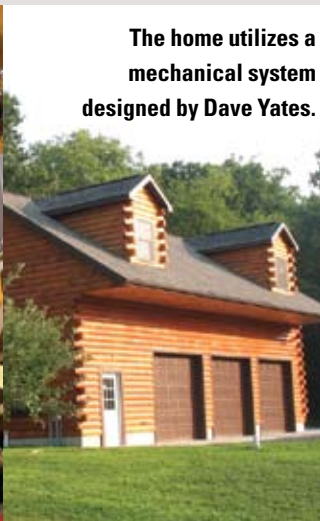


CONTRACTOR

THE NEWSMAGAZINE OF MECHANICAL CONTRACTING



The home utilizes a mechanical system designed by Dave Yates.



Yates helps turn log home green

(PART 1)

SPECIAL TO CONTRACTOR

JAMES CREEK, PA. — In the fall of 2007, Travis and Rachel Wenger bought a 2,400-sq.-ft., three bedroom log home on mountainside property here, bordering thousands of acres of state game lands near Raystown Lake.

Since Wenger and his father, Merv, run a cabinetry business and have experience remodeling houses, they decided to remodel the mountain home, adding insulation, more bedrooms and upgrades to the HVAC system with geo-radiant heat, plus a new garage addition.

Chosen to manage the mechanical makeover, Dave Yates, CONTRACTOR columnist and president of F. W. Behler Inc., York, Pa., visited the Wengers in the fall of 2007 to do the heat load calculation and review the job.

“For the homeowners, achieving energy efficiency was just as important as having year-round comfort,” said Yates. “Previously, the home had electric a/c and a 140,000-Btuh LP-gas furnace with supplemental heat from one fireplace and three old potbelly woodstoves. They also used several electric heaters and an old electric water heater.”

Mechanical systems

The Wengers gave Yates flexibility in designing a “green” system, adding that if it made sense to keep some of the

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Germans win Solar Decathlon — again

BY ROBERT P. MADER
OF CONTRACTOR'S STAFF

WASHINGTON — Maybe the Solar Decathlon scoring should have a multiplier that takes into account how much money was spent on a house.

U.S. Department of Energy Deputy Secretary Daniel Pone- man announced the winners of the 2009 Department of Energy Solar Competition on the National Mall at the end of the contest in mid-October. Team Germany, the student team

from Technische Universität Darmstadt, won top honors by designing, building, and operating the most attractive and efficient solar-powered home. The University of Illinois at Urbana-Champaign took second place followed by Team California in third place.

The German's formula? A million bucks. Put photovoltaic panels on nearly every exterior surface. Heat pump. That's it.

Team Germany's winning



A student team works on a house.

“Cube House” design produced a surplus of power even during three days of rain. This is the team's second-straight Solar Decathlon victory, after winning the previous competition in 2007.

New to this year's competition, the Net Metering Contest was worth 150 points towards the final results and was the

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Sustainability is top priority for GreenTown Chicago

BY CANDACE ROULO
OF CONTRACTOR'S STAFF

CHICAGO — Building green, energy efficiency, water conservation and building a smart-grid were just some of the sustainable topics discussed at GreenTown Chicago 2009, a one-day conference about energy-efficient practices and technologies, green design and building

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CONTRACTOR INFOCUS



ESTIMATED DISTRIBUTION OF CI WATER USE IN THE UNITED STATES IN 1995 BY SUBSECTOR

Health Care	8%
Education	7%
Hospitality	16%
Warehousing	13%
Offices	10%
Irrigation	7%
Miscellaneous Commercial	7%
Sales	6%
Utilities and Infrastructure	26%

Source: Diziegielewski, et. al., *Commercial and Institutional End Uses of Water, 2000*

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Yates helps turn mountain log home green

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old equipment, fine, but where it made better sense to toss out the old to make room for the new, even better.

Before long, materials and equipment were being trucked to the jobsite. Local waterwell and geothermal driller Dave Eriksen brought in his equipment with instructions to drill three boreholes into which geothermal lines were inserted. Holes were then thermally grouted.

The Wengers decided on a unique mechanical system designed by Yates,



Bob Sieger connects one of the two twin-coil Bradford White indirect water heaters.

which, for the heating season, would consist of a high-temp “THW” water-to-water geothermal system by ClimateMaster; two twin-coil Bradford White indirect water heaters; and several preassembled, pre-engineered Hydronex panels by Watts Radiant, one of which was built to introduce solar heat for domestic water and to share addi-



Dave Yates makes a sweat connection between the “geothermal boiler” and the indirect water heater.

tional heat with the radiant system.

By the time the F.W. Behler crew began the project, the Wengers already resealed all the log, began the basement remodel, complete with truckloads of rigid insulation and a mile of tongue and groove pine, and set the

foundation for the log garage, including a 150-ft. trench between the house and garage for a thermally-protected injection loop run between the two buildings. The planned geo-to-radiant system in the house would heat the garage too.

The old 10-SEER central air conditioning system was disconnected and, tapping the existing trunk-line, Behler jobsite supervisor Scott Barnett and senior mechanic Bob Seiger installed a 4-ton ClimateMaster Tranquility water-to-air system, a 27-SEER unit that could also provide backup heat if needed.

The home’s 1,000-sq.-ft. basement previously included a garage (remodeled into a bedroom), lots of storage space and a laundry room. Space also included a bathroom that the Wengers gutted and enlarged, and a study that became

the home’s fifth bedroom.

During the basement remodel, all of the home’s PVC plumbing, which according to Yates, was a “snake pit of code violations” was replaced with neat blue and red PEX home run lines, connecting each plumbing fixture with a central SeaTech manifold in the new mechanical room.

“The SeaTech system by Watts got its start as a plumbing solution for ocean yachts, built to withstand constant movement and flexing, so we knew it’d exceed our needs here,” said Yates.

Most of the home’s lower level concrete slab was rigorously cleaned, crack isolation membrane was attached to hairline fissures, and then HeatWeave electric radiant mats were installed prior to thin-setting of ceramic tile and stone flooring.

While the basement work was under way and the joist bays were open, the crew stapled up 2,400 lineal feet of Watts Radiant’s EPDM synthetic rubber Onix radiant heat tubing to the subfloor to heat the home’s entire main floor. The many loops were brought back to stainless steel Dumser manifolds. The crew also mounted Hydronex panels, which would control hydronic heat flow keying off of an outdoor reset — the panel heat source being one of the Bradford

White 120-gal., twin-coil indirects.

“Onix is our preferred tubing for staple-up,” said Yates. “It flexes like rope, can be doubled-up and pushed through holes, and flattens slightly during staple-up, greatly improving heat transfer.

“We used both of the large, inter-nal stainless steel coils to circulate water from the THW,” added Yates. “The tank’s 120-gal. of water became the THW’s ‘thermal target’ and the source of all good things.”

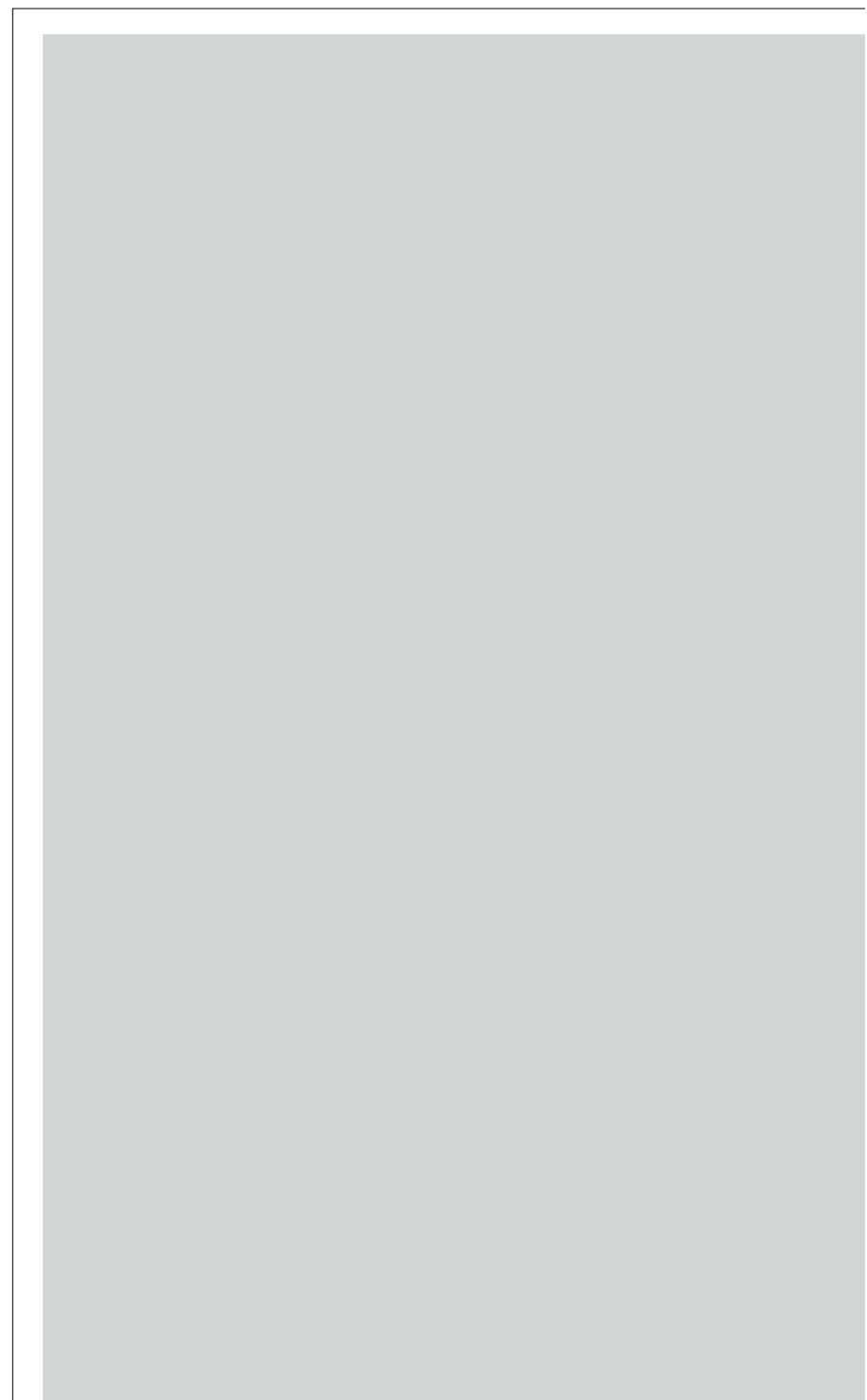
The house would require two water temperatures: one for the staple-up radiant, and a higher temperature for several planned wall-hung panels.

ClimateMaster’s 3-ton, water-to-water THW (what Yates refers to as the geothermal boiler) is rated at a maximum output of 145°F with a peak COP of 4.5, with sufficient geo-exchange.

Fred Umble, president of Creative Energy Services, a wholesaler based in New Holland, Pa., helped Yates choose the right geothermal equipment and specified a need for three 260-ft. boreholes. But the Wengers asked Eriksen to lengthen each hole by 40-ft.

“We believe this was the reason for one of the big surprises at system startup in December of 2008,” said Yates. “Though temps hovered between 10°F and 11°F outside, the THW unit was delivering system heat of 157°F, substantially higher than the system was rated for.”

Part 2 of this article will focus on heating the garage addition, integration of Oventrop solar-thermal equipment with the geo-to-radiant system, activation of solar domestic hot water, and applying a “radiant barrier” as the final stage of home insulation. **G**



For information circle **XXX**