



City of Eagan – Civic Ice Arena Renovation

May 19, 2010

City of Eagan

Steve Lutz

TRAK International

GSHP Demonstration Projects

- Timeline
 - Start date = February 15, 2010
 - End date = July 31, 2010
 - Percent Complete = 65%
- Budget
 - Project Funding = \$2,751,932
 - DOE Funding = \$1,338,000
- Barriers
 - Arena Schedule
 - Geothermal Well Field
 - Parking Lot / Road Weather
 - DOE Approval
- Partners
 - Harris Companies / TRAK International

- Provide a reliable central ice making and heating system that meets the performance requirements of the owner.
- Reduce operation and maintenance costs.
- Provide a high quality indoor environment for the building occupants.
- Meet aesthetic requirements of the building.
- Meet construction budget.
- Provide a system that provides energy cost savings to pay for any increased costs in initial capital in a reasonable period of time.
- Provide a system that can be expanded should the facility require it.

- User Group Meetings
- Load Analysis
- Design Heat Pumps
- Existing Facility Equipment
- Waste Heat Rejection
- Well Field Test Bore
- Well Field Sizing
- Schematic Documents
- Construction Documents
- Building Information Modeling (BIM)

- PreConstruction Services
 - Energy Audit and Analysis – 100%
 - Estimate Schematic Plans – 100%
 - Preliminary Pricing – 100%
 - City Council Approval – 100%
- Design - Construction Documents
 - HVAC Ductwork, Piping, Equipment Plans – 100%
 - Geothermal Well Field Plans – 100%
 - Heat Pumps – 100%
- Design - Building Information Modeling (BIM)
 - Prefabrication Drawings – 100%
 - Heat Pump – 100%
- Construction
 - HVAC Ductwork, Piping and Equipment – 80%
 - Fabricated Piping – 75%
 - Heat Pumps – 65%

- SubContracts
 - Electrical – 90%
 - General Construction – 20%
 - Insulation – 10%
 - Temperature Controls – 10%
 - Low E Ceilings – 0%
 - Geothermal Well Field – 70%
 - Asphalt – 0%
- Documentation
 - Owner Training – 0%
 - Measurement and Verification – 0%
 - Energy Analysis – 30%

- **Personnel**
 - Design and Energy Analysis \$14,900 100%
 - Project Management \$46,644 30%
 - Project Set-up and Commissioning \$81,056 27%
 - Measurement and Verification \$22,820 22%
 - Project Management of SubContracts \$329,853 36%
- **Travel**
 - Vehicle and Travel Expense \$9,560 39%
- **Supplies**
 - Miscellaneous Materials \$21,200 51%
- **Contractual (Vendors)**
 - Mechanical and Electrical Install \$1,283,380 100%

- Vendors Continued

– Geothermal	\$570,000	51%
– Geothermal Controls	\$100,384	0%
– HVAC Controls	\$70,125	0%
– Low E Ceilings	\$115,150	0%
– Building Doors	\$3,795	0%
– Water Conservation	\$9,774	0%
– Geothermal Test Well	\$3,565	100%

- Other Direct Costs

– Permits, Bonds and Fees	\$25,000	100%
– Misc. Tools and Rentals	\$18,000	64%
– Taxes	\$26,825	0%

- Schedule
- Design
 - Low-Emissivity Ceilings
 - Direct Digital Controls
 - Dry Fluid Cooler
 - Waste Heat Reuse
- Heat Pump Technology

















