

Green Feature: Radiant Floor Heating



Styrofoam and wire mesh form the substrate for anchoring the radiant heating tubes in place



Workers install over 8,400 linear feet of plastic tubing for radiant floor heating in the display area, library and offices

The primary means of heating and cooling in the Legacy Center will come from a radiant floor system. One of the most unique features of this system is the use of radiant cooling along with radiant heating. Systems in the United States have typically used radiant panels only for heating because cooling requires that the relative humidity be monitored and cooling turned off when it exceeds a threshold.

The floor of most of the main building will be composed of concrete slabs that house the radiant floor system. Each slab contains internal tubing holding a mixture of a food-grade glycol, a safe, vegetable-based substance designed to prevent the water from freezing inside the tubes. Heat transfer to the glycol mixture in the floor panels occurs at a water-to-water heat pump located in

the basement of the building. Piping extending to nineteen geothermal wells that reach 220 feet below the earth's surface bringing the glycol mixture deep underground to absorb heat from the ground in the winter and dissipate heat in summer. The whole system is composed of 8,400 linear feet of tubing! The heated water will flow through floor panels in the exhibit hall, library, office area, and breezeway. The system uses variable speed pumps to provide only the necessary flow. As each zones reach the desired temperature, it will be turned off and the pump will be slowed down to conserve even more energy.



Plastic tubing will be filled with water and food-grade glycol which will circulate inside the floor to heat much of the building



Nineteen geothermal wells are drilled 220 feet into the ground; each takes about half a day to drill



A team controls the flow of slurry – mud and water – extracted from the well as the drill goes deeper into the ground

To assemble the system, workers first lay 4” thick sheets of rigid styrofoam insulation. On top of that goes a layer of wire mesh. The wire serves both to reinforce the concrete and to act as a grid to hold the plastic tubing in place. A continuous piece of plastic tubing is then fastened to the mesh.



Tubing being installed in the area that will become Aldo Leopold Foundation staff offices

Concrete is poured over the tube system and will serve as the finished floor surface in much of the building. The concrete will take on the temperature of the glycol coils and radiate it into the rooms of the building. Because of the mass of the system and concrete’s insulative qualities, once the slabs reach the desired temperature, it is easy to maintain the temperature without high inputs of heat.



Concrete is carefully smoothed over the plastic tube system

Geothermal energy use currently ranks third among US renewable energies, following hydropower and biomass. The full potential for geothermal use may be realized through increased public awareness and more advanced technical support.



Workers pour concrete over tubing to form floor slabs

Building design by:
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