Yates turns log home green — Part 3

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 and decided to build a log garage and 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., was chosen to manage the project.

Parts 1 and 2 of this article were featured in CONTRACTOR's November and December issues and focused on the home's new geothermal-to-radiant and thermal-solar systems. Both articles can be read online at: *www.Contractormag.com*.

Fortunately, the Wengers and Yates had early conversations about the possibility of tying-in solar heat at a time when Yates was designing the best mechanical solution for the Wengers. Yates calculated that two solar panels from Oventrop — one 4-ft. x 8-ft. flat panel and one 16 tube solar array — would exceed the Wenger's water-heating needs, especially when they were at the home alone.

So when he specified all of the system needs to Watts Radiant, the Springfield, Mo.-based firm that supplied all of the radiant heat gear, including four Hydronex control panels, he explained their desire to integrate solar heat into the home's radiant heat system when there is an excess of heat from the solar collectors.

"We build a Hydronex panel exactly for this purpose," said Alex Green, hydronic engineering manager at Watts Radiant. "The source-select panel is designed to easily integrate multiple heat sources, typically a renewable source with back-up. With more solar heat than they would need from time to time, this off-the-shelf panel was a perfect fit for what Dave Yates needed there. When the Wenger's indirect water heater reaches its set temperature, the panel senses the availability of additional heat from the solar system and simply activates the pumps to let it in."

Sunny side up

Inside, when the Oventrop control unit senses the availability of solar heat, it circulates the closed-loop 50/50 glycol solution through the south-facing rooftop solar collectors and from the roof through insulated copper-to-stainless-steel twin lines that run through the attic, and then an upper-floor closet, and into the basement where it enters a new, 120-gal., twin-coil Bradford White indirect water heater. Heat from the roof circulates within the unit's lower coil to warm the mass of water in there. The separate, upper coil transfers those Btus to "pre-heat" water for the 80-gal. Bradford White electric water heater beside it.

Dave Yates and Scott Barnett set the angle for the Oventrop flat panel.

Dave Yates observes operation of the Oventrop solar pump station.

"The effect is that the Wengers save a lot of previously paid for Btus to heat cooler, incoming water," said Yates. "This is where the lion's share of Btus are consumed in heating domestic water. By preheating it for free, everyone wins."

Scott Barnett and Bob Sieger, senior technicians at F. W. Behler Inc., helped Yates install the solar system. While Sieger began to sweat copper lines to and from the solar control and both water heaters, Yates and Barnett donned safety harnesses and full OSHA regalia before climbing onto the roof to install the solar arrays.

Yates had previously surveyed the location during earlier trips to the Wenger property, noting that, although the home is surrounded by thousands of wooded acres, no shadows were cast on the rooftop until the very end of the day when the sun's solar energy was waning. The rooftop receives good, Btu-rich solar radiation from 8 a.m. or 9 a.m.

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RPA preps for Building Radiant conference, show

LIVERPOOL, N.Y. — The Radiant Panel Association is accepting registrations for both attendees and exhibitors at its Building Radiant 2010 Conference and Trade Show, May 5-8, 2010, in Reno, Nev., at the Peppermill Hotel and Casino.

Vendors will be able to show their products to a focused group of radiant enthusiasts. Classrooms will be available for exhibitor demonstrations.

RPA Executive Director Ted Lowe announced a series of educational tracks for the conference. They are as follows:

Wednesday, May 5:

- Radiant I Class
- Radiant Precision Class
- Radiant Electric Class

Thursday, May 6:

- Radiant II Class
- ET 1: Thriving in Tough Times or Marketing & Advertising
- ET 2: Alt Sources or Geo/Solar Controls
- ET 3: GreenSpeak or Radiant Building Integration

Friday, May 7:

- ET 1: Insurance & Legal or Money Sense - The Numbers
- ET 2: The Electric Option or Installation Considerations
- ET 3: Radiant & Air Conditioning or The Importance of Venting
- ET 4: Working with Others or Open/Closed Systems

Education track topics are subject to change.

Attendees can register for the tradeshow online at *http://www.rpa-info.com/*Reno/ or by calling the RPA office at 800/660-7187. Attendees should make room reservations at the Peppermill Hotel, 866/821-9996, and mention the RPA conference when booking to receive the rate of $97 plus tax. C

In Brief

■ **GHC Mechanical Inc.**, a full-service design build HVAC contractor for the Chicago market, has joined the international group, Linc Service Network. GHC Mechanical, which has been in business since 1969, will begin incorporating the Linc System immediately.

■ New federal data released in mid-December showed sharp increases in the prices of key construction materials like diesel, copper and brass mill shapes, the **Associated General Contractors of America** said. There have been significant one- and three-month increases in the price indices for diesel fuel (up 6.3% over one month and 6.4% over three months), copper and brass mill shapes (+4.6% and +11.3%), steel mill products (-1.6% and +4.1%), and insulation materials (+0.3% and +0.6%). Major steel mills have announced January price increases for construction products.

■ **Mr. Waterheater** has awarded its eighth franchise to DL Cleek Plumbing in North Little Rock, Ark. The Cleeks attended franchise training at Mr. Waterheater headquarters in Pittsburgh in December. Cleek's franchise launch begins in 2010 with a marketing plan developed by Beyond Spots & Dots Advertising Agency.

■ **The U.S. Department of Veterans Affairs**, in accordance with the G.I. Bill, has agreed to reimburse Veterans, eligible dependents and reservists for the cost of any of the LEED Professional Exams administered by the Green Building Certification Institute (GBCI). Individuals planning to take a LEED Professional Exam must apply directly to the VA for reimbursement. The VA will cover up to $2,000 per exam. Anyone who took a LEED Professional Exam after Dec. 3, 2008, is eligible for reimbursement. Visit *http://tinyurl.com/gibillVA* to learn more.

■ Last month's Readers' Choice Awards (pg. 46 of the December issue) has a description of **General Pipe Cleaner's** Snake Oil Lubricant and Protector that included a limited-time offer of a free 4-oz. sample. That offer had expired before printing. CONTRACTOR regrets the error and apologizes to any readers who may have been inconvenienced.

Yates helps turn log home green — Part 3

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until late in the afternoon.

Yates chose to rack the flat panel at a 45° angle for enhanced winter gain, and kept the vacuum-tube array flush to the roofline for optimal year-round averaging. Snow melts rapidly in the winter on the Wenger's south-facing roof, so that wasn't a concern.

Barnett, Yates and Sieger piped-in what Yates referred to as the "solar insurance policy," a 60-foot coil of thick-walled, soft copper tubing buried in a large hole behind the house, entombed in well-packed sand. Both ends of the coil enter the basement wall 6-ft. below grade. The coil was stretched upward as the large hole was filled with sand, wetted and packed as coil loops were pulled upward, so that when the entire coil was packed entirely in sand, its upper end extended to within 18-in. of the topsoil with fresh grass now concealing it.

"We needed a 'dump zone,'" explained Barnett. "If the Wengers weren't at home, especially on a summer day with maximum solar heat, the best way to insure that excess heat has a place to go was to divert it to Mother Earth — where it was headed in the first place. There has to be some accommodation for excess solar energy. The most common ways to do it are to place a commercial baseboard unit in some out-of-the-way place, outside, in a space where heat won't matter . . . or in an underground coil which is the route we chose for the Wengers."

Dave Yates attaches tubes into the Oventrop evacuated tube solar array.

The Oventrop control senses the availability of heat from the rooftop. If the indirect water heater tops off at a set-temp of 120°F, and the electric water heater also has met its set-temp of 140°F, a three-way mix and set-point limit control divert the heated glycol solution into hard lines that run along a back wall of the mechanical room and through the wall into the coil. There, the heated glycol solution simply warms the sand around it.

Yates said that, even on a cloudy day, the Wengers can expect solar gain of 2,000 to 10,000 Btuh. "For maximum, mid-summer gain, they'll be looking at something like 60,000 to 80,000 Btuh of free energy each day. That's a lot of free energy."

> 'The Wengers now have the best solution for water quality and efficient heating, and will probably see an 80% drop in energy expenses.'

Germ warfare

Yates is a militant when it comes to keeping plumbing systems free from germs. Coliform bacteria, a persistent problem near game lands, toxic Cryptosporidium and Legionella bacteria are quite common in potable water systems. One of the most effective ways to beat germs and other pollutants is the combination of high (pasteurization) water heater temperature — about 140°F — thermostatic valves at the water heater's outlet and at all shower and bath fixtures to eliminate the risk of scalding injury.

Top that off by incorporating proper filtration, concluding with Yates' preference for a Watts Premier reverse osmosis for drinking water (delivered, typically, by a single tap in the kitchen), and safety is greatly improved.

Garage needs hot water

The domestic water makeover includes a link from the home to the garage, 150-ft. away. When the Wengers dug a 5-ft. deep trench between the two buildings for the insulated injection-loop lines, they also buried electrical and domestic water lines.

"The domestic water supply between the house and garage extends the home's treated water system over into the garage which easily maintains 40 to 50 psi pressure within the line," explained Yates.

But rather than attempting to send solar-heated domestic water from the home to the garage, Yates and the Wengers chose to heat domestic water in the garage locally. A creative solution for that was found in an electric, 30-gal. wall-hung unit from Bradford White. "We placed it in the radiantly-heated tool room, 8-ft. above the utility sink, and directly below the master bath that serves the four-bed bunk-house upstairs," said Yates.

And, true to Yates' emphasis on germ warfare, another advantage to heating the water locally was the ability to hold water temperatures in the tank in the 138°F - 145°F range, easily killing any free-roaming bacteria that may develop (the shower's Watts temperature/pressure-mixing valve prevents a scalding injury).

"It was the perfect out-of-the-way solution," said Rachel Wenger. "I'd insisted that I didn't want a water heater in the living space up there and — by hanging the water heater in the tool room just below the shower — Dave found the perfect appliance for the job."

The water heater weighs about 320-lbs. when full, so Yates' crew had to lag the supplied supports through heavy, 6-in. wall studs. But it gave them a key, energy-saving advantage: the super-efficient unit could simply be activated when guests were in the bunk-house (typically, five or six weeks each year), and turned off when not in use.

Crowning accomplishments for the home's remodeling effort include a large, multi-filter EcoQuest "Spring House" water purification system with multiple filters and ultra-violet light to kill any bacteria, and a Watts Premier RO system for drinking water.

"The Wengers now have the best solution for water quality and efficient heating, and will probably see an 80% drop in energy expenses this year compared to their first year in the home," concluded Yates. "The carbon footprint got a lot smaller, but they've added tremendously to the size of their comfort zone." C