

KAH-NEE-TA SWIMMING POOL WARM SPRINGS, OREGON

John W. Lund
Geo-Heat Center



LOCATION

The Kah-Nee-Ta swimming pool is located on the Confederated Tribes of Warm Spring Reservation in north-central Oregon south-east of Mt. Hood. The 600,000-acre reservation was formed in 1879 and settled by Paiutes, Warm Springs and Wasco tribes. The swimming pool is located adjacent to the Warm Springs River, a tributary of the Deschutes River. The resort was started in the early 1960s, and in addition to the swimming pool includes a lodge, an RV village with condos and tepees, and more recently, a gambling casino. A flood in February of 1996 caused major damage to the RV park and pool area, but they were rebuilt and available for use in 1997. Additional details can be found at their website: www.warmsprings.com.

RESOURCE

The resource is located on the eastern flank of the Cascades, where there are numerous hot springs such as Breitenbush, Bagby and Austin. Warm Springs is located east of these springs in the Columbia River basalts. These springs are associated with a high temperature resource and issue from north-south trending fault systems. The seven warm springs have been used by the local Indians for centuries. Today, the warm spring, on the banks of the Warm Springs River, produce about 400 gpm at 128°F and are used to heat the swimming pool. None of the other facilities on the resort/casino area are heated by geothermal energy due to the limitation on the flow rate from the springs. Piping hot water to the casino would require about a 1.5-mile pipeline with several 100 feet in elevation gain.

UTILIZATION

Spring water at 128°F is gravity fed from the warm spring adjacent to the river. The water flows first into a small concrete holding tank with capacity of 1,400 gallons (6x6x5 ft), and then into a larger one of 54,000 (30x30x8 ft) gallons, both located in the basement of the pool building. An overflow goes into a sump and then to the drain, dechlorinator and finally into the Warm Springs River. From the smaller holding tank, the water at 128°F is pumped through a filter and then through a brazed plate heat exchanger. The secondary side of this heat exchanger goes into a 400-gallon storage tank from which hot water is fed to the showers. Cold water, piped over the mountain from the water treatment plant at 52°F is used to cool the shower water to 100°F and in summer, used to cool the pool water. From the larger storage tank water at 125°F is pumped by three 20-hp pumps in parallel through a sand filter and chlorinator to the hot tubs and outdoor swimming pools. The two hot tubs are kept at 103°F and the 530,000 gallon outdoor pools are kept at 90 to 94°F, depending upon the season. The waste water from the hot tubs, pools and showers are then fed through the dechlorinators and disposed in the Warm Springs River. Finally, from the smaller holding tank, water is pumped through a sand filter into three indoor tubs in the Wanapine Spa which are kept at 103°F. Water is also pumped to the Tribal Bath House, for exclusive use of the tribal members, and to the Necsha Cottage, the larger rental facility on the grounds. Waste water from these three uses is again piped through the dechlorinator and into the river. The overflow rate from the smaller concrete tank is controlled by a temperature sensor between the overflow line valve to the sump which feeds into the waste water line.

The entire complex has a peak usage of 6.8 million Btu/hr for an installed capacity of 2.00 MWt. The annual use is estimated at about 30 billion Btu with a saving of around \$400,000 compared to natural gas.

OPERATING COSTS

Annual operating costs consist of two items: 1) electricity cost to run the various pumps, and 2) maintenance and chemical costs. The pumping cost for about 95 hp of circulation/booster pumps is estimated at \$30,000 per year. The annual maintenance costs (\$10,000), chemicals for the chlorinator and dechlorinator (\$50,000), and salary for one part-time maintenance worker (\$15,000) is estimated at \$75,000.

REGULATORY/ENVIRONMENTAL ISSUES

Since the facility is on reservation land, the tribes are their own steward. They, however, use the federal EPA standard concerning discharging the waste water into the Warm Springs River. This is accomplished by having a dechlorination filter at the end of the disposal line. The standards set by the tribes are higher than that required by the Oregon DEQ. One of the main concerns is the resortation of trout, steelhead and salmon to the river.

PROBLEMS AND SOLUTIONS

Initially there were problems from iron oxide and algae depositions in the water. With the installation of the sand filters, this problem has been solved. After the 1996 floods they considered providing radiant floor heating to the service buildings adjacent to the pool along with heating the concrete slabs in the tepees; however, there was not enough flow to accomplish this. As mentioned above, piping hot water to the lodge/casino complex would require a 1.5-mile line pumping water uphill, which was not considered economical.

REFERENCES

Oregonian Newspaper, Travel Section, June 8, 1997. "Kah-Nee-Ta: A Spirit of Survival." Portland, OR, pp. T1-T2.

