City of Eagan – Civic Ice Arena Renovation
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City of Eagan
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This presentation does not contain any proprietary confidential, or otherwise restricted information.
Eagan Ice Arena Overview

– 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
Relevance/Impact of Research

• 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.
Scientific/Technical Approach

- 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)
Project Schedule

• 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%
Application of Resources

- **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%
Application of Resources Continued

- **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%
Summary

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