

## **APPROVAL CONDITIONS FOR GEOTHERMAL BOREHOLE CONSTRUCTION**

1. The Driller shall contact the Private Water Supply Contact (by phone or e-mail) for the county they will be drilling in at least 24 hours before borehole drilling begins on any approved project. See reverse side for county contact list.
2. Geothermal pipe loops shall be of approved material for geothermal installation and have a 50-year warranty against defects in materials and workmanship. Loops shall be assembled and pressure tested according to International Ground Source Heat Pump Association (IGSHPA) standards at the factory.
3. The Standard Dimension Ratio (SDR) and working pressure rating of all geothermal piping shall be sufficient to accommodate the system pre-pressurization and the total dynamic head. The total system pressure shall remain below the working pressure of the pipe.
4. Only Wisconsin Department of Natural Resources approved heat exchange fluids and grouts shall be used in a vertical closed loop system.
5. The borehole shall not remain ungrouted for more than 24 hours after completion, but grouting should begin as soon as practicable after completion. The grouting product approved in this application shall be placed in each borehole using a tremie pipe and grout pump. The grout shall be placed from the bottom of each borehole to the top, withdrawing the tremie pipe as needed to place the grout correctly. If the grout settles, additional grout shall be placed in each borehole until grout settling ceases. The borehole shall be covered at all times, until grout settlement ceases and the final grout addition is made.
6. The Wisconsin approved grout material shall be mixed so that it contains a minimum of 20 percent solids when it is placed in each borehole. Thermally enhanced geothermal grout materials using sand to enhance thermal conductivity shall be mixed according to the manufacturer's instructions. A mud balance shall be used to determine if the grout mix achieves the proper weight before it is placed in a borehole. A mud balance shall be used to determine when the mud weight meets specification as it exits the top of a borehole while the borehole is being filled. Grouting shall continue until the mud weight of the grout exiting the top of a borehole is equivalent to the mud weight of the grout being pumped into the borehole.
7. Each geothermal loop shall be pressure tested according to IGSHPA standards after it has been installed in a borehole and the borehole has been properly grouted.
8. Fusion welding of the geothermal loops to the header pipes shall be done according to IGSHPA standards by an IGSHPA certified individual.
9. The geothermal loop system and header pipes shall be pressure tested as a unit according to IGSHPA standards before the loop and header piping is covered with back fill.
10. The geothermal loop system and header pipes shall be pressure tested as a unit according to IGSHPA standards when the system is connected to the heat pump.
11. All loop and header piping shall be purged and cleaned according to IGSHPA standards during the installation and assembly process.
12. If construction of this geothermal system has not commenced within 2 years of the date of this approval, this approval is void. Therefore, you must submit a new application requesting approval for the geothermal system after 2 years if construction of the system has not commenced before then.
13. In the event that any part of the geothermal system fails a pressure test at any time, the location of the leak or leaks shall be identified and replaced or repaired according to IGSHPA standards. Any geothermal loop within a borehole that is identified to be leaking shall be excavated and repaired or the loop shall be permanently sealed by pumping high solids bentonite grout into the loop and completely filling the loop with grout.
14. Contact the local unit of government and ask if they have any local permits for geothermal installations. Ask them to confirm the location of any municipal well systems in their area, and if you will be drilling in a wellhead protection plan area.