

Yates helps turn log home green — Part 2

All images from Holly Noel Photography.



A Watts rainwater harvesting system is installed. Dave Yates begins the solar thermal system installation. Travis Wenger installs ceramic tile over HeatWeave electric radiant mats in the basement.

SPECIAL TO CONTRACTOR

HUNTINGDON COUNTY, PA. — In the fall of 2007, Travis and Rachel Wenger bought a 2,400-sq.-ft., three bedroom log home on mountainside property here. They decided to build a log garage and to remodel the home, adding insulation, more bedrooms and upgrades to the HVAC system with geo-to-radiant heat and a thermal-solar system. Dave Yates,

CONTRACTOR columnist and president of F. W. Behler Inc., York, Pa., a contracting firm that specializes in “green” mechanical systems, was chosen to manage the project. Part 1 of this article was featured in CONTRACTOR’s November issue and focused on the home’s new geothermal-to-radiant system. It can be read online at: www.Contractormag.com.

The garage radiant system,

like the house, gets warmth from the ClimateMaster THW geothermal water-to-water system. Heat from the home’s “geothermal boiler” arrives through an underground, deeply trenched, insulated supply-and-return injection loop to the garage.

The supply line to the garage feeds into a Hydronex panel from Watts Radiant that regulates flow and water tempera-

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Rehab center slashes energy bills by going tankless

SPECIAL TO CONTRACTOR

MELBOURNE, FLA. — The Melbourne Health and Rehabilitation Center was facing a crisis. Two of the facility’s three 100-gal. tank-type commercial water heaters were beginning to fail. The 180-bed nursing facility runs its laundry and kitchen around the clock; two 75-lb. washing machines operate from 5:00 AM to 11:30 PM, while the kitchen requires hot water for three meals a day with two multi-bay sinks and a dishwasher. A solution needed to be found, and quickly.

Facility Maintenance Director Paul Brezina chose to view the moment as an opportunity to introduce a new, high-efficiency tankless hot water system. “I was once a pipefitter,” Brezina said, “and had installed tankless water heaters myself, so I knew they were good. With the tank-type heaters, we were



Service manager Paul Webb of Sun Plumbing explains the operation of the new manifold of recently-installed tankless water heaters.

never satisfied with the hot-water supply.”

To get the work done, Brezina called Sun Plumbing. The Melbourne-based company has been in business for 35 years, and has had a working relationship with the Health and Rehabilitation Center for the past 10. The company services much of Brevard County out

on the Space Coast of Florida, just south of Cape Canaveral.

“We do everything from plumbing repair, service work to septic tank install and septic tank lift stations,” said Paul Webb, service manager for Sun Plumbing. “We have a remodel department, a new construction department, just

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ture going out to the extensive staple-up loops that serve the upper floor, and the in-slab loop that serves the lower tool room.

“We could meet a lot of needs with the THW heating the 120-gal. of water in the main source tank be-

tween 145°F and 155°F, but still the 3-ton THW couldn't exceed 36,000 Btuh, so we had to chose carefully what to heat, and how, and insulated real well in all directions,” explained Yates, as he discussed the garage addition. “The surprise was that, with house needs seen to, we

still had enough Btus to heat an injection loop to the garage.”

They unfurled a large coil of R-flex, Watts Radiant's heavily-insulated, underground tubing with embedded, tandem 1-in. supply-and-return PEX tubing. It was placed inside a 4-ft. deep trench between the house and garage. The subterranean tubing thermally connects the buffer tank's 120-gal. volume with the garage's slightly smaller two-temperature radiant heat system.

In the heating mode, high temperature water (145°F-155°F) is transported via R-flex to the garage where it enters another Hydronex panel. Source water goes directly into a stainless steel manifold with four Onix loops that disappear into the ceiling. Unseen, they're stapled to the under-floor of the building's 600-sq.ft. upper area that includes a bunk-house bedroom with four beds, a living room, bathroom, kitchenette and hallway, all radiantly heated.

“You could heat the place with a candle,” said Yates, who inspected the insulation around the radiant tubing.

Staple-up heat is directed upward by R-19 insulation below the tubing. The Wengers achieved an incredible R-90 in the ceiling and upper knee-walls. In the garage's lower level, only a tool room was radiantly heated. Slab heat was accomplished by pre-insulating that portion of the slab, and Onix tubing was then attached to rewire and pressure-tested until the concrete over-pour was hard.

Next to the tool room is a large car and boat area. Yates installed a 36,000 Btuh, 16-SEER Fujitsu split system multi-zone heat pump as the exclusive source for heat and cooling of this area (served by an 18,000 Btuh air handler). Two 9,000 Btuh air handlers provide back-up heat and all cooling upstairs.

“The Wengers will probably see an 80% drop in energy



The 2,400-sq.ft., three bedroom log home, located on mountainside property, utilizes an efficient HVAC system with geo-to-radiant heat and a thermal-solar system.

expenses,” concluded Yates. “The carbon footprint got a lot smaller, but they've added tremendously to the size of their comfort zone!”

Also installed during the first phase of the project was a multi-filter Spring House water purification system with ultra-violet light, Watts Premier RO system for drinking water, and a 1,700-gal. rain-water harvesting tank sourced through Watts. Garage drain-spouts go underground to supply it. Though the water could be used for greywater flushing, it will be used for watering the 125 trees planted on the property.

Thermal-solar system

Once the geothermal system for radiant heating and the Tranquility 27 geo unit for back-up heating of the home and air conditioning were installed, Yates turned his attention to the thermal-solar system.

Few would consider Pennsylvania the “sunshine state.” Compared with Florida and several Southwestern states, it certainly gets less solar radiation than they do, but more than enough to make solar viable.

“Give a few solar collectors a six- or seven-hour bath of

southern exposure and amazing things can happen, even in our state,” said Yates.

Yates' crew started this phase of the project with a truckload of solar gear that would soon meet a large part of the domestic water heating load and, when there was more heat from above than the family needed, the sun's warmth would be diverted to the home's geo-to-radiant heat system.

Avid hunters and outdoor enthusiasts, the Wengers wanted the home to be their indoor refuge during the six-month heating season. And, from April through September when sunshine is at its best, they use the home as base camp for visitors.

“Having enough hot water for showers, baths, and clothes- and dish-washing was going to be a real challenge with eight or 10 or 12 people in the house,” said Rachel Wenger. “So when we brought this to Dave Yates' attention, he offered the idea of tying-in solar heat. That struck us as a great idea.”

Part 3 of this story will focus on integration of Oventrop solar-thermal equipment with the geo-to-radiant system and the activation of solar domestic hot water. **C**

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