2-73
Guatemala City, Guatemala
Telex: 5234 GU

Andres Caicedo
Executive Coordinator
National Inst. of Electricity
Geothermal Development Unit
6a Avenida 2-73 Zona 4
Edificio Cordon Horjales
Guatemala city, Guatemala
Telex: 5234 GU

HONDURAS

Marco Mass
Chief of Engineering
Empresa Nacional de Energia Electrica
Apartado 99
Tegucigalpa, Honduras
Telex: 1128 ENEE HT

HUNGARY

Peter Ottlik, Energy Advisor
Energy Management Institute
1012 Budapest
Ostrom Utca 23
Budapest, Hungary

INDONESIA

B. Soetantri
2-6, JL Perwira
P.O. Box 12
Jakarta, Indonesia
Telex: 7964062

JORDAN

M. Abu Ajamieh
Deputy Director General
National Resources Authority
Amman, Jordan
Telex: 21415 NRA JO

MEXICO

Ing. Alfredo Manon M.
Comision Federal De Electricidad
Av. Reforma No. 509, 8° Piso
CP-06500 Mexico City D.F. Mexico
Telex: 69623 PGTEME

Mr. Richardo Marquez
P.O. Box 248
Callexico, CA 92231
011-52-65
53-59-48

PANAMA

Vicente Rios
Chief of Studies Department
Instituto de Recursos Hidraulicos y Electrificación
Edificio Poli, Avenida Cuba
Ciudad de Panama, Panama
Telex: 2158 IRHE PA

PHILIPPINES

Jacinto Victa
National Electricifaction Adm. (NEA)
Cor Quezon Avenue and Agham Road
Dilman, Quezon City
Philippines

ST. LUCIA

Al Barthelmy
Chief Energy Officer
Central Planning Unit
P.O. Box 709
Government Building
Castries, St. Lucia, Caribbean
(809) 452-3688
Telex: 3416243 LC

THAILAND

Dr. Khien Vongsuriya
Director Thermal Power Engineering
Bangkok, Thailand
Telex: 82711 EGAT TH

VENEZUELA

Dr. Gustavo Sorondo
Director General, Sectorial De Energia
Ministerio De Energia Y Mines
Torre Oste, Parkque Centrale
Caracas, Venezuela
Telex: 39521692

LIST OF THOSE INVITEES WHO ACCEPTED BUT COULD NOT ATTEND

ETHIOPIA Accepted invitation but did not attend for unknown reasons.

Getahum Demisse
General Manager
Ethiopia Institute of Geological Survey
P.O. Box 2302, Box 486
Addis Ababa, Ethiopia
Telex: 21042 GEO ET

KENYA Accepted invitation but did not attend for unknown reasons.

S. Ki Gichurru
Managing Director Kenya Power Co.
Kenya Power Co., Ltd. Electricity House
Harambee Av.
P.O. Box 47936
Nairobi, Kenya
Telex: 22253 ELECTRIC KENYA

PORTUGAL Accepted invitation but declined in the last week due to pressing legislative commitments

Natalino Viveiros
President, Empresa De Electricidad
Rua Eng. Jose Cordeiro-6
9500 Ponta Del Gada
Azores, Portugal
Phone: 27254
Telex: 82232 EDACA-P

Joao Gago Tavares
Technical Economy Assistant
9500 Ponta Del Gada
Azores, Portugal
Telex: 82232 EDACA-P

WEST INDIES Accepted invitation but was unable to attend due to work demands.

Brinley Selliah
U.S. Agency Int'l Development
USAID - Regional Development Office
P.O. Box 302
Bridgetown, Barbados, West Indies
Telex: 3412259 USEMB BGI
809/436-4910

PROJECT ITINERARY

CONFERENCE TO PROMOTE INTERNATIONAL
SALES OF GEOTHERMAL EQUIPMENT
(CORECT Program 1987)

SEPTEMBER 29, 1987, Tuesday (Some attendees arrive early)

Call 219-7700 for airport pick-up from 7:00 a.m. to 11:00 p.m.

Check into:
Fabulous Inn
2485 Hotel Circle Place
San Diego, CA 92108
(619) 291-7700

12:00 noon to 7:00 p.m.

All attendees and participants should register for the CORECT Program after registering at the Fabulous Inn. The CORECT Program registration will be in the Cottonwood Hospitality Suite.

6:00-8:00 pm

Dinner served at Hungry Hunter Restaurant with a meal coupon.

7:00 p.m.

Cottonwood Hospitality Suite closes. All guests checking in after 7:00 p.m. should wait to register at 9:30 a.m. the next morning.

Complimentary coffee and tea in the Mocha Room. (Mocha Room open 24 hours a day)

SEPTEMBER 30, 1987, Wednesday

Call 219-7700 for airport pick-up from 7:00 a.m. to 11:00 p.m.

Check into:

Fabulous Inn
2485 Hotel Circle Place
San Diego, CA 92108
(619) 291-7700

12:00 noon to 7:00 p.m.

All attendees and participants register for the CORECT Program after registering at the Fabulous Inn. The CORECT Program registration will be in the Cottonwood Hospitality Suite.

7:00 p.m.

The Cottonwood Hospitality Suite closes. All guests checking in after 7:00 p.m. should wait to register at 9:30 a.m. the next morning.

Complimentary coffee and tea in the Mocha Room. (Mocha Room is open 24 hours a day).

OCTOBER 1, Thursday

Call 291-7700 for free airport pick-up 7:00 am. to 11:00 p.m.

7:00-9:30 a.m.

Free continental breakfast in Mocha Room

9:30 a.m.

Register at the main desk if arriving this day and also with the program staff in the Cottonwood Hospitality Suite.

4:30 p.m.

Cottonwood Hospitality Suite closes. All attendees checking in after 4:30 p.m. should check in at the front desk and proceed to the Cottonwood/Mission View Room for the reception, which starts at 5:30 p.m.

5:30 p.m.

A reception in the Cottonwood/Mission View Room.

7:30 pm.

A buffet dinner will be served followed by welcome and orientation speeches. Check with the program staff for details.

Complimentary coffee and tea in the Mocha Room.

OCTOBER 2, 1987, Friday

7:00 a.m.

Continental breakfast served in the Mocha Room.

7:15 a.m.

Attendees check-out at the front desk.

7:30 a.m.

Bus departs for the Imperial Valley. A briefing of the day's activities will be given on bus by David Anderson of the GRC.

10:30 a.m. Arrive at Magma Volcan Power Plant and tour plant and plant area. See appendix E for details.

1:00 p.m. Lunch break at the Stockman's Club in Brawley.

2:00 p.m. Travel to Magma's plant at East Mesa.

2:30 p.m. Tour Magma East Mesa Binary Power Plant and plant area. See appendix E for details of plant and surrounding area tour.

5:00 p.m. Depart for El Centro

6:00 p.m. Check into Vacation Travel Lodge
2000 Cottonwood Circle
El Centro, CA 92243
619-352-9523

6:30 p.m. Happy hour in the Imperial Room A & B.

7:30 p.m. Sit-down dinner in Imperial Room A & B.

8:30 p.m. After dinner two short presentations will be given on various aspects of U.S. geothermal technology - see Appendix E for details.

OCTOBER 3, 1987, Saturday

6:45 a.m. Continental breakfast in Imperial Room A & B.

7:15 a.m. Attendee check-out of the hotel at the front desk and load the bus.

7:30 a.m. Depart for Heber Geothermal Field, double flash and binary power plants.

8:00 a.m. Tour Heber Geothermal Field and both power plants. See appendix E for details. (Lunch will be served in the field).

12:30 p.m. Begin return trip to San Diego airport.

3:30 p.m. Arrive San Diego airport for trip to San Francisco via PSA. All attendees must carry their hand luggage to the area in the airport that will be designated for departure.

4:30 pm. Flight departs for San Francisco

6:00 p.m. Flight arrives in San Francisco.

6:45 p.m. Load bus in San Francisco. NOTE: All attendees must retrieve their baggage from the baggage claim area and place it on the bus. Depart for dinner in Marin County.

7:45 p.m. Dine at the Charthouse which looks towards Golden Gate Bridge and a sunset reflecting off of San Francisco's skyline. After dinner, travel to Santa Rosa for a 2-night stay.

9:30 p.m. Check into:

El Rancho Tropicana
Resort Hotel and Convention Center
2200 Santa Rosa Avenue
Santa Rosa, CA (707) 542-3655

Drink tokens will be given to each guest for the cocktail lounge upon registration. The lounge is open until 1:30 a.m. and will have a band. Restaurant open 24 hours.

OCTOBER 4, 1987, Sunday

7:30 a.m. Continental breakfast in Zinfandel Room

7:45 a.m. A briefing of day's tour will be given by David Anderson in the Zinfandel Room.

8:15 a.m. Depart for Healdsburg Technology Yard

8:45 a.m. Arrive and tour Technology Yard--see appendix E for details

11:30 noon Lunch at Technology Yard

12:30 p.m. Depart for The Geysers Geothermal Field

2:30 p.m. Arrive and tour Geysers Geothermal Field -- see Appendix F for details

3:45 p.m. Enter Socrates Mine Road Gate

5:30 p.m. Depart Big Geysers Gate

6:30 p.m. Arrive at Cheateau Souverain for wine tasting and dinner in Geyserville, CA.

8:00 p.m. Dinner at Cheateau Souverain Winery followed by several short speeches. (see Appendix E for details).

10:30 p.m. Approximate time for return to hotel

OCTOBER 5, 1987, Monday

6:30 a.m. Continental breakfast in Zinfandel Room

7:00 a.m. Attendees check out of the hotel and load bus.

7:30 a.m. Bus departs for Nevada

9:30 a.m. A brief stop is planned to see the GRC office in Davis and to pick up attendee travel cases.

11:30 p.m. Lunch at Olympic Village Inn in Squaw Valley

1:00 p.m. Depart for Wendell Hot Springs

3:00 p.m. Arrive in Wendell Hot Springs for power plant tour. See Appendix E for details.

4:30 p.m. Depart for Nugget Hotel in Sparks for 3-night stay.

John Ascuga's Nugget
1100 Nugget Avenue
Sparks, Nevada 89431
702/356-3300

6:00 p.m. Arrive Nugget Hotel. A dinner coupon will be issued each attendee, which may be used in the hotel's "The Rotisserie" buffet.

OCTOBER 6, 1987, Monday

7:00 a.m. Wake up with continental breakfast - room service delivered to your door

8:00 a.m. Bus departure for Steamboat Hot Springs

8:30 a.m. Tour Geothermal Power Corporation's facility at Steamboat Springs. See appendix E for details

9:30 a.m. Depart for City of Mammoth and Long Valley Caldera

12:00 noon Lunch at Sierra Nevada Inn - Rafters in City of Mammoth

1:30 p.m. Depart for Mammoth Pacific Power Project

1:45 p.m. Arrive at Mammoth Pacific Power Project - see appendix E for details.

3:30 p.m. Depart for Nugget Hotel

6:30 p.m. Arrive at Nugget Hotel in Sparks, NV

7:00 p.m. Reception in Mt. Rose A and B at Nugget Hotel

8:00 p.m. A buffet dinner will be served in the Mt. Rose Room A and B.

OCTOBER 7, 1987, Wednesday

8:00 a.m. Mini Exhibit starts. Continental buffet to be served in Mt. Rose Room A & B with mini exhibit

12:00 noon Mini Exhibit ends -- LUNCH-- All attendees will be given a coupon to use in the hotel restaurants

1:30 p.m. Workshops begin-Alpine Room

1:30 p.m. Exploration Workshop

2:30 p.m. Drilling Workshop

3:30 p.m. BREAK

3:45 p.m. Reservoir Engineering and Well Testing Workshop

4:45 p.m. Production Workshop

7:00 p.m. All attendees will be given coupons to use in the hotel restaurants.

OCTOBER 8, 1987, Thursday

8:30 a.m. Continental breakfast to be served in Mt. Rose Room A & B. Workshops reconvene.

8:30 a.m. Environmental Workshop

9:30 a.m. BREAK

9:45 a.m. Power Plant (small and large) Workshop

11:00 a.m. Financial/Export Management Workshop

12:30 p.m. LUNCH BREAK. All attendees will be given a coupon to be used in the hotel restaurants.

1:30 p.m. Continue with Financial/Export Management Workshop

3:30 p.m. Estimated end of the CORECT Program

APPENDIX TO THE ITINERARY

OCTOBER 2, 1987, Friday

Tour of Magma Volcan Power Plant and Well Field - Specific items to be viewed:

10:30 a.m. Arrive at power plant site

- Crystalizer/Clarifier High Dissolved Solids Brine Handling System
Tom Hinrich, Magma Power Co.
11770 Bernardo
Plaza Court, Ste. 366
San Diego, CA 92128
619/487-9412
- Brine Filters
Gene Pecci, J.R. Schneider Co, Inc.
849 Jackson St.
Benicia, CA 94510
707/745-0404
Telex: 34-0545
- Downhold Logging Equipment
Eddy Pruitt, Pruitt Logging Services
8915 Rosedale Highway
Bakersfield, CA 93312
805/589-2768
Telex: 4992440
- Well Head Equipment-Values, Expansion Spools, Inc.
Robert Hayes, Foster WLG Systems Div.
3600 C Standish Avenue
Santa Rosa, CA
707/585-1981
Telex: 384556
- Brine Line Cleaning
James Dodd, Pipe Restoration Systems, Inc.
136 Forster Avenue
Mt. Vernon, NY 10552
914/664-6867

12:15 p.m. Depart for Lunch

OCTOBER 2, 1987, Friday

Tour of Magma East Mesa Binary Power Plant

2:30 p.m. Arrive East Mesa Power Plant Site

- Overview of Binary Power Plant
Tom Hinrich, Magma Power Co.
11770 Bernardo Plaza
Court, Ste. 366
San Diego, CA 92128
619/487-9412
- Turbine/Generator
James Trotter, Mafi-Trench Corporation
3037 Industrial Parkway
Santa Maria, CA 93455
805/925-5757
Fax: 805/925-3861
- Downhole Line Shaft Production Pumps
Jack Frost, Johnston Pump Co.
16021 Aclolante Avenue
Azusa, CA 91702
818/969-5927
Telex: 67-0316
- Drilling Rig
James Cox, Loffland Brothers Company
P. O. Box 2847
Tulsa, OK 74101-2847
918/622-9330
Fax: 918/664-0828
- Well Testing System
Don A. Campbell, Mesquite Group, Inc.
P. O. Box 1283
Fullerton, CA 92632
714/738-8224

OCTOBER 2, 1987, Friday

Short presentations to be made to the group of attendees after dinner.

8:30 p.m.

- Reservoir Engineering-(Imperial Valley)
James Koenig, GeothermEx Inc.
5221 Central Avenue, Ste. 201
Richmond, CA 94804
415/527-9876
Fax: 415/527-8164

9:15 p.m. Adjournment

OCTOBER 3, 1987, Saturday

Tour Heber Geothermal Field, double flash and binary power plants

7:30 a.m. Arrive and tour Heber Geothermal Company, Double Flash Power Plant

- Power Plant Design and Construction

Jean Bodylski,

Dravo Constructors, Inc.
226 Airport Parkway, Ste. 200
San Jose, CA 95110
408/291-2757
Fax: 408/298-2107

- Well Heads and Production Values (Tentative)

Ray Sied,

Cooper Industries, Inc.
WKM Division
P. O. Box 2117
Houston, TX 77001
713/499-8511
Fax: 713/499-5211

- NCG Air Removal Equipment

Ronald Machens,

Nash Engineering
2100 E. Howell Avenue
Unit 211
Anaheim, Ca 92806
714/978-9622
Fax 714/978-1525

- Control Systems,

Caltrol (tentative)
9645 Telstar Avenue
El Monte, Ca 91731
818/443-9403
Fax 818/401-0087

10:00 a.m. Double Flash Power Plant tour ends, bus leaves for Binary Power Plant.

10:30 a.m. Arrive and tour Heber Binary Cycle Demonstration Power Plant.

- Overview of Heber Binary Project

Robert Lacy,

San Diego Gas & Electric
P. O. Box 1831
San Diego, CA 92112
619/696-1920

- Power Plant Design and Construction
William Sullivan, Fluor Daniel
3333 Michelson Drive
Irvine, CA 92730
714/975-4034
Fax: 714/975-6549

- Turbine/Generator
Albert Zoba, Elliott Company
P. O. Box 384
City of Industry, CA
91749-0384
818/810-2121
Fax: 818/964-0506

- Control Systems
Dennis Lajoie, Honeywell Inc. (Tentative)
IASD Systems Division
16404 No. Black Canyon Hwy.
Phoenix, AZ 85023
602/997-3757
Telex: 667448 HPCD
Fax: 602/863-5692

12:30 p.m. Tour ends and bus departs for San Diego Airport.

OCTOBER 4, 1987, Sunday

Tour Healdsburg Technology Yard

9:00 a.m. Arrive Healdsburg Technology Yard and tour the following exhibits:

- Mud Logging Services
Dwight Walters, Exlog Smith
P. O. Box 1349
Healdsburg, CA 95448
707/431-1700

- Drilling Tools
James Hanson, A-Z/Grant/Drillex
P. O. Box 1231
Healdsburg, CA 95448
707/433-6969
Fax: 713/880-0873

- Downhold Logging Tools
Roger Ross-Smith, Anadrill-Schlumberger
4000 Easton Dr. No. 21
Bakersfield, CA 93309
805/325-0271

- Well Cementing Services
Lanier Lohn, Halliburton Services
P. O. Box 10988
Bakersfield, CA 93389
805/327-0148
Telex: 4720177

- Mud Logging Services
Randy Palmer, Energylog Corporation
P. O. Box 162580
Sacramento, CA 95816
916/452-7541

- Air Drilling Services
 , Dresser-Rand
20602 East 81st St.
Broken Arrow, OK 74014
918/451-1550
Telex: 4637045

- Values and Well Heads
Robert Hayes, Foster/WLG Systems Division
3600-C Standish Avenue
Santa Rosa, Ca 95407
707/585-1981 telex 384556

- Lost Circulation Control
Ken Baughman, N.L. Baroid/Poly Plug
Box 280
Sandia Park, NM 87047
505/281-5191

- Directional Drilling
Nic Nickels, Eastman Christensen Co.
320 Tesconi Circle Unit P.
Santa Rosa, CA 95401
Ph. 707/523-1751
Fax: 707/523-1398

- Drilling Mud
Boyd Green, Dresser
P. O. Box 644
Healdsburg, CA 95448
Ph. 707/433-9446

- Driling Bits
Carl Naterstad, Security Rock Bits
195 Dry Creek Rd.
Healdsburg, Ca 95448
707/433-5568

- Air Drilling
Ken Deakins, M-I Air Drilling Co.
14800 Grove St.
Healdsburg, CA 95448
707/579-5401

- Blow-Out Prevention Equipment
Joe Turk, H & H Oil Tool, Co. Inc.
1000 Church Road
Rio Vista, CA 94571
707/374-6493
- Robert Johnson, Completion Technology Co.
7444 Getty Rd.
Houston, Tx 77086
713/591-1900
Telex 775-781

Joe Turk.

H & H Oil Tool, Co. Inc.
1000 Church Road
Rio Vista, CA 94571
707/374-6493

Robert Johnson,

Completion Technology Co.
7444 Getty Rd.
Houston, Tx 77086
713/591-1900
Telex 775-781

OCTOER 4, 1987, Sunday

Tour The Geysers Geotheraml Field: a power plant and a drilling rig
drilling with air

2:30 p.m. Arrive at south area of geothermal field and tour a power plant and other facilities

- Power Plant No. 13

A tour of Plant 13
may be provided

- Computer Well Field Control Programs

Barbara Bridwell,

Bridwell Controls
1733 Center Avenue
Martinez, CA 94553
Ph. 415/228-5084

3:45 p.m. Enter SOCRATES MINE RD. GATE

- Mud Logging Services
Randy Palmer,

Energylog Corporation
P. O. Box 162580
Sacramento, CA 95816
Ph. 916/452-7541

- Presentation by UNOCAL
Harry Bain,

UNOCAL Geothermal Div.
P. O. Box 6854
Santa Rosa, CA 95406
707/545-7600

- Drilling Services

Grace Drilling
6804 Fishback
Bakersfield, Ca 93308
805/589-5115
Fax: 805/589-5115

5:30 p.m. Depart Big Geysers Gate

OCTOBER 5, 1987, Monday

Tour Wendell Hot Springs Power Station

3:00 p.m. Arrive Wendell Hot Springs and tour Barber-Nichols 300 KW binary cycle power plants

John Ferrero,

Barber Nichols Engineering
6325 West 55th Avenue
Arvada, CO 80002
303/421-8111

4:30 p.m. Depart for Nugget Hotel in Sparks, NV.

OCTOBER 6, 1987, Tuesday

Tour Steamboat Hot Springs Power Station

8:30 a.m. Arrive Steamboat Hot Springs and tour Geothermal Power Companies 1 MW flash steam, modular power plant.

Gary Shulman,

Geothermal Power Co., Inc.
1460 W. Water St.
Elmira, NY 14905
607/733-1027

9:30 a.m. Depart for City of Mammoth and Long Valley Caldera

OCTOBER 7, 1987, Wednesday

Tour Mammoth Pacific Power Station at Casa Diablo Hot Springs, CA

1:45 p.m. Arrive at Casa Diablo Hot Springs and tour Mammoth Pacific Power Station's two 3.5 MW, air cooled, semi modular, binary power plants.

- Power Plant Design and Construction

Clem Giles,

The Ben Holt Company
201 South Lake Avenue
Pasadena, Ca 91101
213/684-2541
Fax: 818/584-9210

- Turbine/Gear Box
Homer Fager,

Rotoflow Corporation
540 E Rosecrans Avenue
Gardena, Ca 90248
213/329-8447
Fax: 213/329-8502

- Reservoir Evaluation
Don A. Campbell, Mesquite Group, Inc.
P. O. Box 1283
Fullerton, CA 92632
714/738-8224

- Generators
Robert M. Hicks, Dresser-Rand
Electric Machinery
1661 No. Raymond Avenue
Anaheim, Ca 92801
714/879-2490

GEOTHERMAL RESOURCES COUNCIL

DAVID N. ANDERSON
Executive Director

CORECT PROGRAM
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Telephone: 916/758-2360
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SAMUEL ADELO
Adelocorp, Ltd.
Interpreter
Telephone: 505/983-9285