

- 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**

50 Pleasant Street, 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  
Oregon Ground Water Association



*Forum Date:*

**Friday, April 24, 2009 - 8:00 am - 4:45 pm**

*Forum Hotel:*

**Holiday Inn - Wilsonville, 25425 SW 95<sup>TH</sup> Avenue, Wilsonville, OR 97070  
Telephone: 503-682-2211**

**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**

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**OREGON HOME INSPECTORS - CEU CREDIT PENDING THROUGH THE CONSTRUCTION CONTRACTORS BOARD**

**OREGON WATER WELL CONSTRUCTORS - 7 HRS CEU CREDIT PENDING THRU THE OREGON DEPT OF WATER RESOURCE S**

**WASHINGTON STATE WATER WELL DRILLERS - 5.8 CEU HOURS THRU THE WA DEPT OF ECOLOGY**

## 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 (continued)

**11:35 am – 12:15 pm**

### **GEOEXCHANGE WELL CONSTRUCTION for THERMAL EFFICIENCY and ENVIRONMENTAL PROTECTION**

**Matthew Winfield**, Director of Operations, Geodyne, Lake Oswego, OR

- An Overview of the geology of the Northwest and how it affects GSHC borings and loop systems
- Drilling Techniques - Advantages / Disadvantages for GSHC system projects
- 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 – 2:05 pm**

### **GROUND SOURCE HEAT PUMPS - THE FUNDAMENTALS**

**Conrad Brown, P.E., CGD**, Sr. Engineer, PAE Consulting Engineers, Portland, OR

- 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 Oregon

**2:05 pm – 2:50 pm**

### **GEOEXCHANGE SYSTEM INSTALLATIONS The LEED PERSPECTIVE**

**Chris Forney, LEED AP**, Sustainable Buildings Group Director, Brightworks, Portland, OR

- What is Leadership in Energy and Environmental Design (LEED)?
- Overview of the various Green Building rating systems:
  - United States Green Building Council (USGBC)
- Overview of the LEED rating systems - Commercial vs. Residential
- How is a building's heating and cooling system (energy-use) evaluated in the LEED rating system?
- How do Ground Source Heating and Cooling systems achieve LEED rating points?

## Forum Program (continued)

**2:50 pm – 3:05 pm      NETWORKING BREAK**

**3:05 pm – 3:50 pm                      CASE STUDIES IN OREGON STATE -  
GEOEXCHANGE INSTALLATIONS -  
PROSPECTS FOR GROWTH**

**Edward Butts, Lead Project Engineer & Principal, 4B Engineering and Consulting, Salem, OR**

- A multi-home GSHP System: Case Study – Pringle Creek
- Regulatory and permitting issues
- System Aesthetics – Less means more
- Design criteria for large heating and/or cooling demands
- How ground/site conditions impact ground heat exchanger design and application
- Ground source heat pump system economics
- Environmental considerations: Installation and Operation
- The Economics of Efficiency
- System Performance

**3:50 pm – 4:30 pm                      GEOEXCHANGE INSTALLATIONS  
STATE and LOCAL RULES and REGULATIONS**

**Juno G. Pandian, Manager, Well Construction and Compliance Section, Water Resource Department,  
Salem, OR**

- Current regulatory requirements in Oregon
- Health concerns from installation and/ or operation of geothermal systems
- Environmental & water resources concerns from drilling, heat exchange or well failure
- “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

**4:30 – 4:45 pm                      Wrap-up and Adjourn**

- Further Questions and CEU sign-out

# Registration Form

## Ground Source Heating & Cooling for Residential and Commercial Properties Latest Technologies, Economic Advantages, Environmental Impacts and Regulations

DATE: Friday, April 24, 2009 - 8:00 am - 4:45 pm

LOCATION: Holiday Inn - Wilsonville, 25425 SW 95<sup>TH</sup> Avenue, Wilsonville, OR 97070, Telephone: 503-682-2211

	CHECK BOX
PRE REGISTRATION (GENERAL)	\$185 <input type="checkbox"/>
PRE REGISTRATION (TRUST CORPORATE MEMBERS)	\$150 <input type="checkbox"/>
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EXHIBIT TABLE (DOES NOT INCLUDE REGISTRATION)	\$200 <input type="checkbox"/>

*(Registration includes workshop handouts, coffee breaks and lunch)*

PAYMENT:  Check *[Make checks payable to: American Ground Water Trust]*

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Return by mail: American Ground Water Trust  
50 Pleasant Street, Concord, NH 03301  
Tel (603) 228-5444

Return by fax: (603) 228-6557 Register on line: [www.agwt.org](http://www.agwt.org)

### CANCELLATION POLICY

- Cancellations received in the Trust office by 5 pm ET 15 days prior to event will be granted a full refund less \$25.
- Cancellation 14 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.