

MONROE-RED HILL HOT SPRINGS - MYSTIC HOT SPRINGS RESORT -

Robert Blackett
Utah Geological Survey
Cedar City, UT

John W. Lund
Geo-Heat Center



Mystic Hot Springs Resort.

GEOLOGY

Sanpete and Sevier Valleys

The Sanpete and Sevier Valleys form a long, narrow, northeast-southwest depression in central Utah. Although appearing geologically simple, surficial deposits mask a structurally complex area of subsidence caused by faulting, folding, and dissolution of salt from Jurassic formations. Warm springs and wells occur throughout both valleys, although, the hotter springs are located at the southern margin of the Sevier Valley.

Three hot spring areas extend over a distance of about 6 miles (10 km) at the southern end of the Sevier Valley. The springs -- Monroe, Red Hill, and Joseph -- were originally included in the Monroe-Joseph KGRA. Brook and others (1979) considered Monroe and Red Hill Hot Springs as one system, and considered Joseph Hot Springs a separate, but similar, system. The springs are associated with Quaternary normal faults which offset widespread mid-Tertiary, intermediate volcanic rocks erupted from the Monroe Peak and Mount Belknap calderas, and other sources farther westward (Mabey and Budding, 1994).

Monroe-Joseph Geothermal Area

Monroe Hot Springs and Red Hill Hot Springs are situated less than a 0.5 mile (0.8 km) east of the town of

Monroe, a community of about 1,470 people (1990 census) located about 3 mile (5 km) east of Interstate Highway 70 in Sevier County. Monroe was the site of a number of geoscience and exploratory drilling studies sponsored by the U.S. Department of Energy in the late 1970's and early 1980's to assess the resource potential (Mabey and Budding, 1987). Although feasibility studies based upon fluid temperatures and flow-rates from a DOE-sponsored production well (600 gpm and 164°F) (38 L/s and 73°C) drilled around 1980 (Blair and Owens, 1982) showed that a district-heating system was not economical, the area could be attractive for process or agricultural direct-heat applications.

The Monroe and Red Hill Hot Springs issue at about 170°F (77°C) near the surface trace of the Sevier fault, adjacent to the Sevier Plateau. The Sevier fault is a 300-mile (480-km) long zone of rupture extending from the Grand Canyon northward into central Utah. Chemical geothermometers suggest maximum resource temperatures of about 230°F (110°C). Maximum measured temperature is 171°F (77°C) at Red Hill Hot Springs and 169°F (76°C) at Monroe Hot Springs. Combined flows for the Monroe-Red Hill system have been estimated at about 320 gpm (20 L/s).

Joseph Hot Spring discharges from a spring mound near the Dry Wash fault, which parallels the Sevier River along the northwest edge of a group of hills that are part of the

Antelope Range. The springs issue at 145°F (63°C) with flow rates approaching 32 gpm (2 L/s).

UTILIZATION

The Monroe-Red Hill Hot Spring area is 10 miles (16 km) south of Richfield in Sevier County. The proprietors have named the resort “Mystic Hot Springs” and offer a geothermal-heated swimming pool, therapeutic baths, camping facilities, and tropical fish ponds. The Monroe and Red Hill Hot Springs issue at about 170°F (77°C) near the surface trace of the Sevier fault adjacent to the Sevier Plateau.

Geothermal water flows from travertine mounds behind the Mystic Hot Springs resort at 168°F (76°C) and 200 gpm (13 L/s). Visitors can soak in bathtubs set in the travertine deposits, or in a soaking pool (shown on page 1 of this issue). A swimming pool, next to the main building appears to be no longer used. The resort offers campsites, RV hook-ups, pioneer cabins and teepees and tropical fish ponds. Six tropical fish ponds are kept at 75°F (24°C) year around, where Koi, Mollies, African cichlids, and fancy guppies are raised. The spring water has a total dissolved solids of 2905 mg/L, consisting mainly of nitrate sulfate (813 mg/L), chloride (645 mg/L), sodium (599 mg/L), bicarbonate (425 mg/L), calcium (255 mg/L), potassium (69 mg/L), and silica (54 mg/L), with traces of other species. See their website at: www.mystichotsprings.com for more details.

REFERENCES

Blair, C. K. and L. B. Owens (Editors), 1982. “Direct Utilization of Geothermal Resources at Monroe, Utah,” *Final Report*, July 14, 1978-July 31, 1981, Report No. DOE/ET/27054-6, Cooperative Agreement No. DE-FC07-ET 17054, US Department of Energy, Washington, D C.

Brooks, C. A.; Mariner, R. H., Mabey, D. R.; Swanson, J. R.; Guffanti, M. and L. J. P. Muffler, 1979. “Hydrothermal convection Systems with Reservoir Temperature $\geq 90^{\circ}\text{C}$,” in Muffler, L. J. P., (editor), *Assessment of Geothermal Resources of the United States, 1978*, U.S. Geological Survey Circular 790, U.S. Geological Survey, Arlington, VA.

Mabey, D. R. and K. E. Budding, 1987. “High Temperature Geothermal Resources of Utah,” *Utah Geological and Mineral Survey Bulletin 123*, Salt Lake City, UT.

Mabey, D. R. and K. E. Budding, 1994. “Geothermal Resources of Southwestern Utah,” in Blakett, R. E. and J. N. Moore (editors), *Cenozoic Geology and Geothermal Systems of Southwestern Utah*,” *Utah Geological Association Publication 23*, Salt Lake City, UT.



Travertine deposits with bath tubs behind the resort.



Red Hill travertine mound.