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FEDERAL ASSISTANCE PROGRAM

Quarterly
MONTHLY PROJECT PROGRESS REPORT

Received by DSI

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GEOTHERMAL DIRECT-HEAT UTILIZATION ASSISTANCE

GRANT NO. DE-FG07-90ID 13040

Reporting Period: JUNE & JULY 1992

Paul Lienau, Project Director

Geo-Heat Center
Oregon Institute of Technology
Klamath Falls, OR 97601

U.S. DEPARTMENT OF ENERGY

EB
MASTER

1.0 Project Summary - June & July 1992

- 1.1 Technical Assistance. GHC staff provided assistance to 57 requests from 12 states and one each from Mexico, Switzerland, Canada and New Zealand. The type of requests included: space and district heating (10), geothermal heat pumps (14), greenhouses (3), aquaculture (3), industrial (2), pool (1), equipment (6), electric power (2), resources (7) and general (10).
- 1.2 R & D Activities. Progress reports are included for (1) Greenhouse Equipment Selection Spreadsheet, (2) Braze Plate Heat Exchangers, and (3) Data Acquisition for Low-Temperature Well Tests and Long-Term Monitoring.
- 1.3 Technology Transfer. Quarterly Bulletin, Vol. 14, No. 2 will be published in August, an article on ground-coupled heat pumps was published in a Trade Journal, 3 presentations and 2 tours were conducted, 15 volumes were added to the library and information was disseminated to 19 requests.
- 1.4 Progress Monitor. Reports on progress monitor activities include: (1) A New Jersey College Taps Into Geothermal Forefront, (2) Catfish Farmers Plan to Build Raceways in Preston, Idaho, (3) Hot Springs May Turn Into Gator Farms and (4) Geothermal Saves Millions.
- 1.5 GHC staff that worked on the project in June and July included: P. Lienau 56%, G. Culver 59%, K. Rafferty 100%, J. Lund 18%, and Donna Gibson 92%.

2.0 Technical Assistance

The Geo-Heat Center staff provided technical assistance to the following during June and July 1992:

	<u>Name</u>	<u>Nature</u>
2.1	Barbara Reiter Boulder Hot Springs, MT	Pool. Provided information on hot springs and pools. Calculated the capacity of a geothermal heated pool and required flow for a 4-hour turnover. The hot springs has sufficient capacity to heat the pool. Requested a schematic of the system to do more work (6/1/92).

- 2.2 Jim Wills
290 County Road
Cal Pine, CA 96124
Aquaculture. Interested in utilizing the Sierraville well that CEC drilled for a mosquito fish project. Discussed greenhouse heating, wells, disposal problems, marketing and rights to wells. Mr. Wills will look into problems and get back to the Geo-Heat Center later (6/1/92).
- 2.3 Rick Bergstrom
1222 Eldorado
K. Falls, OR 97601
Space Heating. Described how the geothermal heating system in a home works with a downhole heat exchanger and how to stop the circulation of water between the well and fan coil. Also, described how the shut off could be made more convenient with solenoid valves and a switch (6/3/92).
- 2.4 James B. Koenig
GeothermEx, Inc.
5221 Central Avenue
Richmond, CA 94804
General. Suggested criteria for an award to be called "Direct Use Geothermal Energy Award" that could be presented at the GRC Annual Meeting (6-4-92).
- 2.5 Doug Kilpatrick, P.E.
WSEO
P.O. Box 43171
Olympia, WA 98504
GHP. Provided a demand and energy study that indicates a 3-7 kW demand reduction for a typical well insulated home using ground-coupled heat pumps in Oregon (6/4/92).
- 2.6 Ned Nisson
Energy Design Update
235 West 102 Street
New York, NY 10025
General. Requested information on the Geo-Heat Center Guidebook and the work the Center does to be included in a newsletter (6/4/92).
- 2 7 Linda Amcele
9500 S.W. Whitford Ln.
Beaverton, OR 97006
District Heating. Requested information on K. Falls geothermal district heating system and residential systems for a report. Information was sent as requested (6/4/92).
- 2.8 Bill Gordon
Milgro Nursery, Inc.
1085 N. Victoria Ave.
Oxnard, CA 93031
Greenhouses. Building 200,000 ft² of greenhouses initially and then expanding to 10⁶ ft² at Newcastle, UT. Milgro has secured 290 acres with water rights. Geothermal wells near the property have reported temperatures of 130°C. Provided information on downhole heat exchangers and

- spreadsheet that aids in the design of geothermal greenhouses. Described and offered GHC's technical assistance program (6/4/92).
- 2.9 Thomas Kleppinger
130 Woodside Drive
San Anselmo, CA 94960
Greenhouses. Designing a greenhouse system in the Calistoga area. Discussed GHS spreadsheet used to optimize geothermal heating system design and sent Guidebook (6/5/92).
- 2.10 Eyob Easwaran
BNF Technologies,
Inc.
4300 King Street
Alexandria, VA 22302
General. Discussed the development status of direct use--types of applications, amount of energy, etc. Provided several reports and papers documenting direct use (6/5/92).
- 2.11 Robert Kingzett
Jeld-Wen
P.O. Box 1329
K. Falls, OR 97601
District Heating. Discussed the connection and operation of the Ross Ragland Theater to the city geothermal district heating system. Requested assistance in the implementation of this project through the GHC technical assistance program (6/9/92).
- 2.12 Senator Jeff Bingman
United States Senate
521 Hart Office Bldg.
Washington, D.C.
Space Heating. A constituent is involved with geothermal heating for a new junior high school at Hatch, NM. Requested technical design information for converting to geothermal. Sent Guidebook and offered the GHC technical assistance program (6/9/92).
- 2.13 Jim Cappa
Colorado Geological
Survey
1313 Sherman Street
Denver, CO 80203
GHP. Discussed ground-coupled heat pumps and sent information materials from the GCHP Seminar. Also, discussed data compilation program for State Resource Teams. Colorado is considering matching funds for geothermal heat pump work (6/9/92).
- 2.14 Becky Hatfield
Lake Co. Economic
Development
513 Center Street
Lakeview, OR 97630
Space Heating. Discussed possible developments utilizing Hunter's Hot Springs including space heating for commercial buildings and aquaculture. Technical information on both applications was sent (6/9/92).

- 2.15 Ken Woodfork
K. Falls, OR
Aquaculture. Developing an aquaculture and greenhouse facility at a site with an existing 90°C geothermal well. The site is 17 miles south of Klamath Falls and will be designed to accommodate handicapped workers. The project will consist of 6 raceways (35,320 ft²), 15 circular tanks (10,600 ft²) growing freshwater prawns and tilapia and 11,650 ft² of greenhouses. The GHC is assisting with heat loss calculations and determination of flow requirements (6/11/92).
- 2.16 Rich Bergstrom
1222 Eldorado
K. Falls, OR 97601
Equipment. Wanted to know how to stop heat in the summer from geothermal DHE heating system. Sent sketch of changes to be made in system (6/13/92).
- 2.17 Gene Ciancanelli
Cascadia Exploration
Co.
Escondido, CA 92025
District Heating. Discussed temperature gradients at the Mammoth drilling site as reported in Vol. 2. A slow temperature increase may indicate a low flow through the aquifer or the area around the hole was plugged due to drilling operations (6/15/92).
- 2.18 Frank Burk
Modoc Joint Unified
School District
906 West 4th Street
Alturas, CA 96101
Equipment. Discussed the failure of a vertical lineshaft turbine pump used in a geothermal well for the school district space heating system. The pump was inspected by GHC staff with special attention given to sand pumping, cavitation, lateral and alignment of shaft. Wear patterns were discussed and no theory could explain why the wear pattern should have occurred. Technical information on OIT successful pumping systems was provided, especially bearing materials (6/15/92).
- 2.19 Anton Martin
P.O. Box 436
Geyserville, CA
Aquaculture. Developing an aquaculture project in Calistoga. Discussed sites, disposal, type of aquatic species, markets, etc. They are also considering a small binary generation, so discussed required flow

of geothermal fluid and cooling. Provided information on binary, macro. rosenbergi, yappie and red claw lobsters (6/15/92).

2.20 John Pierce
1445 Pacific Terrace
K. Falls, OR 97601

Equipment. Residential geothermal well has space heating only, wants to know how to install domestic hot water. Described domestic hot water systems, downhole heat exchangers, valves regulators, etc. Also provided information on well from GHC file and referred to pump company for estimates (6-16-92).

2.21 Chuck Sterling
Chief Engineer
Cal State Polytechnic
University
Pomona, CA

District Heating. A site visit was made to the Pomona campus for the purpose of obtaining information about the heating system, operation, locate a nearby oil/water separation facility and discuss the potential of geothermal heating with physical plant personnel. The campus has 13 buildings heated by hot water boilers that fall under air quality control regulations. The nearest separation facility is 7 miles distance from the point of use. Water production was only 3,000 to 5,000 barrels per day at a production temperature of 100 to 125°F. The campus appears to be too far from the resource to economically transport and there does not appear to be convenient hot water resource available by drilling wells (6/17/92).

2.22 Dixie Haugen
2101 Willington Blvd.
Alexandria, VA 22308

GHP. Interested in installing a geothermal heat pump in an older home using a hot water boiler and cast iron radiators. Discussed water-to-water heat pumps using a ground-coupled coil. A number of technical papers on the technology were provided (6/23/92).

2.23 Don Michels
P.O. Box 8652
Missoula, MT 59807

Industrial. Discussed technology of using geothermal energy for milk pasteurization and also the 1892 start date for the Boise Warm Springs District Heating System. Papers on these two topics were sent (6/23/92).

- 2.24 M. P. Sharma
University of
Wyoming
Petroleum Engr.
Department
Laramie, WY 82071
Resources. Discussed Wyoming geo-
thermal resources and direct uses,
including thermal enhanced oil re-
covery (TEOR). Sent Wyoming site
database and other information
(6/23/92).
- 2.25 Marco Vilchis
Univ. of Baja
P.O. Box 16-287
111 First Street
Calexico, CA 92231
General. Tentative cooperative tech-
nical assistance possibilities, with
approval of DOE, could include: (1)
district cooling, (2) ground-coupled
heat pump demonstrations project (3)
investigation into the use of by-
products from Cerro Prieto power
plant for insulating properties,
supplemental material for road con-
struction and building blocks, and
(4) short-term lectures (6/23/92).
- 2.26 David Hansen
No. D-103
2501 Lake Austin
Boulevard
Austin, TX 78703
General. Discussed services of the
GHC, sent publications request form,
Bulletins and information about the
Center (6/24/92).
- 2.27 Frank Groen
133 Brae Burn Drive
Eugene, OR 97405
GHP. Discussed technology of both
ground-coupled and water-source heat
pumps. Referred to WaterFurnace and
Sub-Terra companies and sent tech-
nical information on installations
and comparisons (6/25/92).
- 2.28 Tim Franklin
Ogden Geothermal
Operations
New York, NY
Electric Power. Investigating poten-
tial of geothermal power generation
near Vale, Oregon. Requested names
of geologists familiar with the
area. Provided names and phone
numbers of four geologists
(6/25/92).
- 2.29 Roger Peake
CEC
1516 9th Street
Sacramento, CA 95814
Equipment. Discussed methods to
eliminate the corrosion of copper
components in the Cedarville High
School and Elementary School geo-
thermal heating systems. Isolation
heat exchangers should be installed
to eliminate the corrosion problem.
There is no way to accurately evalu-
ate the damage done to date, short
of disassembling the system and
doing failure analysis work, which

would be more expensive than the heat exchangers. A brief report was prepared on the recommendation (6/25/92).

- 2.30 Dr. C. Rybach
Inst. for Geophysics
ETH - Honggerberg
CH - 8093 Zurich
Switzerland
GHP. A former student of Dr. Rybach is seeking employment related to experience with ground-coupled heat pumps. Copies of her vitae and abstract of her thesis were sent to 5 institutions all actively working in ground-coupled heat applications and/or research (6/26/92).
- 2.31 Erick Sikkema
National Conference
of State
Legislatures
1560 Broadway
Denver, CO 80202
General. Discussed direct-heat resources and applications. Sent a number of technical papers on direct use, Bulletins and publications request forms (6/29/92).
- 2.32 Andrea Beck
Hawaii Energy
Extension Service
Hawaii Business Center
99 Aupuni Street
Hilo, HI 96720
General. Requested 24 brochures on GHC services and publications request forms (6/29/92).
- 2.33 John Deuble
Planning Associates
Escondido, CA
Electric Power. Discussed results of non-condensable gas analysis of temperature gradient wells at Newberry. Also, informed him that we did not know of any flow tests conducted (6/30/92).
- 2.34 Eyob Easwaran
BNF Technologies,
Inc.
4401 Ford Avenue
Alexandria, VA 22302
General. Developing digest on geothermal energy. Requested slides on equipment, greenhouses, aquaculture, TEOR and chart on annual direct use energy (6/20/92).
- 2.35 Ron White
Architect
1701 N.E. 6th Street
Grants Pass, OR 97526
GHP. Installing a geothermal heat pump for a 17,000 ft² juvenile detention center. Discussed open and closed loop technology and sent comparisons on operating large tonnage systems (7/2/92).

- 2.36 Gerrit DeGroot
 K. Falls, OR

Well. Measured water level for injection well in excavation, and temperature at 135°F. Suggested a check be made for leaks in piping. Shut-off DeGroot and Henri's wells and monitored water level. Problem is water surfacing at injection well (7/6/92).
- 2.37 Cornelius Brinkman
 LSW Engineers
 5560 Ruffin Road
 San Diego, CA 92123

District Heating. Discussed geothermal district heating possibilities. A report on U.S. geothermal district heating and Guidebook were sent (7/7/92).
- 2.38 Harvey Houston
 K. Falls, OR

Well. Discussed what Mr. Houston could do about injection for disposal of geothermal fluids. Suggested injecting into Lucas & Howard Furniture's well or collection line near the A & W. Also measured the water level in his well (7/7/92).
- 2.39 Wayne Apostolik
 Northwest Home
 Crafters
 11410 N.E. 124th
 Kirkland, WA 98034

GHP. Discussed ground-coupled heat pump technology. Pointed out that one of the problems of increased development of this technology is lack of awareness on the part of the public. Progressive and informed contractors like Northwest Home Crafters can do much to help solve this problem. Sent a package of information prepared for the May Seminar (7/7/92).
- 2.40 Ellen Morris
 House Science, Space
 and Technology
 Committee
 388 House Annex 2
 Washington, D.C.
 20515

General. Discussed the potential for direct use and provided several names of persons knowledgeable about resources. Also discussed geothermal heat pumps and mentioned several utilities that are using this technology to cut their peak loads. R&D needs were discussed including improved drilling methods to reduce installation costs and improved heat transfer materials (7/8/92).

- 2.41 Sheryl Roop
Wocus, OR
Well. A well with a total depth of 780 ft and cased to 500 ft started pumping sand after the California earthquake June 20, 1992. Suggested that the water level change in the well possibly caused a cave-in resulting in sand being pumped. Discussed other wells changing after the earthquake (7/8/92).
- 2.42 Stephanie Colvin
UURI
Salt Lake City, UT
GHP. Developing fact sheets on geothermal heat pump installations. Sent technical details, databases and contacts for Galt House East project in Louisville, Kentucky; Shield Tavern in Colonial Williamsburg; Albertson home in Perry, OK; Montana House in Kalispell and Job Service Office in Hammond, LA (7/8/92).
- 2.43 Brad Deserramo
Energy & Mines Dept.
Province of Manitoba
Canada
GHP. The Energy & Mines Dept. is considering rules for heat pump wells and wanted to know what the states are doing. Discussed regulations for heat pump wells in Oregon, California, Idaho and Colorado. Oregon and Colorado are in the process of changing regulations--gave contacts for these two states (7/16/92).
- 2.44 Christine Smith
Daily Journal of
Commerce
P.O. Box 10127
Portland, OR 97210
GHP. Requested a guest editorial for the Journal. A short article on ground-coupled heat pumps was written because the technology has great potential for applications in the northwest region (7/21/92).
- 2.45 Lisa Jack
Biotherm
P.O. Box 750967
Petaluma, CA 94975
Greenhouses. Discussed the development and use of geothermal resources for greenhouses. Provided a number of technical papers, including software to aid in the design and selection of geothermal heating systems for greenhouses (7/21/92).
- 2.46 Ron Jackson
Trendwest Inc.
303 Main Street
K. Falls, OR 97601
District Heating. In a letter report provided a very preliminary estimate of costs to connect a remodeled creamery to the city of K. Falls geothermal district heating system (7/22/92).

- 2.47 R. F. Metcalfe
Academic Registrar
Univ. of Auckland
Auckland, New Zealand
Wells. Requested that the GHC serve as an external examiner of a Ph.D. thesis titled "Downhole Heat Exchanger Performance Analysis." A portion of the work was performed on DHE wells in K. Falls, Oregon. Center staff are currently reviewing the thesis (7/22/92).
- 2.48 Bill Ganong
Painter Street
K. Falls, OR
Well. A downhole heat exchanger was being pulled, requested an inspection of the system. The pipes were corroded and need to be replaced. The well was drilled about 1945 when the house was built (7/22/92).
- 2.49 Nancy Philipp
Benton PUD
P.O. Box 6270
Kenewick, WA 99336
GHP. Discussed antifreeze solution for ground-coupled heat pumps. Provided information on potassium acetate (GS-4) and other publications on geothermal heat pumps (7/22/92).
- 2.50 Klamath Economic
Dev. Council
K. Falls, OR
Resource. Discussed potential and development of geothermal resources in urban area--probably related to new businesses. Supplied reports and maps of K. Falls geothermal possibilities (7/24/92).
- 2.51 Barbara Trent
Program Coordinator
ASHRAE
1791 Tullie Circle NE
Atlanta, GA 30729
GHP. The Technical Committee (TC 6.8) endorsed a seminar at the Chicago meeting titled "Design Practices and Operating Experiences with Ground-Coupled Heat Pump Systems" (7/24/92).
- 2.52 Ross Colahan
Paisley, OR
Equipment. Inspected the vertical lineshaft turbine pump which failed while operating in 240°F geothermal fluids. Symptoms included reduced flow and noisy. The 2nd impeller collet had slipped resulting in a badly worn impeller. Other impellers showed either lack of lateral or poor lateral adjustment (7/24/92).
- 2.53 Frank Mages
3225 Longmeade
Farmers Branch, TX
75231
GHP. Discussed ground-coupled heat pump technology and sent handouts from the GCHP Seminar. Referred to heat pump book by Steve Kavanaugh (7/27/92).

- 2.54 Bruce Laird
Oregon Econ. Dev.
Department
Salem, OR Industrial. Personal visit with two clients looking for a geothermal site for a food processing plant. Discussed Klamath Basin resources and applications (7/28/92).

- 2.55 Kelsan Fosgren
UURI
Salt Lake City, UT GHP. Discussed geothermal heat pump database developed on Paradox software. Sent disk of database and discussed ways that the format and analysis could be improved (7/28/92).

- 2.56 Dave Anderson
GRC
Davis, CA General. Requested GHC develop milestones using historic photographs of direct use development for a poster at the Annual GRC Meeting (7/28/92).

- 2.57 Aqua-Glass
K. Falls, OR Space Heating. Aqua-Glass is a new manufacturing plant locating in K. Falls. GHC staff met with Owens Engineers to discuss geothermal energy potential. Agreed to conduct temperature profiles of wells in the area of the plant (7/29/92).

- 2.58 Vern Cook
Fairmont Hot Springs
Resort
1500 Fairmont Road
Anaconda, Mt 59711 Equipment. Problems have developed with a fiberglass pipe carrying 158 to 172°F at 100 psi geothermal fluids. A submersible pump in the well runs continuously producing 180 gpm delivering geothermal fluid to the 0.25 mile pipeline. Delamination of the fiberglass appears to occur between 20 to 500 ft from the well. Reasons for the failure, according to the Senior Engineer of the manufacturer, is probably due to high pH (8.4) (7/29/92).

3.0 R & D Activities.

- 3.1 Greenhouse Equipment Selection Spreadsheet. Development of the software for assisting developers with evaluation of geothermal heating systems for greenhouses has been completed. Work continues on documentation of the software.

- 3.2 Brazed Plate Heat Exchangers. Three units have been examined and analyzed - Boise, OIT and control unit (see progress report, April 1992). The fourth unit was installed late at Pagosa Springs and will be removed for analysis in about two months.

- 3.3 Data Acquisition for Low-Temperature Well Tests and Long-Term Monitoring. After review of the draft report, data will be included on the reservoir properties for Example 2 - Monitoring Injection of Geothermal Fluids at OIT.
- 4.0 **Technology Transfer.** GHC staff provided the following services:
- 4.1 Quarterly Bulletin. Vol. 14, No. 2 of the Quarterly Bulletin was completed and has been forwarded to the printer. This issue will contain:
1. "A Century of Service: The Boise Warm Springs Water District System" by Kevin Rafferty.
 2. "Geothermal Low-Temperature Reservoir Assessment Program - A New DOE Geothermal Initiative" by P. M. Wright, P. J. Lienau and L. L. Mink.
 3. "Geothermal District Heating System in Tanggu, Tianjin, China" by Cao Jinrong.
 4. "Geothermal Pipeline - Progress and Development Update."
- 4.2 Trade Journal Publication. An article on ground-coupled heat pumps was written for the Daily Journal of Commerce titled, "New Heating/Cooling Technology Making a Splash" by Kevin Rafferty (see attached article).
- 4.3 Presentations and Tours.
1. Two papers were presented at the ASHRAE 1992 Annual Meeting: (1) "Large Tonnage Groundwater Systems" and (2) "Large Tonnage Groundwater Heat Pumps - Experiences with Two Systems" by Kevin Rafferty, June 27 - July 1, 1992.
 2. A series of four lectures and one tour was presented to an Elderhostel group of 40 people titled "Uses of Earth Heat" by Paul J. Lienau, July 26 - 31, 1992.
 3. A tour was conducted for 40 middle school teachers studying alternative energy systems at Southern Oregon State College of Klamath geothermal facilities, July 15, 1992.
 4. Testimony was presented for the House Subcommittee on Environment of the Committee on Science, Space and Technology titled "Geothermal Direct Use" by P. J. Lienau and J. W. Lund, July 31, 1992.

4.4 Geothermal Library. Fifteen volumes were added to the library during June and July.

4.5 Information Dissemination. The Geo-Heat Center provided the following with publications:

<u>Name</u>	<u>Nature</u>
<u>6/4/92</u>	
Thomas Kleppinger 130 Woodside Drive San Anselmo, CA 94960	1. PRF 2. Bulletin Vol. 14, No. 1 3. GHC Brochure 4. Greenhouse Equipment Spreadsheet 5. GHC Programs 6. Geothermal Greenhouse Development
<u>6/5/92</u>	
Doug Kilpatrick, P.E. WSEO P.O. Box 43171 Olympia, WA 98504-3171	1. PRF 2. GHC Brochure 3. HP Seminar Package
<u>6/8/92</u>	
Bill Gordon Milgro Nursery, Inc. 1085 N. Victoria Ave. Oxnard, CA 93031	1. PRF 2. GHC Brochure 3. Greenhouse Spreadsheet 4. Chapter 15 - Greenhouses 5. DHE 6. Testing & Modeling of DHE in Shallow Geothermal Systems 7. Evaluation & Design of DHE for Direct Use Application 8. Bulletin Vol. 14, No. 1
<u>6/9/92</u>	
Eyob Easwaran BNF Technologies, Inc. 4300 King St., Ste. 310 Alexandria, VA 22302	1. PRF 2. GHC Brochure 3. Geothermal Direct Use Developments in the U.S. 4. Bulletins Vol. 13, No. 2, 3 and 4, and Vol. 14, No. 1 5. The Current Status of Geothermal Direct Use Developments in U.S., Update: 1985 - 1990

Senator Jeff Bingman
Attn: Erik Ness
U.S. Senate
524 Hart Office Bldg.
Washington, D.C. 20515

1. PRF
2. GHC Brochure
3. Geothermal Energy Brochure
4. Guidebook

6/10/92

Jim Cappa
CO Geological Survey
1313 Sherman St., Rm. 715
Denver, CO 80203

1. HP Seminar Package

Becky Hatfield
Lake Co. Economic Dev.
513 Center Street
Lakeview, OR 97630

1. PRF
2. GHC Brochure
3. Geothermal Energy Brochure
4. Bulletins Vol. 13, No. 2, 3 and 4, and Vol. 14, No. 1
5. Direct Heat
6. An Overview of U.S. Geothermal District Heating Systems
7. Using the Earth to Heat and Cool Homes
8. Chapter 15 - Greenhouses
9. Chapter 16 - Aquaculture
10. A Layman's Guide to Geothermal Aquaculture
11. Culture of Freshwater Prawn Using Geothermal Waste Water

6/29/92

Andrea T. G. Beck
Hawaii Energy Ext. Serv.
Hawaii Business Center
99 Aupuni Street, #214
Hilo, HI 96720

1. PRF
2. GHC Brochure
3. GHC Programs
4. Geothermal Energy Brochure
5. Bulletin Vol. 14, No. 1

Erick Sikkema
National Conf. of State
Legislatures
1560 Broadway, Ste. 700
Denver, CO 80202

1. PRF
2. GHC Programs
3. Geothermal Energy Brochure
4. GHC Brochure
5. Bulletins Vol. 13, No. 2, 3 and

7/2/92

Ron White, Architect
1701 N.E. 6th St.,
Suite B
Grants Pass, OR 97526

1. PRF
2. GHC Brochure
3. Heat Pump Package

7/9/92

Richard Eckfield
1611 Harding Avenue
Pasadena, CA 91104

1. PRF
2. Bulletins Vol. 13, No. 4 and Vol. 14, No. 1
3. Geothermal District Piping - A Primer
4. Chapter 14 - Absorption Refrigeration
5. A Materials & Equipment Review of Selected U.S. Geothermal District Heating Systems

Wayne Apostolik
N.W. Home Crafters
11410 N.E. 124th, # 248
Kirkland, WA 98034

1. Heat Pump Package

7/7/92

Cornelius Brinkman, P.E.
LSW Engineers
5560 Ruffin Road,
Suite 1
San Diego, CA 92123

1. PRF
2. Guidebook
3. A Materials & Equipment Review of Selected U.S. Geothermal District Heating Systems
4. Bulletin Vol. 13, No. 4
5. Chapter 14 - Absorption Refrigeration
6. Geothermal District Piping - A Primer

7/8/92

Ellen Morris
House Science, Space
& Technology Committee
388 House Annex 2
Washington, D.C. 20515

1. GHC Brochure
2. The Current Status of Geothermal Direct Use Development in the U.S., Update: 1985 - 1990
3. Geothermal Direct Use Development in the U.S.
4. Geothermal Energy Brochure

7/9/92

John Sass
USGS
2255 N. Gemini Drive
Flagstaff, AZ 86007
Senator Jeff Bingman
Attn: Erik Ness
U.S. Senate
524 Hart Office Bldg.
Washington, D.C. 20515

1. Klamath Falls Slides
2. Klamath Falls Field, OR
3. Geothermal Direct Use Development in the U.S.
1. PRF
2. GHC Brochure
3. Geothermal Energy Brochure
4. Guidebook

7/21/92

Lisa Jack
Biotherm
P.O. Box 750967
Petaluma, CA 94975

1. PRF
2. GHC Brochure
3. GHC Programs
4. Chapter 15 - Greenhouses
5. Geothermal Energy Brochure
6. Bulletins Vol. 13, No. 2 and 3,
Vol. 14, No. 1

7/22/92

Nancy Philipp
Benton PUD
P.O. Box 6270
Kenewick, WA 99336

1. Ground & Water Source Heat Pumps
2. Closed Loop/Ground-Source Heat
Pump Systems
3. Article on Antifreeze for GSHPs

7/27/92

Frank Mages
3225 Longmeade
Farmers Branch, TX 75231

1. HP Package

7/28/92

Chris Karman
St. Francis Cabrini
Hospital
3330 Masonic Drive
Alexandria, LA 71301

1. HP Package

5.0 Geothermal Progress Monitor.

5.1 A New Jersey College Taps into Geothermal Forefront.

It's safe. It's cheap. It won't destroy the ozone layer. It won't make Saddam Hussein any richer.

And it's coming to New Jersey in a big way.

It's geothermal energy--no, not the kind that bubbles up from Wyoming hot springs when Old Faithful spurts its stuff. This geothermal is more gentle: a way to heat and cool houses, schools, hospitals and businesses by tapping into warm water deep in the ground.

"It just makes damn good sense," summed up David N. Anderson, executive director of the Geothermal Resources Council, a nonprofit group in Davis, California. "And you won't have to go out and buy oil from the Middle East to run your power plant."

Sentiments like that are what fueled New Jersey's decision--expected to become official today--to make Stockton State College in Atlantic County what is being called the biggest user of geothermal energy in the United States.

"It will save energy. It will result in fewer pollutants being emitted to the atmosphere. And it will save the college money," said George Klenk, a spokesman for the New Jersey Department of Environmental Protection and Energy, which has approved a \$2.37 million grant. That's about half of what it will cost the school to geothermalize the half-million square feet of its sprawling, modern campus in the pinelands of Pomona.

With geothermal energy, the school can scrap its air conditioners, most of its natural gas and about quarter of the electricity it uses.

Klenk said Stockton would save about \$455,000 a year on energy bills. Officials at the school, where the board of trustees will vote on the plan today, have said it could generate up to 2,000 tons less carbon dioxide and other pollutants each year.

In a nutshell, geothermal energy works like this:

Wells are drilled about 450 feet into the ground, where the water in a climate like South Jersey's is about 55 degrees Fahrenheit year-round. The wells are connected by a loop of plastic tubing to a heat pump in the basement of a building, Klenk said.

There are no holes or open ends in the plastic tubing, so nothing gets discharged into the ground, he said.

The heat pump takes the water in the building's radiator or central heating system and pumps it down through the tubing into the ground--and back up again into the heating system. By the time it gets back to the building, the water is already much warmer than the outside temperature in, say, January.

The heat pump system draws the heat from the water and uses it to warm the building. It works well enough to keep buildings toasty until the outside temperature drops below 40 degrees, Klenk said. Then, electric heat will add the extra warmth. But it will require much less electricity than otherwise would be used, he said. In the summer, the pump keeps pumping. But this time, the 55-degree water feels cooler than the temperature in most air-conditioned rooms.

It may seem surprising, but utilities are gaga over geothermal. In fact, Atlantic Electric in South Jersey is giving Stockton a \$1.1 million "rebate" to help it pay for the new wells, pumps and tubes.

Why?

"We like energy-efficient customers," said Susan Coan, an Atlantic Electric spokeswoman. "It means utilities have less-dramatic swings in the demand for power. "We can add new customers without adding new plants."

Geothermal energy of the hot springs and volcano variety is being used in California and other Western states. But the heat pump kind is in only a handful of states, Anderson said.

It is heating and cooling a 28-story office building in Salt Lake City; a downtown commercial complex in Louisville, Kentucky; a college in Oklahoma and homes in Indiana.

Pennsylvania is also starting to go geothermal.

About 200 homes in Scranton-Harrisburg-Allentown area are using geothermal heat pumps already.

"This year marks the beginning of a very aggressive push for us on geothermal," said Mike Messer, project engineer for Pennsylvania Power & Light. The units cost a little more to install, but soon pay for themselves.

In South Jersey, about 800 homes are using geothermal energy, and the Stockton plan, if approved, will be up and running in a year.

Could this be a source of energy that actually is not controversial?

Scott Denman, executive director of the Safe Energy Communication Council in Washington, said U.S. oil companies shouldn't complain too much, since most domestic oil fueled cars, not heat or electricity.

As for environmentalists:

"So long as you're not drilling the wells in a rain forest or wetlands, we're very much in support of using geothermal energy," Denman said. "It has tremendous potential that has not yet been tapped." (The Philadelphia Inquirer, July 1992)

5.2 Catfish Farmers Plan to Build Raceways in Preston, Idaho.

Robert King and his son Jeff, owners of Valley Fish, hope to open a catfish farm in Preston, after purchasing a similar operation in Duckwater, Nevada.

The Preston residents bought the Nevada operation last October to build up their physical assets and make their over-the-counter stock more valuable. They plan to trade stock in the next 45 days.

"We feel we can get the necessary financing for expansion as soon as the stock is trading over the counter," Jeff King said. "We firmly believe the Nevada operation will enhance the company's ability to locate rearing and processing operations in Preston in the future."

The Kings thought the Preston area's virtually untapped geothermal resources would be ideal to build a warm-water catfish farm, because water temperatures could be regulated year-round for maximum fish production.

Their plan to build 48 fiberglass raceways in Preston to produce 2.2 million pounds of catfish fillets per year is still viable, King said.

"Our research has shown catfish to be in demand and the market stable," King said. "We know we can market catfish in Seattle, Portland and throughout the Pacific Northwest. A secondary market is along the Wasatch Front and south to Las Vegas."

King had no time frame for opening a fish farm near Preston. A processing plant there would run on two shifts and have 35 to 50 employees.

Their Duckwater facility 70 miles west of Ely and 274 miles north of Las Vegas was built 10 years ago. Previous owners have contracts for fillets with Las Vegas casinos and demand is greater than production.

The facility produces 327,000 pounds of prime, 8-ounce catfish fillet per year. Capacity will be tripled with little capital improvements, King said. Valley Fish is selling all fish it can produce and plans to make minor renovations.

"Since word has gotten around the Preston area about the Duckwater acquisition, our biggest concern is people may think we have written off Preston," King said. "Nothing is further from the truth." (Farm & Ranch, July 1992)

5.3 Hot Springs May Turn Into Gator Farms.

Within a year, the hot springs in southern Idaho and northern Utah could be used as alligator farms that some residents say would not only create new jobs but give farmers a way to dispose of dead animals.

Kent Horton, coordinator of the Logan office of the U.S. Department of Agriculture's Bear River Resource Conservation and Development Service, said this week he introduced the idea to the Cache County Council several months ago.

"Since then, a lot of people have asked me to pursue it," he said. The RC&D is scheduled to discuss the proposal later this month.

Horton said he had been told by people involved in the alligator industry in Florida and Louisiana that the geothermal springs of northern Utah and southern Idaho, with an average temperature of 89 degrees, should be an ideal place to raise alligators.

Garland Larson of Trenton, Utah, is one farmer who says he's "ready to pick up the ball and run with the idea."

He's working on a plan to start buying alligator eggs from Louisiana, Mississippi and Florida to hatch in Utah. The young gators would be raised in the springs, with animal carcasses used for food.

He said that within five years, the alligators would begin to breed and the females would lay eggs.

"Some people might laugh at the idea, but we've learned that there is a large market for tanned alligator hides to be used in making such items as boots and purses," Larson said. "Alligator meat is also a delicacy and in demand in the southern states, on the West Coast, and even in Japan." (Farm & Ranch, July 1992)

5.4 Geothermal Saves Millions.

Geothermal energy has proven to be the Philippines' most reliable domestic source of electricity, setting a new performance record in 1990 and saving the nation an estimated \$187 million which would have been spent on oil imports.

Geothermal power plants represent 24% of the electricity produced in the Luzon grid, and geothermal generation has significantly exceeded that of oil, hydroelectricity, and gas turbines in the grid. (Transistions - A Newsletter in Support of Pacific Island Energy Self-Reliance, July 1992)

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