GEOTHERMAL PIPELINE

Progress and Development Update
From the Geothermal Progress Monitor

ASHRAE GEOTHERMAL HEAT PUMP ACTIVITIES

Among the many organizations working to develop information on geothermal heat pump systems is ASHRAE, or American Society of Heating, Refrigeration and Air Conditioning Engineers, a professional organization whose members consist largely of engineers involved in Heating, Ventilation and Air Conditioning (HVAC) design, manufacturing, research and education. The Society is the primary source of design and application information for engineers involved in the HVAC industry. Through a variety of publications, ASHRAE makes this information available to its 60,000 members and the public.

Within the organization, approximately 100 Technical Committees (TCs) oversee the development of design information, research and standards in their respective areas of expertise. The primary committee for geothermal heat pumps (called ground-source heat pumps within ASHRAE) is TC 6.8 Geothermal Energy. For many years, this committee has been actively developing information for designers of commercial geothermal heat pump systems. Among the more important products of these efforts are:

Chapter 29 - Geothermal energy, ASHRAE Handbook of Applications

The ASHRAE Handbooks (a 4-volume set) are the most widely used source of design information for practicing engineers. These volumes are updated on a 4-year schedule. The current Geothermal Chapter is contained in the 1995 volume, and updating and improvements are underway in preparation for the 1999 issue.

Contained in the chapter is information on the design of direct use geothermal (100 - 300°F), open loop (groundwater) and closed loop (ground-coupled) heat pump systems for commercial applications. This information focuses on the ground loop portion of the systems. Information on the building loop and heat pump equipment is contained in other chapters of the ASHRAE Handbook series.

Commercial/Institutional Ground-Source Heat Pump Engineering Manual

This manual was prepared by CANETA Research and published by ASHRAE in 1995. It contains information on design and installation for ground-coupled (closed loop), groundwater (open loop) and surface-water GHP systems. The vertical ground-coupled design methodology presented in this manual is the one developed by CANETA Research. This manual focuses on ground-coupled systems and provides somewhat less coverage of groundwater and surface water systems.

TC 6.8 is currently reviewing a second design manual for future publication by ASHRAE. This manual contains the design method developed by Dr. Steve Kavanaugh (University of Alabama) for vertical ground-coupled systems, and an expanded coverage of groundwater systems.

Commercial Ground-Source Heat Pump Systems

This document (referred to within ASHRAE as a Technical Data Bulletin) is a collection of papers previously published in the *ASHRAE Transactions* on the topic of commercial systems. It contains 15 papers on such issues as cost, design, modeling, energy use, standards and field testing of systems. The papers contained in the Bulletin were published between 1992 and 1995.

ASHRAE Transactions

The *ASHRAE Transactions* contains all of the papers presented at ASHRAE winter (January) and summer (June) meetings each year. TC 6.8 has been very active over the past several years holding sessions on GHPs at most meetings. Between 5 and 15 papers per year have been published as a result of these programs. All are included in the *ASHRAE Transactions*.

The research projects which have been conducted with oversight from TC 6.8 have recently resulted in two important publications.

Operating Experiences with Commercial Ground-Source Heat Pumps

This report by CANETA Research was published in October 1995 and resulted from ASHRAE Research Project RP-863. The report contains detailed case study information on 23 commercial ground-source heat pump systems. A wide variety of system types, designs and geographical locations included. Information on system cost, design, layout, operation and maintenance is included.

Assessment of Antifreeze Solutions for Ground-Source Heat Pump Systems

This report by the Center for Global Environmental Technologies (University of New Mexico) was completed as part of ASHRAE Research Project RP-908 and published in 1996. It contains a comprehensive review of the environmental, physical and thermodynamic properties of four current and two potential antifreeze fluids for GHP systems. Specific areas covered for each include: cost, corrosion, leakage, health hazard, fire risk and environmental risk.

In addition to these publications, TC 6.8 members are currently developing a 3-hour short course for presentation at the ASHRAE's January meeting in Boston. The course would include design information for large building GHP systems. Development of the 3-hour course is considered a stepping stone to preparation of an ASHRAE course on GHP to be included in the Professional Development Series (PDS).

This series presents 1-day seminars around the country each year on topics of current interest to ASHRAE members.

The publications described in this article can be ordered directly from ASHRAE by calling 1-800-527-4723 or www.ashrae.org. A Geo-Heat Center staff member is actively involved in the TC 6.8 and can provide additional information on any of the above publications.

GHP TRAINING CENTERS AND WEBSITES

Regional training centers for the installation of geothermal heat pumps have been established in seven areas of the U.S. The support for these centers has come through the Geothermal Heat Pump Consortium with funding from USDOE, USEPA and electric utilities. The purpose is to provide training and certification for HVAC firms involved with the installation of geothermal heat pump systems.

Alabama Heat Pump Training Center
Verbena, AL
800-634-0154

Alternative Energy Corp.
Raleigh, NC
919-857-9000

Geothermal Energy Association
Davis, CA
916-750-0135

Ferris State University
Big Rapids, MI
616-592-2351

Keystone Geothermal Heat Pump Training Center
Johnstown, PA
814-269-3874

Northern Geothermal Support Center
Brookings, SD
605-688-4288

International Ground Source Heat Pump Assoc.
Stillwater, OK
800-626-4747

The following websites have information on geothermal heat pumps.

- Geothermal Heat Pump Consortium
- http://www.ghpc.org

- Geo-Heat Center
- http://www/oit.edu/~geoheat

- IGSHPA
- http://www.igshpa.okstate.edu

- ERRI
- http://www.eprihp.com

- New Jersey Heat Pump Council
- http://www.njhpc.org

- DOE
- http://doegeothermal.inel.gov

- Geothermal heat pump manufacturers' websites:

- Addison Products Company
- http://www.addison-hvac.com

- ClimateMaster Inc.
- http://www.climatemaster.com

- Econar Energy Systems Corporation
- http://www.econar.com

- FHP Manufacturing
- http://www.fhp-mfg.com

- Mammoth Inc.
- http://www.mammoth-inc.com

- The Trane Company
- http://www.trane.com

- WaterFurnace International
- http://www/waterfurnace.com

CALIFORNIA

Geothermal Plant Shutting Down

One of 24 geothermal energy plants hooked into The Geysers outside Santa Rosa, the world's largest producer of natural steam energy, is slated for dismantling because that energy source has been tapped out by overuse.

A consortium of public utilities that serves Sacramento, Modesto and Santa Clara opened the $200 million Coldwater Creek Geothermal Power Plant in 1988. But from the beginning, it operated at only half capacity because there wasn't enough steam.

According to the U.S. Energy Commission, power production at Sonoma County's geysers, 60 miles north of San Francisco, peaked in 1988 but has declined steadily since then. The reason: too many plant operators tapped into its natural underground heat source (Source: *Herald & News*, March 31, 1997).

PENNSYLVANIA

New WEBFAXX Option Delivers ASTM Standards Any Day, Any Time, Any Where

American Society for Testing and Materials (ASTM) standards can now be delivered within 10 minutes to any fax machine, any time, any where.

Thanks to WEBFAXX, a new option on ASTM's website, users can receive copies of ASTM documents via fax for just $.75 per page in the United States, Canada and Mexico, and $1.50 per page in other countries (plus the cost of the standard). WEBFAXX can be accessed at: <http://www.astm.org>, in the "Search for Standards" area.

ASTM, the world's leading developer and publisher of voluntary consensus standards, is the first and only standards development organization to provide this service, which requires no customer service assistance.

ASTM updates the database weekly to ensure the most up-to-date standards are available. The quality of most standards is good, text, line drawings, and tables are perfectly legible and useable. Photographs, however, do not fax clearly because fax machines are incapable of the resolution necessary. If photographic clarity is essential to you, mail delivery is suggested.

Organized in 1898, ASTM is one of the largest standards development system in the world.