engineering
design
initiative

September 23, 2013

Swift County
Mike Pogge-Weaver, County Administrator
301 14th Street North
Box 288
Benson, MN. 56215

Re: Swift County LEC HVAC Conversion to Geothermal
EDI Project No. 13-045.01

Dear Mike,

Based upon our discussions, it is our understanding that the Board is considering a geothermal system for the courthouse building based upon our previous study. Since that study did not address the LEC, the Board has asked if the LEC can be incorporated into a facility wide geothermal system that includes both buildings. This information will assist the Board in their decision making process.

Existing HVAC:
In general, the LEC has two air handlers (AHU) each with a hot water coil and a DX cooling coil. Hot water for heating is produced by the boiler plant in the courthouse and delivered over to the LEC via two underground heating pipes inserted into sleeves. These heating pipes daylight into the LEC basement and are piped to the heating coils in the two AHU's. Hot water is also delivered to two hot water suspended unit heaters located in each of the garages.

On the cooling side, the two air handlers have DX cooling coils with refrigeration piping routed to two outdoor air cooled condensing units.

The two AHU's are original equipment to the building from 1984 as well as one of the outdoor condensing units. The other outdoor condensing unit has been replaced.

Geothermal Feasibility:
To convert the existing system to geothermal, the following would need to be accomplished:

1. Provide an additional 17 bores to the borefield, 350 feet deep, to accommodate this addition load.
2. Replace the heating and cooling coils in the existing air handling units. The air handling units will remain. The coiling coils will change from a refrigerant coil to a chilled water coil.
3. Disconnect and remove the two outdoor condensing units as they will no longer be needed.
4. Disconnect and remove the garage unit heaters. These would be replaced with water-to-air heat pumps.
5. Provide two water-to-water heat pumps and locate in the LEC. Location within the LEC to be determined. These heat pumps will supply heating water to the hot water coils and chilled water to the new cooling coils all located in the AHU's. A reversing valve within the heat pump switches the unit into the heating or cooling mode.

6. The existing hot water heating pipes from the courthouse boiler plant will be converted to an extension of the borefield loop. These pipes will connect to the source side of the new heat pumps in the LEC.

The LEC appears to be a good candidate for conversion for the following reasons:

1. The coils in the air handlers are 30 years old and are beyond their expected service life. Replacement or repairs can be expected.
2. One of the condensing units is also 30 years old and beyond its expected service life. Replacement or repairs can be expected.
3. The existing heating system is not extensive and does not include reheat coils or any fin-tube radiation. Those items would require replacement if they existed.
4. If scheduled correctly, the work can be accomplished with minimal operational effect to the facility.

Schedule:
To minimize operational distributions, it is advised that the work be performed during the cooling season. The intent would be to utilize the existing DX cooling system while the heat pump system is installed.

Engineers Opinion of Probable Cost: Range from $375,000 – $450,000

Expansion of the borefield:	$97,000
Heat pumps:	$80,000
Air handler coils (4 total):	$15,000
Buffer tanks, pumps and piping:	$50,000
	$242,000
Labor:	$150,000
Total:	**$392,000**

If you have any questions, please feel free to give me a call to discuss,

Sincerely,