

By Phil Rawlings

If you have a question about geothermal installation, design or troubleshooting, send it to Phil Rawlings in care of *Geo Outlook*, Oklahoma State University, 499 Cordell South, Stillwater, OK 74078 or via e-mail to insight@igshpa.okstate.edu.



1. Should I require a P.E. to design my ground heat exchanger?

The P. E. designation carries no indication of experience with or proficiency in geothermal loop field design. The designation for the highest level of qualification in geothermal heat pump system design (requiring understanding, knowledge, and experience) is the Certified Geothermal Designer. This credentialing is administered by the Association of Energy Engineers (AEE), with joint sponsorship by the International Ground Source Heat Pump Association (IGSHPA) and the Geothermal Heat Pump Consortium (GHPC). If the P. E. is not a CGD, be sure to evaluate their qualifications, experience, and references. Also, do not exclude highly qualified CGDs that are not P. E.s!

2. If the P. E. is a good, highly qualified mechanical engineer, what's the problem?

A lack of understanding and/or experience in the field can result in poor system design. The most common mistakes are not adhering to IGSHPA installation standards and recommendations by:

- Using standard instead of extended range water source heat pumps.
- Using unnecessary boiler/chiller or boiler/cooling tower type mechanical room and heat pump connection components and accessories.
- Using “utility” class trenching specifications for loop field header piping.
- Using “hard” (metal, PVC) loop pipe testing criteria on the flexible, expansive (under pressure) high density polyethylene piping specified in IGSHPA Standards.
- Ignoring or misinterpreting state or local well drilling/casing/well sealing regulations.
- Inappropriate loop design approach resulting in incorrect loop length, pipe size, grout, header design, etc.
- No reverse return header connections to balance flow through each borehole in a multi-borehole grid
- No “step-down” of loop field header piping sizes to facilitate purging
- No accommodations in the mechanical room for high volume flushing/purging

3. Do state or local drilling and/or water well codes have jurisdiction on federal facilities?

Maybe!!! If personnel at a federal facility indicate they are not governed by state or local codes/regulations, get it in writing! Then check it out with the state or local jurisdictions to verify the information is correct. If you get conflicting information, you must work with both parties to reach a clear and mutually agreed understanding, in writing, of who has jurisdiction.

4. What type of ground heat exchanger is most common on federal facilities?

Typically, vertical ground heat exchangers. Some facilities have been able to use pond loops where bodies of water are available. Other applications have used standing column wells or conventional pump-and-dump open loop ground water systems with reinjection wells. Space and dense underground utilities typically prohibit using horizontal loops.

Mr. Rawlings has over twenty-five years experience in the geothermal industry. He is a Certified Geoexchange Designer (CGD) and an IGSHPA Accredited Installer and Trainer.