STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH
REGULATORY SERVICES BRANCH
ENVIRONMENTAL HEALTH SECTION

EHS Circular Letter #2007-11

Date: April 26, 2007

To: Local Directors of Health and Registered Sanitarians

From: Suzanne Blancaflor, MS
Chief, Environmental Health Section

Re: Geothermal Wells

As many of you are aware Geothermal Heat Exchange Systems are becoming more popular in Connecticut. Recently the Department of Public Health (DPH), in consultation with the Departments of Consumer Protection and Environmental Protection, issued a report to the Connecticut General Assembly on such systems. The report made recommendations concerning:

- Construction standards for closed loop geothermal systems
- Grouts used in closed loop geothermal systems
- Heat transfer fluids
- Permits
- Separation distances
- Abandonment procedures
- Licensing of contractors

The Department of Consumer Protection, in consultation with the Departments of Environmental Protection and Public Health, is in the process promulgating regulations for Geothermal Heat Exchange Systems. In the interim, the DPH is issuing this guidance to environmental health professionals, based on the recommendations made in the report.

OPEN LOOP GEOTHERMAL SYSTEMS

Open loop geothermal systems withdrawal groundwater from the earth, circulate it through a heat exchanger, and discharge it to either a surface water, a sewer, into a separate well, or back into the same well. The vertical boreholes associated with open loop systems are considered water supply wells and fall under the current regulations for water supply wells. Environmental professionals should be aware that wells discharging over 5,000 gallons per day require a DEP permit and any well discharging into surface water may require a permit from the local inland wetlands agency. A water company land permit is required pursuant to CGS Section 25-32(b) for the installation of any geothermal borehole on water company owned land.

Phone: (860) 509-7289, Fax: (860) 509-7295
Telephone Device for the Deaf (860) 509-7191
410 Capitol Avenue - MS # 51LAB
P.O. Box 340308 Hartford, CT 06134
An Equal Opportunity Employer

Separation distances are based on the withdrawal rate of the well as stipulated in Section 19-13-B51d of the Public Health Code (PHC). Wells that are used for both the drinking water supply and a Geothermal System may have flow rates that require increased separation distances than usually required for domestic private wells.

CLOSED LOOP GEOTHERMAL SYSTEMS

Closed loop systems may utilize vertical boreholes or horizontal trenches. These systems circulate a heat transfer fluid through a series of piping in the ground and a heat exchanger located in a dwelling. Closed loop boreholes are considered non-water supply wells, and as such the provisions for locating wells that are included in PHC Section 19-13-B51d would not be applicable. However, it should be understood that closed loop geothermal systems that are installed contrary to the construction standards included in the report to the legislature might constitute a source of pollution and the location relative to water supply wells must be considered. The Department advises that environmental health professionals consider the recommendations made to the legislature. The report may be downloaded from the Environmental Health Section website under publications:

http://www.dph.state.ct.us/Environmental_Health/index.htm

Some key points to consider concerning the recommendations:

Any connection between a geoexchange system and a domestic water supply should be protected with the installation of a reduced pressure backflow preventor.

Geoexchange boreholes should be a minimum of four (4) times the inside diameter (id) of an individual loop pipe supplying the system, and shall be a minimum of four (4) inches in diameter.

Geoexchange boreholes should not be yield tested.

Vertical boreholes for closed loop systems should be filled entirely with grout. The grout acts as a heat transfer media, protects the piping, and would help to contain any fluids in the event of a leak.

Heat transfer fluids should be non-toxic. The Department has recommended potable water and solutions of either potassium acetate or propylene glycol as appropriate choices.

The following table depicts the separation distances recommended in the report for closed loop systems. Prior to allowing these reduced separation distances, we recommend the licensed well driller certify that they will follow the recommendations made in the report concerning the installation of the vertical borehole and the geothermal system. This certification can be made on the well drilling permit or as an attached document. The geothermal system should be considered a source of pollution relative to water supply wells in the event such certification is not supplied to the local health department. The January 1, 2007 revision of the *Technical Standards for Subsurface Sewage Disposal Systems* stipulates a minimum separation distance of 75 feet to geothermal wells, however, a special provision under Item A in Table No. 1 of Section II, allows for a reduced distance if so authorized by the

Commissioner of Public Health. Refer to EHS Circular Letter #2007-12 for requirements for reduced distances to closed loop geothermal systems.

Structure	Closed Loop Geothermal System Separation Distance
Private Water Supply well, withdrawal rate < 10 gal/min	25 Feet
Private Water Supply well, withdrawal rate >10 gal/min	50 Feet
Public Water supply well, withdrawal rate <10 gal/min	25 feet*
Public Water Supply well, withdrawal rate >10 and <50 gal/min	50 feet*
Public Water Supply well, withdrawal rate > 50 gal/min	200 Feet*
Source of Pollution (subsurface sewage, leaching field, grinder pump on sewer lateral, known releases of hazardous materials, structures or containers (tanks) of hazardous substances located above or below ground or other known source of contamination)	50 Feet. A separation distance of 25 feet may be used for septic tanks that meet the performance testing criteria specified in Section V(A)(6) of the *Technical Standards*
Separation Distance from high water mark of any surface water body or drain carrying surface water or of a foundation drain	10 Feet

*A permit is required pursuant to CGS Section 25-32(b) from the Commissioner of the Department of Public Health if a geothermal borehole is to be installed on water company owned land.

If you have any questions concerning this guidance please contact the following:

General questions concerning Geothermal Systems:

Jeff Curran - Supervising Environmental Laboratory Consultant, (860) 509-7369

Geothermal Systems and Private Wells - Ray Jarema, Supervisor, Private Well Program, (860) 509-7296

Geothermal Systems and Public Water Supplies - Cam Walden, Supervising Sanitary Engineer, (860) 509-7333

Water Company Lands Permits – Lori Mathieu, Supervising Environmental Analyst, (860) 509-7333

Geothermal Systems and Subsurface Sewage Disposal Systems - Robert Scully, Supervising Sanitary Engineer, Environmental Engineering Program, (860) 509-7596

DEP Permitting - Don Gonyea, Environmental Analyst III, (860) 424-3018

Cc. Ellen Blaschinski, Chief, Regulatory Services Branch, DPH
Pamela Kilbey-Fox, Chief, Local Health Administration Branch, DPH
Gerald Iwan, Section Chief, DWS