- Education Forum -

USING THE EARTH'S RENEWABLE ENERGY

Ground Source Heating & Cooling for Residential and Commercial Properties

Latest Technologies, Economic Advantages, Environmental Impacts and Regulations

Presented by: **American Ground Water Trust** Concord, NH

Ground Water Information, Awareness & Education Since 1986

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In Cooperation with:

Geothermal Heat Pump Consortium
International Ground Source Heat Pump Association

Forum Date:

Wednesday, February 3, 2010 - 8:00 am - 4:45 pm

Forum Hotel:

Holiday Inn - SeaTac Intl Airport, 17338 International Blvd, Seattle, WA 98188
Tel: 206-248-1000

CONTINUING EDUCATION CREDIT AVAILABLE - CALL THE AGWT FOR DETAILS 800-423-7748

ARCHITECT CREDITS - 7.25 LUS (FOR HSW AND SUSTAINABLE DEVELOPMENT) THROUGH THE AIA
AMERICAN SOCIETY OF HOME INSPECTORS - 7.0 ASHI® CE CREDITS
OREGON WATER WELL CONSTRUCTORS - PENDING 6.5 HRS CEU CREDIT THRU THE OREGON WATER RESOURCES DEPT.
WA WATER WELL CONTRACTORS - 6.5 CEUS (INCLUDING 2.0 RULES & REGULATIONS) THRU THE DEPT OF ECOLOGY
CALL FOR DETAILS FOR OTHER PROFESSIONS

What's It All About?

Today's ground source heating and cooling (GSHC) technology provides a proven method for saving significant amounts of energy for heating, cooling and hot water generation for ANY application. Thousands of homes, businesses and manufacturing plants across the nation are already taking advantage of these energy-efficient conditioning systems. GSHC systems operate at significantly lower costs than traditional gas, oil or electric-based installations. National benefits from geoexchange installations include less demand for energy generation capacity, reduction in green-house gas emissions and a reduced dependence on imports of oil and other fossil fuels.

By definition, installation of ground source systems involves accessing the sub-surface by either excavation or by drilling vertical bores. Because the sub-surface heat-exchange process occurs near or beneath the ground water table, environmental and water resource regulatory questions about design and installation have been raised in some states.

This one-day program will:

- ➔ Define the "state of the art" in terms of design options and economic pay-back
- ➔ Demonstrate the environmental and strategic benefits of the technology
- ➔ Dispel common myths about the effectiveness, reliability and safety of ground source systems
- ➔ Explain industry-accepted installation, operation and maintenance practices
- ➔ Provide an update on state, local and regulatory oversight recommendations

Questions to be considered include:

- ➔ Are there any environmental or economic risks associated with this technology?
- ➔ Are there data that clearly demonstrate risk cause and effect?
- ➔ Do design and installation standards provide adequate environmental protection?
- ➔ Should specific professional training be required for the below-ground system installation?
- ➔ Which agencies should, or do, have, regulatory oversight for heat exchange installations?
- ➔ What are the barriers to widespread adoption of the technology for new buildings or for homeowner retrofit? What can be done to eliminate these barriers?

The Forum program draws on the experience & expertise of industry and agency professionals and will provide a unique opportunity for exchange of information among policy makers involved in energy issues and specialists involved with the design, construction and permitting of ground source geoexchange systems for cooling and heating.

Who Should Attend?

This program will be of interest to professionals who design, install, inspect, approve, recommend or regulate these systems. This technology has the potential to become the technology of choice among those considering "green energy" alternatives for commercial or residential installations.

Energy company engineers, architects, planners and conservation commissioners, building code inspectors, environmental health professionals, home inspectors, water well contractors, HVAC professionals, real estate agents, home builders and developers, town officials (Conservation, Zoning, Planning), water testing specialists should not miss this opportunity to get up to speed with this technology. It will be coming to a building near you!

American Ground Water Trust

The American Ground Water Trust is a national not-for-profit public education organization. The Trust's mission:

- ♦ Promoting efficient and effective ground water management
- ♦ Communicating the environmental and economic value of ground water
- ♦ Showcasing ground water science and technology solutions
- ♦ Increasing citizen, community and decision-maker awareness
- ♦ Facilitating stakeholder participation in water resource decisions

Forum Program

8:00 – 8:20 am **INTRODUCTION**

Garret W. Graaskamp, P.G., Hydrogeologist, American Ground Water Trust, Concord, NH

- Concept of Resource Sustainability
- Geologic Considerations

8:20 – 8:50 am **WASHINGTON'S ENERGY INITIATIVE - GROUND SOURCE ENERGY OVERVIEW**

Tony Usibelli, Division Director, Washington Energy Policy Office, Olympia, WA

- Overview of Washington's Energy Initiatives
- Washington's economic perspective of reducing electrical energy demands and the need for infrastructure investment
- Potential impact of geoexchange technology on Washington's energy security
- Ground Source technology impact on Washington's efforts to reduce CO2 emissions

8:50 – 9:40 am **THE STATUS OF THE "GEOTHERMAL" INDUSTRY**

John Dibble, Western Regional Manager, ClimateMaster, Sandpoint, ID

- Geographic distribution of geothermal installations, nationally and in Oregon
- Trends in the growth of geothermal applications
- Market potential and market predictions for the geothermal industry
- How the Geothermal industry is organized nationally, regionally and locally
- What appear to be the barriers to greater acceptance of geothermal installations?

9:40 – 10:30 am **GROUND SOURCE HEAT PUMPS - THE FUNDAMENTALS**

Lisa Meline, President, Meline Engineering, Sacramento, CA

- Understanding the basic physics of the heat transfer process
- Explanation of terminology (geoexchange, geothermal, ground source, BTUs, tons etc.)
- How the heat exchange process works for heating and cooling
- What happens to the heat transferred underground – are there any risks?
- How to measure the efficiency of geothermal systems
- Primary differences between geothermal and traditional HVAC applications
- What should a home inspector, Realtor or prospective purchaser look for?
- Application of ground source heating and cooling systems in Washington

10:30 – 10:45 am **NETWORKING BREAK**

Forum Program (continued)

10:45 – 11:35 am **GROUND SOURCE EARTH COUPLING DESIGN PRINCIPLES**

Sean Dillon, Northwest Territory Manager, WaterFurnace International Inc., North Bend, WA

- Explanation of the methods:
  - Closed loop – vertical, horizontal (slinky)
  - Open system – to surface, to diffusion
  - Heat exchanger systems for surface water (ponds and lakes)
- Weighing positives and negative aspects of each earth coupling method
- Design considerations for geothermal wells in bedrock vs. shallow sand & gravel wells
- What makes one well more efficient than another for thermal transfer?
- Common misconceptions about the geothermal earth coupling

11:35 am – 12:15 pm **GEOEXCHANGE WELL CONSTRUCTION for THERMAL EFFICIENCY and ENVIRONMENTAL PROTECTION**

Michael Snorsky, CDI, Geo Loop Tec Co., Seattle, WA

- Review of typical Washington installations. Is there a "good, better or best" type?
- The basis for selecting installation materials (well casing, grout, propylene glycol, methyl alcohol. etc/)
- Use of an existing well for a geothermal application. Can it be done?
- How does a ground source heat pump well differ from a drinking water well?
- Common problems that can result from installation errors
- What to do if a closed loop develops a problem, etc.

12:15 – 1:15 pm **LUNCH** (Provided on site)

1:15 – 1:55 pm **ECONOMIC SUCCESS STORIES – THE PAYBACK - Residential, Commercial and Industrial**

John Geyer, CGD, President, Northwest Geothermal, Vancouver, Washington

- How to do the short-term and long-term math on energy saving vs. installation cost?
- What is the typical payback period and Return on investment (ROI)?
- How do geothermal installations add equity value to a property?
- What are the typical servicing and maintenance needs and costs for a geothermal system?
- What is the relationship among architect, system designer and installer? (Who is selling to whom?)
- Case studies of installation and operation in Washington (homes, churches, schools, offices etc.)

1:55 – 2:20 pm **THERMAL GROUTS - TYPES and PROPERTIES**

Jack Sowers, Senior Field Services Technical Representative, Baroid IDP, Yakima, WA

- Why grout a ground source heat pump boring?
  - Energy (heat) transfer media efficiency
  - Ground water protection
- What are the properties of an efficient and effective thermal grout?

Forum Program (continued)

2:20 pm – 3:00 pm **PAINTING THE ENERGY EFFICIENCY PICTURE OF HEATING AND COOLING SYSTEMS**

Lisa Rosenow, P.E., Project Manager, Northwest Energy Efficiency Council, Seattle, WA

- Heat Transfer - Hot Red to Cold Blue (Thermodynamics)
- Energy Utilities - Calculating energy efficiency of a system
- Carbon emissions - Defining the Carbon Footprint

3:00 pm – 3:15 pm **Networking Break**

3:15 pm – 4:00 pm **COMPUTER-AIDED DESIGN For GROUND SOURCE HEAT PUMP HVAC SYSTEMS**

Daniel Bernstein, President, GAIA Geothermal, LLC, Mountain View, CA

- Principles of Computer Design
- What Information does the software require to "identify the best answer"?
- Is there a standard procedure that a designer should follow to develop most efficiently a satisfactory design?
- Which system variables have the most impact (sensitivity analysis) on the design outcome?
- What are the advantages of using Computer–aided design software
- What are the possible pitfalls of using Computer-aided design software?
- How does a designer know if the computer output is the "best" design for the project?
- Project Example – City and State called out here.

4:00 pm – 4:40 pm **GEOEXCHANGE INSTALLATIONS STATE and LOCAL RULES and REGULATIONS**

Bill Lum II, Hydrogeologist, Washington Department of Ecology, Olympia, WA

- Health concerns from installation and/ or operation of geothermal systems
- Environmental & water resources concerns from drilling, heat exchange or well failure
- Current regulatory requirements in Washington
- "Paperwork" burden for installation of a geothermal system
- Perception of "risks" to the integrity of ground water or aquatic environments
- In what instances do drinking water regulations apply to geothermal wells?
- Licensing requirements for geothermal well and heat-exchange equipment installers

4:40 – 4:45 pm **Wrap-up and Adjourn**

- Further Questions and CEU sign-out

Registration Form

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		CHECK BOX
PRE REGISTRATION (GENERAL)	$185	☐
PRE REGISTRATION (TRUST CORPORATE MEMBERS)	$150	☐
ON-SITE REGISTRATION	$225	☐
EXHIBIT TABLE (DOES NOT INCLUDE REGISTRATION)	$200	☐

(Registration includes workshop handouts, coffee breaks and lunch)

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50 Pleasant Street, Concord, NH 03301
Tel (603) 228-5444

Return by fax: **(603) 228-6557** **Register on line:** **www.agwt.org**

CANCELLATION POLICY

- Cancellations received in the Trust office by 5 pm ET 5 days prior to event will be granted a full refund less $25.
- Cancellation 4 to 2 days or less, prior to the event will receive a 50 % refund.
- Cancellations on the day of the event are considered "No Shows."
- Refunds will not be granted for "No Shows" (substitutions gladly accepted).
- The Trust will not cancel a conference program because of bad weather conditions. Except that, as the result of an event cancellation resulting from, (but not limited to) circumstances such as a state mandatory evacuation or a fire at the program facility, the Trust will reschedule the event and honor registrations as payment for the new event.