INITIAL RESULTS OF RESERVOIR PRODUCTION TESTS, RAFT RIVER GEOTHERMAL PROJECT, IDAHO

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Two geothermal test wells were drilled and completed in Raft River Valley, Southern Idaho by the Idaho National Engineering Laboratory between January and August, 1975. Subsequently, hydraulic tests were conducted on these wells to make preliminary estimates of the geothermal reservoir parameters and reservoir geometry. The purpose of this presentation is to discuss the data obtained from these tests.

Geological Setting

The Raft River geothermal area lies in a north-trending, warped and down faulted basin, filled with tufaceous sandstone, siltstone, coarse-grained sandstone and shale (the Salt Lake formation of Mio-Pliocene age). In the vicinity of the test wells, the Salt Lake formation overlies a quartz-monzonite bed rock of Precambrian age. In both test wells [RRGE #1, 4989 feet deep and RRGE #2, 5988 feet deep] hot water at approximately 294°F (146°C) was tapped at the base of the Salt Lake formation. Both are artesian wells with shut-in well-head pressures of about 150 psi. The bottom hole pressures at a depth of 5000' were about 2200 psi. If opened to the atmosphere, each well can flow freely up to 800 gpm. The distance between the two wells is approximately 4000 feet.

The Hydraulic Tests

The hydraulic tests conducted on these wells extended between mid-September and early November. The tests principally consisted of flowing either of the wells at controlled rates and observing pressure changes either in the flowing well itself or in the non-flowing well. A key piece of equipment in these tests was a sensitive quartz pressure gauge capable of an accuracy of .001 psi. A summary of the tests conducted is contained in Table 1.

An important feature of the pressure transient data collected, especially during tests 2 and 3, was the remarkable response of the reservoir pressure to the gravitational changes induced by the passage of the moon. Comparison of the observed pressure changes with the earth tide computations made by Dr. Howard Oliver of the U.S.G.S. at Menlo Park for the period of observation indicated a maximum earth tide-induced perturbation of about 0.2 psi in reservoir pressure while the maximum change in gravity over the same period was about 0.25 m gal. In order *to* use the data for reservoir nterpretation appropriate corrections had to be made for the earth tide- nduced perturbations. A quick way to eliminate such perturbations was to consider only those pressure measurements corresponding to the times at which he earth-tides had zero magnitude.

The long duration interference test (test 2) indicated that between the two test wells the reservoir has an overall $kH = 2.28 \times 10^5$ md feet and an overall ϕCH of 1.2×10^{-3} ft/psi. Careful study of the early pressure buildup data failed to indicate the presence of unit slope or half-slope line segments on the log-log paper, suggesting the absence of either well-bore storage effects or the effects due to prominent fractures. The system appears to behave, in a bulk sense, as a homogeneous reservoir.

Test 1 indicated that there possibly exist one or two barrier boundaries close to well No. RRGE #2. Test 2 indicated the possible presence of one barrier boundary. With only two test wells it has not been possible to locate these barrier boundaries.

The results of the hydraulic tests conducted so far suggest that the geothermal reservoir in Raft River Valley is fairly large and permeable and is of considerable practical interest.

TABLE 1

TEST DATA FOR RRGE WELLS

Test No.	Description	Duration (hours)	RRGE Well No.	Flow Rate (gpm)	Max. Pressure Drop (Δp, psi)	Depth, (feet)
1	Short Term Test	17	2	210	39	5200
2	Long Term Test	615.5	2	400	3.6	1000
3	Short Term Test	30	1	26	1.1	4700