Geothermal Retrofit of Illinois National Guard State Headquarters Building
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Department of Military Affairs
Ground Source Heat Pumps Demonstration Projects

This presentation does not contain any proprietary confidential, or otherwise restricted information.
Overview Slide

- **Timeline**
  - Start Date: May 2010
  - Feasibility study complete October 1, 2010
  - Project Design complete December 1, 2010
  - Construction complete August 2011
  - Monitoring complete August 2014

- **Budget**
  - Total project funding, DOE share = $1,200,000, awardee share = $400,000, To date no funding has been received

- **Barriers**
  - Technical Issues
  - Legal Issues
Relevance/Impact of Research

• Potentially reduces cost of installation by reducing well field requirements from hundreds of wells to as few as two.

• Scalable

• “Green” use of former coal mine

• Payback periods of less than 10 years for implementation to meet National Guard Bureau standards
Scientific/Technical Approach

• Determine Legal issues including
  – Ownership
  – Liability
  – Permitting

• Test Wells to determine
  – Water temperature, quality and quantity
  – Recharge rates and design parameters

• Design and Implementation
  – Based on results, design system to
    • Minimize wells
    • Scalability
    • Long term viability
Accomplishments, Expected Outcomes and Progress

• Develop methodology for determining mine water quality and quantity;
• Determine legal issues related to ownership, liability and permitting requirements;
• Determine the best energy recovery systems that balance cost with environmental or other concerns;
• Estimate scalability for campus use;
• Develop alternative plans and emergency planning for potential changes in mine water availability and temperature;
• Publish a methodology for exploiting this resource across the state of Illinois.
• Project Management
  – Illinois Department of Military Affairs
    • Mark Lee, Energy Manager
  – Capital Development Board (Illinois state contracting)
    • Gary Kitchen, Project Manager
  – Technical and Design Support
    • Hanson Professional Services/IGE

• Schedule
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• Reporting
  – Feasibility Report
  – Construction Plans
  – Monitoring
Future Directions

• Apply the technology to the planned new Combined Support Maintenance Shop (CSMS), located adjacent to the Headquarters building (2014).

• Expand initial system across the campus as new construction is implemented or retrofitting pre-existing structures (2016-beyond)

• In Illinois, there are over 5,500 abandoned mines that generally lie in the same strata and potentially offer the opportunity for similar geothermal treatments. Potential near term sites in Springfield
  – The airport
  – 183rd FW (Air Guard)
  – State Fairgrounds
• Key Points
  – Only limited applications of mine water usage for geothermal have been demonstrated before – none in Illinois
  – Illinois National Guard has never attempted a project of this nature
  – Illinois mine landscape is perfectly suited for this application
  – If successful, Illinois National Guard will follow up with multiple applications on Camp Lincoln
  – Should reduce construction costs enough to meet National Guard Bureau guidelines for payback periods – expanding the use of geothermal in new and retro construction significantly.