

January 2006/Volume 23, Number 11

PM

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*The flexibility of hydronics
offers warmth to two-ton
hippos, macro-pods, raptors
and other critters.*



by Steve Smith

HIPPO HEAVEN

When the Rio Grande Zoo in Albuquerque, N.M., learned that a three-year-old hippo was available from another zoo, they jumped at the opportunity to give her a home. The catch? Karen would be arriving in three weeks, and because the Rio Grande had not housed a hippo before, they had to act quickly to prepare her new digs.



Aardvark Co. Inc.'s Juan Carlos Grijalva-Cervantes, apprentice, and Socorro Sotelo, master plumber, pipe gas to the boiler/water heater.

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"In the wild, hippos spend most of the day in warm water," says **Tom Silva**, assistant director for the zoo. "In the winter, temperatures can drop down pretty low here. It's not uncommon to go from daytime highs in the 80s to less than 20 degrees at night, so we had to prepare a heated pool for Karen."

Fortunately, there was a spot. What was originally planned to become a duck pond could be redesigned as a wading pool for Karen. The pond holds approximately 120,000 gallons of water. It's 7 ft. in its deepest spot and features gentle slopes for two-ton Karen to walk over when passing between the pool and her barn.

The zoo immediately contacted **Mike Dossey**, estimator for Aardvark Co. Inc., also in Albuquerque, the mechanical contractor firm that's routinely done the zoo's plan-and-spec work for more than five years.

"The zoo needed a heated pool and they needed it *fast*," says Dossey, who had to complete the project by the week before Christmas 2004.

Clearly, a water heater that could provide proper temperature control was key. The system would have to maintain water temperatures between 72 degrees to 80 degrees F, even during the coldest days of the winter, and with the substantial waterfall, pumped from the pool water, going at full tilt.

Evaporation from this water feature factored in substantially during the heat loss calculation. It didn't help that the pond was not insulated from below, though the final determination showed that a 2 million Btuh Laars Pennant boiler, which is classified as either a boiler or high-volume water heater, could handle the load with heat to spare.

Although the equipment offers a four-stage control to meet demand as needed, single-stage firing with an automatic, built-in bypass was chosen as the best way to respond to outdoor conditions.

"Rather than maintaining high mass, standby energy at considerable cost, the copper tube boiler meets the need easily," says **Tim Jackson**, a service technician for local rep Boyd Engineering Supply, who worked closely with Dossey during the equipment piping and start-up phases.

The automatic bypass simplified the installation, gave the system enough flexibility and also protects the boiler from low return water temperatures.

"We designed the system around a need to hold water temperature in the pool at 72 degrees F, but it meets the need for 80 degrees F without a hitch when ambient temperatures drop, even down to around 10

degrees F," Dossey adds.

The design also includes a filtration system that removes straw and waste, treats the water with ozone, then feeds it back into the boiler. And, for animals that consume hundreds of pounds of food in a day's time, the by-product has to go somewhere, so you can only guess at the complexity of the pool's waste removal and filtration systems.

When Karen arrived at the zoo on a cold, mid-December day, the Aardvark crew was completing installation of the heating system — situated outside next to the pool — and preparing it for start-up. A bit disgruntled that she had to wait in the barn for a day, Karen was pacified when she was able to wade into her new pool the next morning.

"She was a little cantankerous when she arrived, but who wouldn't have been after a lengthy move?" Dossey says. "After the long ride, Karen only wanted to freshen-up a bit. Once she found the warm water, all was good!"

For the system's first winter, Albuquerque experienced very cold and moist weather with plenty of snow. Silva said everything went well. "Karen was like a kid in a hot tub! We knew where we were likely to find her day or night."

Last April, the Rio Grande Zoo found another hippo. Enter Moe, a 32-year-old who formerly lived at Salt Lake City's Hogle Zoo. Silva says hippos can live up to 50 years so they both have plenty of time to enjoy hydronic comfort.

The zoo is considering plans for a similar set-up for a saltwater crocodile exhibit.



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RADIANT MENAGERIE

Wendy Looker runs Rehabitat Inc., Dillsburg, Pa., a nonprofit rehab center for mainly birds of prey, but also home to kangaroos, bearcats and dogs. All the animals come to Rehabitat with varying degrees on injury.

She cares for about 120 raptors each year that may have been struck by cars, run into power lines or eaten poisons. Looker provides medical care until they are ready to be released back into the wild. Those animals too injured to be returned become part of the Rehabitat traveling education crew and often act as foster parents for raising orphaned birds.

Looker was planning a new building and heard that radiant heat would offer the greatest comfort for her patients while saving operating costs. Installation costs were a real concern — the heating solution would need to fit within a tight budget. The nonprofit facility must raise \$40,000 each year to care for the raptors. “We take care of the other animals out of our own pockets,” she adds.

F.W. Behler Inc., York, Pa., specializes in radiant heat and knew that where there was a will, there was way.

“They had me hooked,” says **Bob Sieger**, senior tech. “As an animal lover, and someone who likes a good cause, this was a project that inspired me emotionally.” The company found ways to trim labor costs, primarily by using Rehabitat’s volunteer workforce without compromising safety or design. It also meant the bulk of work would be performed on weekends and weeknights when volunteers were available.

The system they settled on for the new, 1,800-sq.-ft. building would be divided into three distinct areas: office/dogs; raptors; and macro-pods, which means “large-footed,” and applies to kangaroos and wallabies that hop along on large hind legs.



To keep costs down, Rehabitat’s regular volunteers took a crash course in radiant and helped install the system.

To further reduce installation time, Sieger installed a wall-mounted, direct-vent, propane-fired Mini-Therm boiler by Laars Heating Systems, and a pre-manufactured “HydroControl” injection panel made by Watts Radiant.

“Injection piping gave us the opportunity to minimize piping and, at the same time, maximize the use of remote radiant manifolds to distribute the heat in various zones within the concrete slab,” Sieger explains. “Given the very low flow rates needed to transfer Btus with injection pumping, 1/2-inch PEX lines were added to deliver warm water to both manifolds.”

The design also needed to have the distribution manifolds installed close to the floor level so that their tubing runs could disappear into the concrete directly below them. The assorted critters would, no doubt, scratch, gnaw and leave acidic deposits that, over time, could compromise the system.

Sieger’s volunteers received a quick course on installation techniques and settled into the work. The Watts Onix radiant tubing also



Rehabitat’s radiant system was divided into three separate zones: office/dogs; raptors; and macro-pods, aka, kangaroos and wallabies.

helped the volunteers more easily position and secure the tubing than more ridged PEX.

This winter will be the first for the ailing creatures to rest comfortably on the warm concrete slab. *PM*