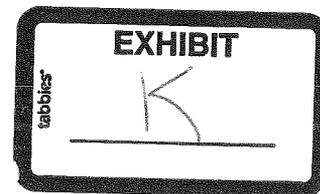


April 22, 2008

The Honorable Jerry Farrell, Jr.
Commissioner
Department of Consumer Protection
165 Capitol Avenue
Hartford, CT 06106



Re: Comments – Proposed Amendment to Section 25-128-34 of the Regulations of State Agencies

Dear Commissioner Farrell:

Thank you for the opportunity to comment on the state Department of Consumer Protection's proposed amendments to Section 25-128-34, the Connecticut Well Drilling Code.

As currently drafted, Energy Independence, LLC opposes the proposed regulations, which undermine the ability of Connecticut to realize the savings and environmental benefits associated with Direct Exchange Geothermal (DX Geothermal) systems.

DX Geothermal is a proven technology that has saved consumers thousands of dollars in energy costs. In addition, it is a safe, reliable and energy efficient technology that will help reduce Connecticut's carbon footprint by eliminating tons of carbon dioxide and significantly reducing emissions.

Recognizing this, the federal Energy Policy Act of 2005 authorizes tax credits to encourage homeowners and businesses to use DX Geothermal heat pump systems. In fact, the U.S. Environmental Protection Agency (EPA) has spent millions researching this technology and has concluded that DX Geothermal is the most efficient and environmentally safe heating-cooling system available today and they encourage its use.

DX Geothermal uses copper tubing to harvest the earth's thermal energy for heating and hot water and return energy to the earth for cooling. In DX geothermal, refrigerant is circulated through highly conductive copper earth loops buried in the earth, enabling the direct transfer of thermal energy from the earth to the building. A few feet below the surface, the earth remains at a stable temperature throughout the year; in New England this is about 55 degrees Fahrenheit. In the summer months, the DX system operates like the compressor in an ordinary refrigerator or an automobile air conditioner; it transfers heat from the building to the earth, and thus cools the building. In the winter, the system's

action is reversed, and it transfers heat from the earth to the building, providing comfort in the coldest weather.

DX Geothermal is remarkably efficient. According to U.S. Department of Energy, DX Geothermal provides three to four units of energy for every unit of electrical energy used to run them. Energy Independence, LLC has measured system providing as much as six units of energy. Moreover, the United States Green Building Council, which has created the "Leadership in Energy and Environmental Design" or LEED point rating system – a system supported by the Governor and the Connecticut General Assembly – includes DX Geothermal in meeting the LEED energy performance standards.

Clearly, Connecticut needs to support the development of innovative, alternative and renewable energy systems such as DX Geothermal in order to strengthen its energy independence and economic competitiveness. With rising energy costs, uncertain supplies and political upheavals around the world, growing green energy solutions such as DX Geothermal is in the best interest of Connecticut.

We must therefore nurture the growth of technologies such as DX Geothermal by creating a supportive regulatory environment. This is consistent with the public policy of the state, which has authorized tax credits and grants to support DX Geothermal and other geothermal energy systems. To that end, we respectfully submit the following comments for your review and consideration:

As currently drafted, the proposed regulations effectively prohibit the use of DX Geothermal systems. While we recognize that the Department has attempted to build some flexibility into the proposed regulations by authorizing the commissioner to approve the use of other refrigerants, tubing, etc., we believe that this approach would have a chilling effect on the use and development of other geothermal technologies, including DX Geothermal. In order to support and nurture investment in DX Geothermal and other energy systems, the regulations must provide certainty and clarity. Otherwise, manufacturers, investors, installers, consumers and businesses will be reluctant to invest in and utilize such technologies.

Energy Independence, LLC therefore identifies the following issues in the proposed regulations which will thwart the development of DX Geothermal:

I. Construction of Regulations

Pursuant to Section 25-126 of the general statutes, "well drilling" is defined as "the industry, procedure and all operations engaged in by any person, full time or part time, for compensation or otherwise, to obtain water from a well or wells by drilling, or other methods for any purpose of use."

Geoexchange bore hole drilling, however, is generally defined as a hole drilled or bored into the earth into which piping is inserted for use in a geothermal system – a system which uses the Earth's thermal properties in conjunction with electricity to provide greater efficiency in the heating and cooling of buildings. Given the vastly different

procedures, coupling together provisions relating to geothermal bore hole drilling with the Well Drilling Code create some confusion that that may have unintended consequences for DX Geothermal as well as traditional well drillers. We therefore recommend that the regulations relating to geothermal bore holes be addressed separately, rather than attempting to insert them into existing regulations affecting well drillers.

II. Definitions – Geothermal Bore Hole – Proposed Section 4 (16)

The definition of “Geothermal Bore Hole” in Section 4 (16) is limited to vertical bore holes. DX Geothermal uses an off-vertical earth tap loop pattern to minimize the manifold pit and point of entry and to maximize the earth contact with the least amount of bore hole depth (only 30 – 60 feet) and size (2.5 – 5 inches in diameter). **We therefore recommend that the definition of geothermal bore hole be revised to incorporate reference to off-vertical methods.**

III. Geothermal Bore Holes – Proposed Section 25-128-39a

DX Geothermal utilizes bores of 2.5 – 3 inches in diameter. Although this section attempts to accommodate these smaller bore sizes by providing that the geothermal bore holes shall be a minimum of 4 times the inside diameter of the largest individual loop, the following provision is too restrictive and must be deleted: “Geothermal systems employing fluids that remain in a liquid state while circulating through loop pipes shall have bore holes with a minimum diameter of 4 inches.”

IV. Closed Loop Geothermal System Fluid – Proposed Section 25-128-39b

Proposed Section 25-128-39b limits the types of fluids that are permitted for use in closed loop geothermal systems to potable water, heat transfer fluids containing potable water and a maximum of 20% food grade propylene glycol or potassium acetate. This therefore prohibits the use of certain refrigerants even though EPA has concluded that such refrigerants are a safe, acceptable method to be used in DX Geothermal systems. We therefore recommend that this section be revised to allow for acceptable refrigerant blends as set forth in <http://www.epa.gov/ozone/snap/refrigerants/refblend.html>. We also refer you to the following sources for more information relative to the use of these refrigerants:

Step 1

For a list of EPA list of acceptable refrigerant blends (components):

<http://www.epa.gov/ozone/snap/refrigerants/refblend.html>

Sample: 421A, components = HFC-125 and HFC-134a

Step 2

The Substance Registry System (SRS) provides information on substances and how they are represented in the Environmental Protection Agency (EPA) regulations and information systems

<http://www.epa.gov/srs/>

Sample:

Look up HFC-125 and get CAS 354-33-6

Look up HFC-134a and get CAS 811-97-2

Step 3

Use the PBT Profiler

Developed by the Environmental Science Center under contract to the Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency

<http://www.pbtprofiler.net/>

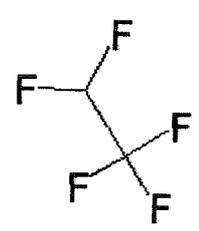
Sample:

Component 1 - HFC-125 CAS 354 33-6

Results

Orange or red highlights indicate that the EPA criteria have been exceeded.
Black-and-white version

<u>Persistence</u>		<u>Bioaccumulation Toxicity</u>		
354-33-6 Pentafluoroethane				
PBT Profiler Estimate = PBT				
<u>Media</u>	<u>Half-Life</u> (days)	<u>Percent in</u> <u>Each Medium</u>	<u>BCF</u>	<u>Fish ChV</u> (mg/l)
Water	38	 47%	3.1	28
Soil	75	0%		
Sediment	340	0%		
Air	8,300	 52%		



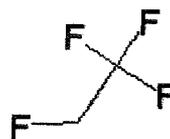
P2 Considerations and more information

Note: The EPA considers any chemical's BCF of greater than 1000 to be a problem.
HFC-125 is 3.1

Results

Orange or red highlights indicate that the EPA criteria have been exceeded.
Black-and-white version

	<u>Persistence</u>		<u>Bioaccumulation</u>	<u>Toxicity</u>
811-97-2 1,1,1,2-Tetrafluoroethane				
PBT Profiler Estimate = PBT				
<u>Media</u>	<u>Half-Life</u> (days)	<u>Percent in</u> <u>Each Medium</u>	<u>BCF</u>	<u>Fish ChV</u> (mg/l)
Water	38	██████████ 47%	3.9	18
Soil	75	0%		
Sediment	340	0%		
Air	3,200	██████████ 52%		



Note: The EPA considers any chemical's BCF of greater than 1000 to be a problem. HFC-134a is 3.9

V. Closed Loop Geexchange System Piping – Section 25-128-39c

We opposed Proposed Section 25-128-39c, which restricts the use of materials for the underground portion of a closed-loop geexchange system to high density, polyethylene extrusion compound.

These provisions effectively prohibit the use of DX Geothermal, which uses copper taps or loops which are very heat sensitive and allow the nearly resistance free movement of heat to and from the earth. The benefits of copper are clearly evident. DX Geothermal uses an “off-vertical” earth tap loop pattern to minimize the manifold pit and point of entry and to maximize the earth copper contact with the least amount of bore hole depth (only 30 – 60 feet) and size (2.5 – 5 inches in diameter). As a result, the heat transfer is superior to any plastic based tubing systems and the process itself is less expensive.

While we recognize that Section 25-128-39c 2 of the proposed regulations gives the commissioner discretion to approve other types of piping, such as copper, this does not provide the industry as well as consumers with the certainty and clarity needed to support the growth of DX Geothermal. Moreover, a process that involves review by the Department of Consumer Protection, in consultation with the Department of Public Health and the Department of Environmental Protection, may prove unduly time-consuming which would discourage the growth of green technologies, such as DX Geothermal.

We therefore urge the department to redraft this section to reflect the use of copper tubing as an acceptable material for closed loop geexchange systems.

VI. Joining Sections of Pipe – Proposed Section 25-128-39c (b)

In addition, Section 25-128-39c(b) dictates the acceptable method for joining sections of buried polyethylene pipe but do not reference acceptable methods for joining other types of pipe used in geothermal systems. **This section should also be redrafted to reflect methods of joining other types of pipes.**

VII. Annular Space – Proposed Section 25-128-48a

This section requires all closed-loop geexchange bore holes, upon installation of loop piping, to be grouted with high grade bentonite or thermally enhanced bentonite compounds containing a minimum of 20% by weight of bentonite with a maximum coefficient of permeability of 10^{-7} cm/s. For DX Geothermal, sand or sand-bentonite mixture is an acceptable grouting material. Again, although the regulations attempt to build some flexibility into this provision by allowing the department, in consultation with the Department of Public Health to approve other grouting materials, this undermines the ability of the state to grow green technologies such as DX Geothermal. **We therefore recommend that this section be revised to reflect sand and sand-bentonite mixtures as an acceptable method of grouting for DX Geothermal.**

VIII. Tremie Method – Proposed Section 25-128-48a 8(g)

Section 25-128-48a 8(g) requires all closed-loop geexchange system bore holes to be filled using the tremie method. However, in a DX Geothermal system, since bores are short and shallow, they can be grouted without the use of a tremie tube. **We therefore recommend that this section be revised to reflect that the DX Geothermal closed loop systems do not have to be filled using the tremie method.**

IX. Bore Hole Termination – Proposed Section 15

There are differences with the methods used for bore hole termination in DX Geothermal because the holes are so shallow and narrow. Generally, masonry sand is returned to the hole. **We therefore recommend that this section be revised to exempt DX Geothermal or to incorporate reference to methods for the termination of DX Geothermal bore holes of bore hole termination in DX Geothermal.**

X. Geexchange System Abandonment – Proposed Section 21

There are differences in the process for abandonment of a DX Geothermal system. For example, the refrigerant should be recovered and loop abandoned. **We therefore recommend that this section be revised to exempt DX Geothermal or to incorporate reference to methods for abandonment of a DX Geothermal system.**

XI. Well Drilling Licensing – Proposed Section 22

The proposed regulations extend the licensure requirements for well drillers to the drilling of bore holes. This would undermine the ability of the state to utilize DX Geothermal. DX Geothermal utilizes an “off-vertical” earth tap loop pattern with smaller

bores (2.5 – 3 inches in diameter) and a bore depth of 30-60 feet. The type of equipment used in well drilling can only drill at a straight vertical and cannot drill the smaller bores that are utilized in DX Geothermal. We are therefore concerned that by requiring licensure as a well driller, there will not be any drillers who are licensed with the equipment and expertise to drill the types of bores needed in DX Geothermal.

XII. Permit Requirement – Proposed Section 29

This section requires a well contractor to obtain the permit. **This should be revised to include other qualified individuals, such as HVAC, plumbers or individuals certified by the geothermal consortium or equipment manufacturer.**

Again, thank you for the opportunity to comment. We look forward to working with the department to craft regulations that will help consumers save thousands of dollars on their energy bills using green technologies such as DX Geothermal.

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