

GEOHERMAL HEATING APPLICATION

By Rich Krumel

Barker Lemar has begun utilizing stored geothermal energy for heating our Drilling Division Headquarters. The newly-constructed 6,000 square foot shop building was completed in 2004 and integrates a closed-loop geothermal exchange system with a radiant-floor heating system.



HOW IT WORKS

The geothermal exchange system uses fourteen 200-foot boreholes with a mixture of water and antifreeze circulating to and from the building. The temperature below ground is typically about 55° F in the top few hundred feet. In the heating mode, the temperature of the water rises from approximately 40° F outgoing to 46° F incoming.

a Heat Pump.

And that's exactly what it does. The heat pump units use the heat from the ground to boost the temperature of the fluid circulating in the tubing laid in the floor of the building to approximately 100° F. The warm concrete slab radiates heat throughout the building.

ADVANTAGES

It is well known that the operational costs for geothermal are significantly lower than conventional heating or cooling. In this case, the operating costs for the coldest months of the winter 2004-2005 were calculated at approximately \$600 per month. This is for a 6,000 sq. ft. building, with minimal insulation and three large overhead doors which are opened regularly!

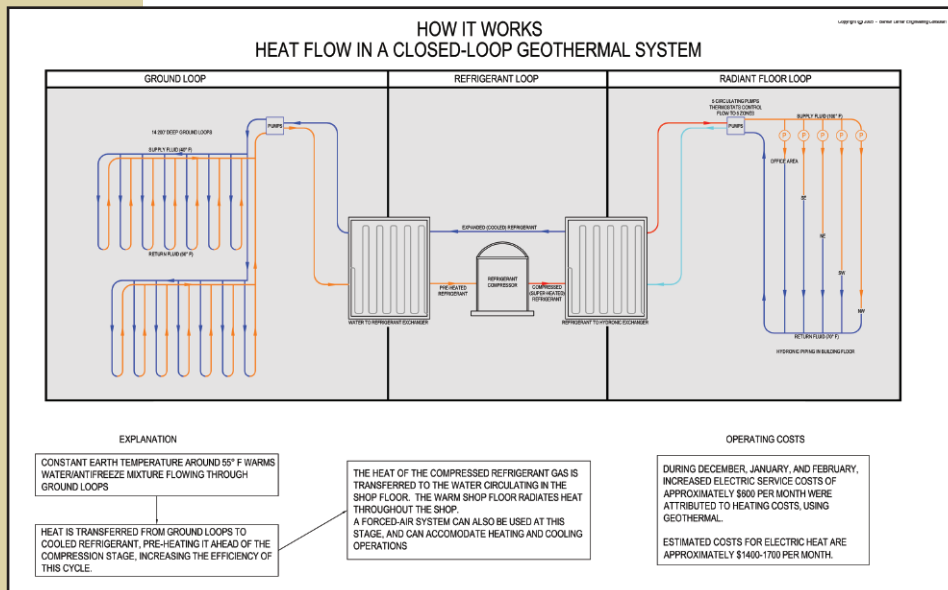


Barker Lemar installs geothermal system at Prairie Meadows Race Track and Casino, Des Moines, Iowa.

With the in-floor radiant heat, we have observed a rapid re-heating of the air after doors are closed as well as a drying effect which dries out wet or icy equipment quickly when exposed to the warm floor.

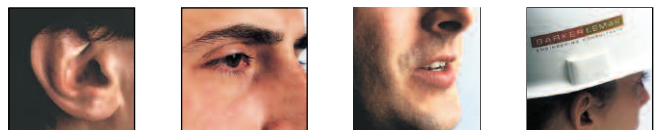
Barker Lemar has completed numerous geothermal projects from large-scale institutional to smaller custom homes. In each case, high quality standards of construction and materials were used to insure a reliable and efficient product.

For more information on Geothermal Systems, contact Tracy Lemar, PE or Rich Krumel at 800-707-4248.



The temperature rise may seem small; however, because it is a continuous flow of liquid, it represents a large amount of available heat (expressed as BTUs) which can be stripped away and used to boost the efficiency of a type of reversible refrigeration know as

LISTENING ► UNDERSTANDING ► SOLVING ► IMPLEMENTING



ENVIRONMENTAL ISSUES: WHAT CONCERNS YOU?

Barker Lemar and Mowry Strategies were awarded a joint contract by the US EPA (Environmental Protection Agency) Region VII to conduct a community-based environmental priorities outreach project in Des Moines, Iowa. The focus of the project was to conduct surveys and participate in a series of public meetings to identify and prioritize environmental issues in the community that are of importance to local residents.



Initially, a series of meetings were held with local environmental leaders, including neighborhood association groups and City of Des Moines staff, to develop a web-based,

bilingual survey instrument that would be used as a tool to collect data from residents. To drive residents to the survey site, an informational flyer was included with the Des Moines monthly water bill in February and sent to 65,000 households. Matt Nieswender, Co-Project Manager said, "Developing focused ideas for implementation and identifying the tools needed to begin the process of change are at the heart of this Environmental Priorities project."



Residents completed 196 surveys. The survey results indicated a significant number of responses within the category "Community Development." The community development category included the following topics: "Improving Urban Blight (such as vacant lots, abandoned vehicles, graffiti, etc.)," "Educating Residents on the Impacts Urban Sprawl has on the City of Des Moines," "Improving Safe Routes for Walking and Biking to Work, School or for Pleasure," and "Using Alternative Forms of Transportation."

Community development issues, specifically the topic of urban blight, were discussed with various community leaders in Des Moines on May 23 and May 24, 2005. "Residents concern about urban blight and related community development issues may be a direct result of the focused attention these issues are

receiving from the City of Des Moines and various non-profit organizations in the Metro area," says Nieswender.

Barker Lemar and Mowry Strategies will be working with the EPA in June and July to solidify additional funding and implement specific projects in 2005/2006. Nieswender states, "The EPA is committed to environmental/community development issues at the local level and they are reviewing the potential of dedicating additional resources so Des Moines can obtain tangible results from specific environmental/community development projects."

RAW DATA SURVEY RESULTS:

196 surveys completed.
Scoring Issue
Highest Scoring Issues
Lowest Scoring Issues

| Total Points | Raw Votes | Issues Description | Environmental Changes |
|--------------|-----------|--|----------------------------------|
| 267 | 79 | Improving urban blight (such as vacant lots, abandoned vehicles, graffiti, etc.) | Community Development |
| 226 | 64 | Educating residents on the impacts urban sprawl has on the City of Des Moines | Community Development |
| 219 | 66 | Improving safe routes for walking and biking to work, school or for pleasure | Community Development |
| 205 | 72 | Maintaining the State's Bottle Bill | Solid Waste Disposal & Recycling |
| 196 | 55 | Quality of drinking water | Public Health |
| 194 | 58 | Greater use of curbside recycling | Solid Waste Disposal & Recycling |
| 181 | 62 | Using alternative forms of transportation | Community Development |

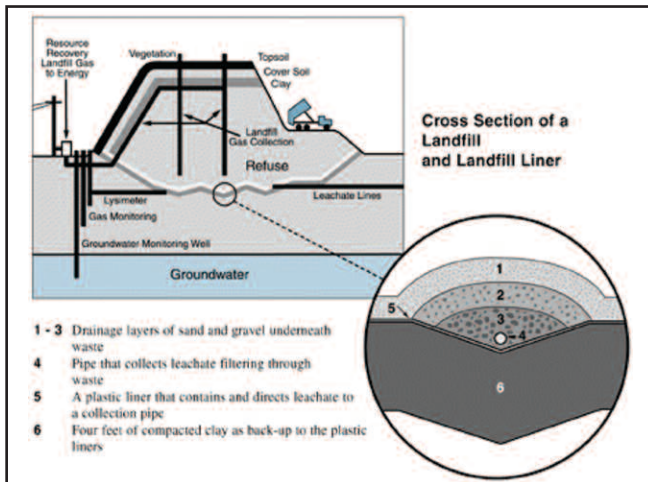
| Total Points | Raw Votes | Issues Description | Environmental Changes |
|--------------|-----------|--|-----------------------|
| 35 | 15 | Mold in private homes | Indoor Air Quality |
| 27 | 10 | Reducing the chances of childhood lead poisoning | Public Health |
| 20 | 6 | Carbon monoxide in private homes | Indoor Air Quality |
| 17 | 5 | Radon gas in private homes | Indoor Air Quality |
| 16 | 7 | Educating the public about soil erosion | Water Quality |
| 15 | 6 | Open burning in unincorporated Polk County | Outdoor Air Quality |
| 6 | 3 | Educating the public about hazardous waste sites | Public Health |

TRANSITIONING MSW LANDFILLS INTO ENGINEERED GROUNDWATER PROTECTION SYSTEMS

By Jeff Myrom, Executive Officer
Energy & Waste Management Bureau, IDNR

Although municipal solid waste landfills (MSWLFs) typically occupy the lowest rung on the integrated solid waste management hierarchy (below source reduction and recycling/composting), they play a critical role in protecting our groundwater resources. The Iowa Department of Natural Resources (IDNR) is transitioning all Iowa MSWLFs into compliance with the minimum federal standards required in 40 CFR 258, often referred to as RCRA Subtitle D.

Iowa is the last state in EPA Region VII (which also includes Kansas, Missouri, and Nebraska) to imple-



ment the RCRA Subtitle D requirements for MSWLFs. Federal regulations passed by EPA in 1991 require all active landfill disposal cells to utilize a liner and leachate collection system to help prevent groundwater contamination. Twenty-seven of Iowa's fifty-nine MSWLFs have already made the transition to properly lined disposal cells and several more facilities already have plans for construction in the near future.

The IDNR recognizes that the transition to Subtitle D liners and leachate collection systems will require additional engineering, consulting, and construction costs for some MSWLFs. However, Subtitle D equivalent landfills offer significant benefits to all Iowans. As stated in 40 CFR 258.1(a): "These minimum national criteria ensure the protection of human health and the

environment." Moreover, 80% of Iowa residents obtain their drinking water from groundwater and 50% of Iowa's industrial and commercial facilities utilize groundwater. Iowa's Groundwater Protection Act (see Iowa Code Chapter 455E.5(1)) sets the policy of the state as "... to prevent further contamination of groundwater from any source to the maximum extent practical." Landfills that are RCRA Subtitle D compliant provide the maximum practical protection for Iowa's groundwater and citizens.

The IDNR has solicited comments from affected facilities and utilized that feedback to work with EPA Region VII to develop a compliance timeline of October 1, 2007, for all MSWLFs to transition to RCRA Subtitle D standards. In preparation for the upcoming compliance timeline, IDNR and ISOSWO partnered to hold two planning workshops for solid waste agency board members, local officials, and operators. The workshops focused on the details of developing a new compliant disposal cell or developing a transfer station to haul waste to a compliant MSWLF elsewhere. Information from the workshops, as well as other information related to compliance with the minimum federal standards for MSWLFs, can be found at the following web site: <http://www.iowadnr.com/waste/policy/landfill.html>.

Recently, liner status verification letters were sent to all MSWLFs to ensure that their permit information was correct. The IDNR will review this information to ensure accuracy before sending compliance schedules to facilities and sharing that information with EPA Region VII as we continue to work together to bring all MSWLFs into compliance with minimum federal standards.

It is important for all non-compliant MSWLFs to begin the local decision making process of whether they will continue landfilling over a new Subtitle D equivalent disposal cell, or transfer their waste to another compliant MSWLF. Iowa, like all states, must implement the minimum federal standards for the protection of our groundwater resources. This transition will be challenging, but it is a necessary step to ensure our MSWLFs are not environmental hazards, but engineered groundwater protection systems for our valuable aquifers.

For more information or questions regarding Subtitle D Compliance, contact: Tim Buelow, P.E. or Christine Collier, E.I. at 800.707.4248.



EMPLOYEE SPOTLIGHT:

Name: C.J. Lage

Title: Project Manager, Solid Waste Division

Technical Expertise: Construction Management of solid waste design/build systems including leachate systems, toe drains, new cell construction, gas collection systems, storm water control structures, transfer stations, recycling centers and management of field sampling activities.

Professional Goals: To consistently maximize project efficiencies while providing our clients with the best service possible.

Education: Bachelor of Science in Environmental Health, Iowa Wesleyan College

Hobbies: Hunting, Kayaking, Bike Riding and House Remodeling Projects

Family: Single

BARKER LEMAR QUARTERLY GOES ELECTRONIC!



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