

GEOHERMAL RESEARCH AT THE GEO-HEAT CENTER OREGON INSTITUTE OF TECHNOLOGY

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ABSTRACT

The Geo-Heat Center was established in 1975 to provide information and technical services for geothermal energy direct-use and development--mainly utilizing low- and moderate-temperature resources (<150°C). The Center is funded by the Geothermal Division of the U.S. Department of Energy (USDOE). Our main functions are (1) technical assistance, (2) resource information, (3) advising and referrals, (4) speaker's bureau, (5) tours of geothermal systems, (6) publications, (7) research, and (8) stocking a geothermal library. During 1997, the Geo-Heat Center staff provided assistance to 761 individuals, companies and municipalities--up to eight hours of technical assistance can be provided free of charge. Staff members have also participated in numerous international geothermal direct-use projects. The Center has developed a "Geothermal Direct Use Engineering and Design Guidebook" and publishes a free "Quarterly Bulletin" on geothermal direct-use projects and research. The Geo-Heat Center also has a website (<http://www.oit.edu/~geoheat>). Several of these direct-use research projects are discussed in the paper, including: a) Downhole Heat Exchangers, b) A Cost Comparison of Commercial Ground-Source Heat Pump Systems, c) A Spreadsheet for Geothermal Energy Cost Evaluation, d) Utilization of Silica Waste from Geothermal Power Production, e) Fossil Fuel-Fired Peak Heating for Geothermal Greenhouses, f) Selected Cost Considerations for the Geothermal District Heating in Existing Single-Family Residential Areas, and g) Collocated Resources Inventory of Wells and Hot Springs in the Western U.S.

INTRODUCTION

The beginning of the Geo-Heat Center (GHC) can be traced to an international conference held on geothermal energy at the Oregon Institute of Technology (OIT) campus during October of 1974. The meeting was organized to review nonelectric, multipurpose uses of geothermal energy in Hungary, Iceland, New Zealand, the United States and Russia (USSR). As a result of the conference and interest in the need to exchange and disseminate information on low-to-moderate temperature resources and their utilization, the Geo-Heat Center (first known as the Geo-Heat Utilization Center) was established in 1975. Initial funding was provided by the Pacific Northwest Regional Commission (PNRC), a branch of the Executive Department of the Governors of the states of Oregon, Washington and Idaho. A sum of \$3,000 was granted to distribute information to participants of the October 1974 international conference. The proceedings were published in a volume titled "Multipurpose Use of Geothermal Energy--Proceedings of the International Conference on Geothermal Energy for Industrial, Agricultural and Commercial/Residential Uses." The primary functions of the Center were to disseminate information to potential users of geothermal resources, perform applied research on the utilization of low-temperature resources, and to publish a quarterly newsletter on the progress and development of direct-use geothermal energy in the United States and other countries.

Over the years, a number of people were employed by the Center on a full-time basis or for special projects. Many of these individuals started their careers in geothermal with the Center and are still involved with geothermal energy today.

The transfer of technological information to consultants, developers, potential users, and the general public, is an important element in the development of geothermal energy. Through the USDOE, the Geo-Heat Center's resources are available to the public. Information developed through first-hand experience with hundreds of projects and through extensive research is provided to individuals, organizations or companies involved in geothermal development.

SERVICES OFFERED

Technical Assistance

The Geo-Heat Center provides technical/economic analysis for those actively involved in geothermal development. This assistance can be in the area of feasibility at the out-set of a project, equipment and materials selection during the design phase or follow-up troubleshooting for operational systems. Geothermal projects involving direct and heat pump space heating, industrial process, and low-temperature wellhead electric power generation, will be allocated a limited number of man-hours for analysis (based on merit).

Resource Information

Based on recently developed databases for the states of AZ, CA, CO, ID, MT, NV, NM, OR, UT and WA, data can be provided on over 8,000 thermal springs and wells. Data is available for a specific area of a city or county and includes: location, temperature, flow rate, depth, water chemistry, current utilization and source references from which more detailed information can be obtained.

Advising and Referrals

The Geo-Heat Center acts as a clearinghouse providing technical information by meeting with groups and answering telephone inquires, letters and e-mail from individuals, businesses, and local governments on geothermal resources, space heating, district heating, greenhouses, aquaculture projects, equipment, heat pumps, small-scale electric generation systems, and other related items.

Speaker's Bureau

Center staff are available to make presentations on topics such as system design, economic considerations, and project examples to both lay and technical audiences.

Tours

The Center will arrange individual and group tours of Klamath Falls district heating system, campus geothermal heating/cooling system, residential and local greenhouse applications