Upper Peninsula of Michigan Geothermal Technical Guidance

The Superior Environmental Health Code's definition of a "well" includes the following in regards to geothermal exchange:

- An opening in the surface for the earth for utilizing the geothermal properties of earth formations, including, but not limited to a heat exchange well used for the purpose of utilizing the geothermal properties of the earth formations for heating or air conditioning.

The Superior Environmental Health Code authorizes the local health department to develop and adopt a technical guidance manual. This geothermal technical guidance applies to jurisdictions under the Superior Environmental Health Code.

This technical guidance document shall become effective on _July 1_, 2009.

Vertical Closed Loop Systems

Vertical Closed Loop Systems are any installations vertical or horizontally directionally bored which are at a depth of 15 feet or greater.

Vertical closed loop systems require a permit from the local health department.

One permit is required for single and two family residential sites or systems.

One permit is required per 25 boreholes on a commercial site or system.

Permit application shall include a site diagram, the number of proposed boreholes, and proposed heat transfer fluids to be used.

A permit application must be submitted to the local health department 14 days prior to installation.

Geothermal Construction Permit Requirements:

1. Geothermal boreholes must be constructed (drilled and grouted) by a Michigan licensed water well driller or individuals authorized under the Administrative Rules, as amended, of the Michigan Public Health Code, 1978 PA 368, Part 127.

2. All hydronic piping installation must abide by the rules set forth in the 2006 International Mechanical Code.

3. A preliminary site evaluation shall be conducted by the health department prior to any drilling or installation.

4. Geothermal boreholes must be constructed and grouted in accordance with Part 127.

5. Grouting of boreholes shall be completed within 24 hours of borehole completion.

6. One record representing the formation must be submitted for each geothermal permit. The formation information, as-built drawing, and all other requested information must be recorded on the DEQ Geothermal Closed –Loop Construction Notice and submitted to the health department within 60 days of completion of the boreholes.

7. Vertical loops shall be isolated in accordance with the following isolation distances:

Household drinking water well	50 feet
Type IIb or Type III public water well	75 feet
Type I or IIa public water well	200 feet
Residential on-site sewage system	25 feet
Buried water service line or sewer line	10 feet
Property line	10 feet

   Note: The local health department having jurisdiction shall have the authority to grant variances to or increase the isolation distance listed above.

8. Heat transfer fluids shall be food-grade propylene glycol, methanol, or ethanol (20 percent) or other nontoxic compounds that meet IGSHPA Closed Loop/Geothermal Heat Pump Systems, Design and Installation Standards, 2007 Edition, Section 3B and 3C, and are compatible with manufactures' specifications. Flammable liquids shall not be used.

9. All underground piping must be a minimum of 160 psi pressure rated high density polyethylene.

10. All joints in piping must be heat fused by butt, socket, sidewall or electrofusion in accordance with the pipe manufacture's procedures and in compliance with the 2006 International Mechanical Code.

11. Pressure testing must be conducted prior to transfer fluids being installed. Pressure testing must be at 100 psi for 30 minutes in compliance with the International Mechanical Code.

12. A leakage detect shall be immediately excavated and repaired or the loop shall be permanently abandoned in accordance with Part 127.

13. A tag listing contractors name, chemicals used for heat transfer fluids, and chemical concentrations must be install on the heat exchanger unit.

14. All buried geothermal piping must have continuous locator tape attached.

15. All vertical bore holes that are to be abandoned must be abandoned in accordance with Part 127. If the loop can not be removed, the loop shall be permanently sealed by pumping high solids bentonite grout into the loop and completely filling the loop with grout.

Vertical Open Loops Systems

Vertical Open Loops Systems utilize a water well to supply ground water to a heat pump. All open loop wells are regulated under Part 127, require a water well permit from the local health department, and shall be constructed by a Michigan licensed well driller.

Wells that are part of a groundwater thermal exchange system may not serve another function, except water may be supplied to the domestic water system if the domestic water system is protected by an airgap or backflow prevention device in accordance with Michigan's Plumbing Code.