

Mr. Hamby,

Allen County Primary Center Geothermal HVAC system is experiencing severe problems concerning the Variable Frequency Drive (VFD) components that control the speed in which the geothermal water pumps run. Our current VFD is 20 years old and is failing. It is obsolete and there are no parts available for repairs. Our VFD is a single unit that controls 2 motors. We only run 1 motor at a time and alternate daily. **It is crucial that we replace our VFD drive as soon as possible. It is failing daily and our only alternative is to run the pump motors at full speed which causes an extremely high pressure in our geothermal system.**

The pump motors are 50 horsepower three phase 460 volt motors that utilize a VFD to control the speed. A **VFD drive** is a device that is used to control the speed of an electrical motor. The speed is controlled by changing the frequency of the electrical supply to the motor. We cannot continue running these motors at full speed (60 hertz) because of the high pressures achieved in the geothermal piping systems. These high pressures cause stress on our piping systems and can lead to pipe failure. Pipe failure results in a flooding situation as well as complete geothermal system shutdown.

We normally run these pump motors at 36 hertz or approximately 60% of their rated maximum speed in order to maintain a certain differential pressure in the geothermal system piping. By using a VFD we have two (2) primary advantages as opposed to using smaller pumps and pump motors.

1. A VFD allows varying speed of the motor to maintain a constant differential pressure in the geothermal system. As various HVAC units cycle on and off, the differential pressures change. The VFD allows the motors to speed up or slowdown in order to maintain the required differential pressure.
2. By utilizing a VFD the electric motors run slower and cooler thus extending the life of the motors dramatically.

It is my recommendation to replace our current failing VFD with two (2) new VFD units that control each motor independently. An automatic rotation cycle would be included so that both motors run equally. Two VFD drives will give us redundancy that will minimize total system shutdown.

I have attached 2 quotations.

- Comfort Process Solutions - Complete turnkey package. Please note that this quote is 7 months old and is under review by CPS for updated pricing.
- Bluegrass Hydronics is for equipment and startup only. This also includes utilizing existing differential pressure transmitters. Price does not include electrical or mechanical installation. Additional labor cost must be added for mechanical and electrical installation. Rough estimate \$8,000-\$12,000 install cost.

Kelly Grizzle