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**FEDERAL ASSISTANCE PROGRAM
QUARTERLY PROJECT PROGRESS REPORT**

**GEOHERMAL ENERGY PROGRAM:
INFORMATION DISSEMINATION, PUBLIC OUTREACH,
AND TECHNICAL ANALYSIS ACTIVITIES**

GRANT NO.: DE-FG-01-99-EE35098
REPORTING PERIOD: JANUARY 1 - MARCH 31, 2001
JOHN W. LUND, PROJECT DIRECTOR

**GEO-HEAT CENTER
OREGON INSTITUTE OF TECHNOLOGY
KLAMATH FALLS, OR 97601**

QUARTERLY PROGRESS REPORT
January 1 to March 31, 2001
USDOE Grant No. DE-FG01-99-EE35098

Geothermal Energy Program:
Information Dissemination, Public Outreach,
and Technical Analysis Activities

PROJECT ACTIVITY SUMMARY

The project team consisting of the Geo-Heat Center (GHC), Geothermal Resources Council (GRC), Geothermal Education Office (GEO), Geothermal Energy Association (GEA) and the Washington State University Energy Program (WSU) accomplished the following activity during the second quarter of the renewed grant period:

Geo-Heat Center. The GHC staff responded to 601 requests for technical analysis/technology transfer from 39 states, the District of Columbia and 29 countries. The majority of the inquiries/responses were for general information, geothermal heat pumps, equipment, electric power generation, and resource and well data. Vol. 22, No. 1 issue of the *Quarterly Bulletin* (March), devoted to geothermal heat pumps was sent to 2227 subscribers. Eleven technical meetings were attended and/or presentation made by staff members. The GHC web site received an average of 920 user and 6,067 hits per day, an increase of 74% and 54% respectively, over the last quarter. The number of downloaded files (35,316) increased by 68% over the previous quarter. A total of 552 publications were distributed to individuals.

Geothermal Resources Council. The GRC web site is under continuous development and improvement, containing over 23,000 bibliographic entries of technical geothermal literature and averaging 1,400 inquiries per month. Quarterly No. 43 of the *IGA News* was distributed as an insert in the January/February 2001 edition of the *GRC Bulletin* Vol. 30, No. 1. The *Geothermal Technologies Newsletter* produced by NREL will be inserted in the March/April issue of the *GRC Bulletin* to be mailed out in April. Over 100 papers have been received for presentation at the GRC 2001 Annual Meeting. Technical review of these paper in preparation for inclusion into Vol. 25 of the *GRC Transactions* will take place in April.

Geothermal Education Office. GEO staff is planning the next Teacher Education Workshop to be held at the GRC Annual Meeting in August. Approximately 1,000 flyers were distributed in early March announcing the workshop. GEO sent out about 2,100 publications, and 45 video tapes to 219 recipients. The GEO also provided material to the Joint Oceanographic Institutions, Indonesian Geothermal Association, California Energy Commission, McGraw Hill Publishing Company and to San Mateo County. A number of publication will soon be available on their website. In connection with the energy crisis in California, they spent time assisting reporters from the media with the correct geothermal information and working closely with several shows on geothermal energy. These included the *San Francisco Chronicle*, *The East Bay Express*, *CBS Marketwatch*, *CNN Newsroom* and *KQED public radio*.

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

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Geothermal Energy Association. In cooperation with the DOE geothermal program, GEA has begun working with the World Bank Group - GEF, IFC, and World Bank - to support redefinition of its geothermal loan program. As a result, a workshop is scheduled for May 25th, probably in Washington, D.C.. In connection with the workshop, a draft white paper summarizing and elaborating on recommendation made during a meeting in February, is being prepared. In addition, GEA is polling members of the geothermal industry to develop "target" countries that will be used to examine the feasibility of any proposed new World Bank initiative.

Washington State University Energy Program. Staff members attend the International District Energy Association (IDEA) Colleges and Universities conference in NY City. A committee meeting for proposals for the Direct Use Solicitation by DOE was attended.. WSU has provided assistance for a short course on electric power generation to be held in Portland in April; on a special presentation for a DOE conference in Alaska; provided assistance to the City of Mammoth Lakes, CA for their proposed district heating project; and, provided input on several geothermal heat pump projects.

In-Kind Professional Services. A total of 244 hours of in-kind professional services were donated by the Geo-Heat Center and Geothermal Education Office this quarter.

GHC: 200 hours @ \$75/hr = \$15,000

GEO: 44 hours @ \$75/hr = \$ 3,300

Total = \$18,300

**Geo-Heat Center
Quarterly Report
1 January to 31 March 2001**

**TECHNICAL ANALYSIS/TECHNOLOGY TRANSFER.
(Objectives 3 and 5)**

The GHC staff provided responses to 601 requests during the report period (1 January to 31 March 2000), which is the second period under the FY01 portion of the contract. This is a 38% increase over the previous quarter and a 76% increase over the same quarter for FY00. Downloaded files from our website have increase significantly over the previous quarter; by 68%.

These requests/responses were from 39 states and the District of Columbia and included 61 international contacts (10%) from the following countries: Australia, Canada, Chile, China, Columbia, Costa Rica, Ethiopia, Germany, Guatemala, Honduras, Hungary, Iceland, India, Iran, Ireland, Israel, Italy, Japan, Micronesia, New Zealand, Nigeria, Panama, Philippines, Poland, Portugal, Romania, Trinidad, United Kingdom and Yugoslavia. A total of 334 contacts (56%) were by email of which 84 could not be identified as to location. A breakdown of requests relative to applications are: GHP (145), General (217), Resource/Wells (82), Equipment (35), Resort/Spa (18), Electric Power (37), Space Heating/Cooling (20), Greenhouses (19), District Energy (4), Aquaculture (15), Industrial (3), and Snow Melt (6). Within the General category of requests, 23 were from students, 124 from professional people or organizations, 4 for data base information, and 66 from other categories.

Of the total 601 inquiries/responses 188 were from private companies, 100 from government agencies (federal, state and local), 82 from educational institutions, 186 from individuals (including students), and 45 from organizations such as ASHRAE, NREL, GEA, GRC, etc.

**INFORMATION DISSEMINATION/PUBLIC OUTREACH.
(Objectives 1, 2, 4)**

Geo-Heat Center Quarterly Bulletin. Bulletin, Vol. 22, No .1 (March 2001), featuring articles on geothermal heat pumps, was mailed to 1781 U.S. and 446 international subscribers. The following articles were featured in this issue of 44 pages:

"Geothermal Heat Pumps - An Overview" by John W. Lund

"Feasibility Study on the Utilization of Geothermal Heat Pump (GHP) System in Japan" by Shinji Takasugi, Tsukashi Akazawa, Takashi Okumura and Mineyuki Hanano.

"Hot Water Supply Test Using Geothermal Heat Pump Systems at Petropavlovsk-Kamchatsky, the Capital of Kamchatka, Russia" by Ken Ikeuchi, Shinji Takasugi and Shin-ichi Miyazaki

"Current Status and Future Directions of Geothermal Heat Pumps in Turkey" by A. Hepbasli, M. Eltez and H. Duran

"Design Aspects of Commercial Open-Loop Heat Pump Systems" by Kevin Rafferty

"Specification of Water Wells" by Kevin Rafferty

"A Guide to On-Line Geological Information and Publications for Use in GSHP Site Characterization" by Kevin Rafferty

"Dual-Set Point Control of Open-Loop Heat Pump Systems" by Kevin Rafferty

This issue and issues back to 16/4 can be accessed on the GHC web site at: <http://www.oit.edu/~geoheat/bullet.htm>. The next issues of the Quarterly Bulletin, to be published in June, 2001, will be devoted to general geothermal direct utilization subjects.

Technical Papers, Presentation and Tours.

The following meetings were attended and presentation made during this quarter:

1. Kevin Rafferty attended the American Society of Heating, Refrigeration and Air-Conditioning Engineer's meeting in Atlanta, GA where he presented a workshop on "Dual Set Point Control for Open Loop GSHP Systems" Approximately 50 persons attended the session.
2. Kevin Rafferty, at the ASHRAE meeting in Atlanta, attended the Committee 6.8 (geothermal) meeting and Committee 6.2 (district heating) meeting
3. Kevin Rafferty made a presentation on geothermal heat pumps to staff of the Oregon Department of Energy in Salem.
4. Kevin Rafferty attended the Oregon Section meeting of ASHRAE in Eugene, OR
5. Kevin Rafferty attended the California Aquaculture Association meeting in Sacramento, CA
6. John Lund and Toni Boyd attended the Aquaculture 2001 meeting in Lake Buena Vista, FL where they staffed a geothermal booth and responded to questions on using geothermal energy for aquaculture.
7. John Lund and Toni Boyd attended the Stanford Reservoir Engineering Workshop where they presented a joint paper on "Geothermal Energy Utilization in the United States - 2000." Ms. Boyd also chaired a direct-use session.
8. John Lund and Toni Boyd attended the mini Program Review by DOE in Washington, DC. They also met with staff of the Oregon Congressional Representatives, World Bank representatives, Secretary staff of DOE and staff of the Office of Power Technology, and Wind and Geothermal Technologies.
9. John Lund made a presentation to EESI (Environmental and Energy Study Institute) members in Washington D.C. on direct-use of geothermal energy. Over 50 persons attended the session.
10. John Lund attended the Pacific Northwest Section of the Geothermal Resources Council meeting in Portland. The section, along with the Geo-Heat Center is planning to hold a seminar on Geothermal Power Development in Portland on 17 April 2001.
11. John Lund attended the GRC Board of Directors meeting in San Francisco. He is now the President (2001-2002) of GRC.
12. John Lund was interviewed on Southern Oregon Public Television on geothermal activities in southern Oregon and of the Geo-Heat Center (1/2 hour).

One tour was given by GHC staff of the OIT campus geothermal heating systems to approximately 30 home-school junior high students.

GHC Web Page Update.

The Geo-Heat Center web page, maintained by Toni Boyd, now has the following additional items available to be accessed:

Quarterly Bulletin Vol. 21, No. 4

Updated the Direct-Use Database.

The website activity from January 1 to March 31 is as follows (2 days missing):

Total users:	80,998	Average users per day:	920*
Total hits:	546,883	Average hits per day:	6,067*

* corrected for the 2 missing days - 74% and 54% increase over last quarter, respectively.

Total users from the U.S.	61,558	76%
Users from international:	5,670	7%
Unknown users:	13,770	17%

Average user session time 10 minutes 12 seconds

Total number of downloaded files: 35,316 (68% increase over the previous quarter)

Top 10 downloaded files (Session downloads)

- GHP Owner Info. Survival Kit	1,346
- Historical Volume circular	765
- Geothermal Power Generation Paper	374
- GSHP - Manufactures list	356
- On-Line Guide in GSHP Site Charact.	325
- Outside the Loop #3-1	281
- Scaling of GHP paper	273
- Outside the Loop #3-2	252
- Geothermal Power Seminar Announce.	247
- Aquaculture Info. Packet	216

Users by country (top 10)

USA	61,446
Canada	1,474
UK	645
Australia	381
New Zealand	269
France	219
Germany	200
Japan	190

Singapore	141
Netherlands	129

Geothermal Library

During the period of January 1 to March 31, 2001, 18 new volumes were added to the library. The library's total is 5,727 volumes cataloged.

Publications Disseminated

The GHC provided publications to individuals according to the following topics:

<u>Topics</u>	<u>No. Publications</u>
Geothermal Heat Pumps	97
Space Heating/Cooling	44
Greenhouses	37
Aquaculture	26
Equipment	123
Resources/Wells	179
General	<u>70</u>
	552

In-Kind Services Contribution

GHC Quarterly Bulletin (10 outside authors):

10 @ 10 hrs @ \$75/hr = \$7,500

GHC Director (J. Lund)

200 hours @ \$75/hr = \$15,000

Total in-kind services contribution by professionals = \$22,500

GEOTHERMAL RESOURCES COUNCIL

TED J. CLUTTER
Executive Director

Progress Report

January 1 through March 31, 2001
Geothermal Resources Council

Project Title: Geothermal Energy Program
DOE Grant — Instrument No. DE-FG01-99-EE35098

Maintenance of GRC On-Line Geothermal Library. The GRC web site (<www.geothermal.org>) is under continuous development and improvement, with one full-time person devoted to it. During the quarter, GRC On-Line Librarian Estela Smith reports that the GRC web page contains over 23,000 bibliographic entries of technical geothermal literature available from the GRC. These listings are regularly supplemented as various periodicals are published; work is in progress. The GRC averages 1,400 inquiries to its web site per month. Databases are continuously updated, and subscriptions to various publications are renewed. Principal work accomplished during the quarter was updates of library listings.

Production of GRC *Transactions* Volume 25. At the end of March, papers were being received for presentation at the GRC 2001 Annual Meeting and production of Volume 25 of the *Transactions*. GRC staff has set up a filing system for 80 to 100 papers that are expected by the GRC deadline of April 9. Technical review of the papers will take place on April 12-13 in San Diego, with in-kind work expected by at least 12 professional reviewers. A contract proposal has been received by the GRC from John Bassett (Sacramento, CA) for publication set-up and design, which will begin after final papers are received on May 11. Goal is to deliver finished volume for distribution at the 2001 Annual Meeting (August 26-29).

GRC Printing and Distribution of DOE quarterly *Geothermal Technologies* Newsletter. No newsletter was produced by NREL personnel during the quarter. An issue of the newsletter is expected for publication in the March/April edition of the Bulletin, after April 1.

Respectfully Submitted,

Ted J. Clutter, GRC Executive Director
April 9, 2001

GEOHERMAL EDUCATION OFFICE**QUARTERLY REPORT
January 1, 2001 – March 31, 2001****Public Information Workshop: *Introduction to Geothermal Energy***

GEO is planning the next workshop which will be conducted in August 2001 in San Diego in conjunction with the Annual Meeting of the Geothermal Resources Council. 1,000 flyers were distributed in early March at the meeting of the San Diego Science Educators Association, and an announcement of the workshop will appear in their upcoming newsletter. We are currently preparing a mailing for all of the schools (both public and private), government agencies, city planners and utilities in San Diego County and parts of Imperial County.

Distribution of public information materials

GEO sent out about 2100 booklets, brochures, posters, fact sheets, curricula, bookmarks and 45 videos in response to 85 student, 110 teacher and 24 general public requests. GEO continues to answer email questions submitted via email from the website and passes on technical questions to expert volunteers. GEO also answered questions from students forwarded to it from the Geothermal Resources Council, the International Geothermal Association, GeoHeat Center and others.

Providing materials for translation and speaker presentations

In addition to the above, GEO assisted the acting director of the Joint Oceanographic Institutions by providing materials for a geothermal presentation, sent materials for distribution through the Indonesian Geothermal Association, shared its Energy Timeline for use on the website of the California Energy Commission, provided McGraw Hill publishing company graphics for use in a new textbook, provided text and graphics to the Energy and Geoscience Institute for use in a poster, and trained a speaker and provided videos and handouts for a teacher's workshop as part of the Sustainable San Mateo program in San Mateo County.

Publications: We are still working on the following publications, all of which will be in hard copy or on our website within this fiscal year:

The Project WET Geothermal Activity Guide (new publication)

A Global View of Geothermal Energy (being updated)

Database of power plant contact information for field trips

Classroom activities: *Geothermal Energy: A Renewable Option* (new publication)

Exhibit Booth Animation "*Electricity from Geothermal Energy*" (new)

Consultant expertise and outreach

The energy crisis in California made this a very busy time for GEO. We spent a lot of time on the phone assisting reporters and others from the media to make sure they had correct information. We did a lot of referring, gave away many video tapes and brochures. Those we worked with include:

The San Francisco Chronicle, The East Bay Express, CBS Marketwatch, CNN Newsroom, and KQED public radio. GEO worked with GEA on several letters to editors. GEO also was responsible for convincing KQED to do the show on geothermal energy, and worked closely with the radio station to make sure they chose the best panel members.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Marilyn Nemzer', with a long, sweeping horizontal stroke extending to the right.

Marilyn Nemzer
Executive Director
Geothermal Education Office

GEOTHERMAL EDUCATION OFFICE
664 Hilary Drive
Tiburon, CA 94920
800/866-4436

In Kind Contributions **January 1, 2001 - March 31, 2001**

<u>Project</u>	<u>Name</u>	<u>Organization</u>	<u>Hours</u>	
Medea, Technical Advice	Thomas Sparks	Consultant	4	
	Karl Gaywell	Geothermal Energy Ascn.	4	
Computer	Roger Levin	TeachMacs	18	
Accounting	Kenneth Nemzer	Counselor	18	
Total hours donated for period:			44	
Value at \$75 Q1 2001				\$3,300.00
(Contributions other than time:)				
Advertising		Geothermal Resources Council		\$500.00
Total for Quarter				<u>\$3,800.00</u>

GEOHERMAL ENERGY ASSOCIATION

Washington, D.C.

Quarterly Report: 1 January to 31 March 2001

by Karl Gawell

Together with the Department of Energy's geothermal program, GEA has begun working with the World Bank Group -- GEF, IFC, and World Bank -- to support redefinition of its geothermal loan programs in a manner that is more appropriate for US companies and developing countries.

On February 1st, a meeting and conference call reacted to preliminary documents produced by GEA as well as comments from Ted Kennedy with the World Bank. The meeting involved GEA staff and members as well as DOE personnel. The group gave input into the Bank's process in anticipation of a meeting the following week in Brussels with US and other government representatives.

As a result of that conference call, GEA has worked with DOE and the Bank Group in preparing for a workshop scheduled for May 25th. In preparation for the workshop GEA will produce a draft white paper summarizing and elaborating upon recommendations made during the Feb 1st meeting. In addition, GEA is polling members of the geothermal industry to develop "target" countries that will be used to examine the feasibility of any proposed new Bank initiative. Both the polling results and draft white paper will be examined and critiqued at the workshop, in order to produce a final document for DOE and the Bank.

A first draft of the white paper is now under review, and the questionnaire has been drafted and should be distributed shortly.

In addition, GEA has written up the conduct of the meeting and distributed it widely through its newsletter and web site.

COOPERATIVE EXTENSION

Washington State University

ENERGY PROGRAM

Progress Report

Geothermal Information Dissemination, Public Outreach, and Technical Analysis

March 2001

This has been a very busy quarter. We began to prepare materials for various upcoming district energy meetings. A new booth display has been prepared, and we have new fliers.

We attended the International District Energy Association's (IDEA) Colleges and Universities conference in New York City.

Participated in evaluation of proposals that came in to the U.S. Department of Energy (USDOE) under the Direct Use Solicitation. Attended the review committee meeting at NREL. Been working with the developers and utilities in Washington to evaluate proposals for electrical generation.

I am now organizing a direct use session for the Geothermal Resources Council's annual meeting in the fall, and also organizing a special session for this year's IDEA annual meeting in June.

I am working with USDOE's Seattle office on a special geothermal presentation at a USDOE conference in Alaska.

Have been working on a geothermal course being held April 17 in Portland, Oregon, on geothermal electric generation. Making presentation, mailings, organizing, etc., for this course. Was guest professor at Grays Harbor College where I spoke about geothermal.

We've been providing assistance to the City of Mammoth Lakes, California. Provided input on several geothermal heat pump projects and sent out considerable information to project proponents.