

They store electricity underground

What's half the size of a football field, lives underground, consumes two million gallons of water and saves millions of dollars?

If you guessed a fat, miserly gnome, you're off. It's the University of Michigan Hospitals' newly constructed thermal storage basin. It's the largest of its kind in a U.S. hospital, according to Gordon Holmes, spokesman for the hospital's architect, Albert Kahn Associates Inc. of Detroit.

The basin is similar to passive solar storage systems used by many homeowners. But instead of storing the sun's energy, the basin will house electrically produced heating and cooling energy.

PART OF the U-M's Replacement Hospital Project, the \$14 million basin was built primarily to economize on air conditioning, and the savings are substantial.

Engineers predict that when the replacement hospital is completed, the basin will help cut electrical costs by almost 25 percent.

Every 10 hours of basin operation, they said, will supply cooling equivalent to 3,000 half-ton air conditioners.

Despite its immensity — 170 feet long, 72 feet wide and 25 feet deep, the basin is practically hidden from view. The only parts visible to a casual observer are a few vents and the eight manhole covers through which engineers may lower themselves to check basin operation.

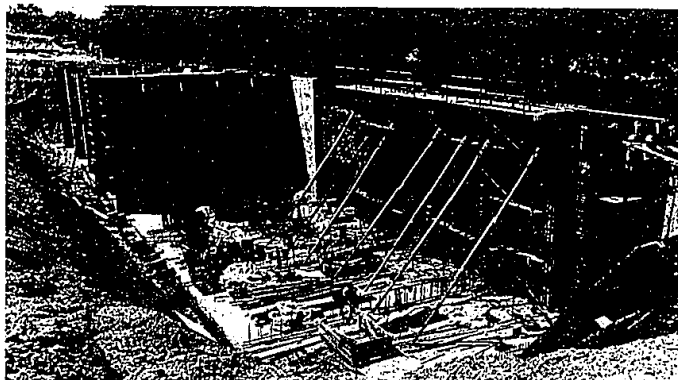
UNDERGROUND, reinforced steel and concrete walls two feet thick retain the water, and eight identical chambers stratify the liquid. Depending on the season, engineers will manipulate the temperature and the water flow direction to cool or heat the hospital.

Twenty-four probes mounted along the basin's side and immersed in the water, will monitor the temperature with the help of a microprocessor. Engineers will take mean Michigan temperatures over a period of several years, feed them into the computer, and get an estimate of how much cooling is required for the next day.

"Only a 10-degree variation in water temperature between the warm and cool sections is needed for the basin to operate effectively," said Andy Parker, senior engineer for U-M Hospitals. Temperature range is from 55 to 45 degrees Fahrenheit, he said.

"THE BASIN is essentially a holding tank," said Parker.

"Water at ground temperature in the basin is cooled 10 degrees by a chiller, and from there, the water travels to the hospital where it is used to cool the



This is the last time you'll ever see the thermal storage basin at the University of Michigan Hospitals' replacement project. When it's done, it will do its work — cutting electricity costs 25 percent — under ground.

air entering a patient's room.

"In winter, the process is reversed, and the chillers are used as pumps, producing heat much like a heat pump in many homes."

The basin permits the electrically powered chillers to run at night when rates are down, in effect storing energy for use the next day. In addition to saving energy, this capability saves money.

Detroit Edison penalizes commercial users by imposing a 24 percent penalty for electricity used between 11 a.m. and 7 p.m., the peak demand period for commercial use of electricity in Ann Arbor.

Commercial demand for electricity plummets during the late evening and early morning hours, and rates are considerably less. At the U-M Hospitals, rates have

risen dramatically. In the 1950s, one kilowatt cost 1.5 cents, Parker said, while today that amount has jumped to six cents per kilowatt.

"Without the basin, an additional 1,500 tons of heating and cooling equipment would have been required," Parker said. "The hospital will save about \$750,000 in equipment alone and another \$16,500 each month in penalty power fees to Detroit Edison."

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