



GL07192

INTEROFFICE CORRESPONDENCE

date October 13, 1978
to W. E. Waters
from W. L. Niemi
subject RESERVOIR ENGINEERING ASSESSMENT ON FUTURE DEVELOPMENT OF
 RAFT RIVER KGRA (189 FOR SECOND 5-MW) - WLN-5-78

Reservoir engineering hydrogeologists, after reviewing available hydrogeologic data, suspect that the Raft River power plant, as currently structured, might produce from the cold portion (the Bridge Fault) of the Raft River KGRA and inject (dispose) into the hot portion (the Narrows Structure). Evidence, including geochemical studies, recent borehole geophysical logging of RRG1-6, and the testing of RRG1-4, combined with the fact that RRGE-3 contains the highest temperature water thus far encountered in the Raft River KGRA, emphasize the need to evaluate decisions regarding placement of production and injection and/or disposal wells. Reservoir engineering believe that water temperature is more important than production capability in the selection of sites for production wells.

The objective of Reservoir Engineering for the second 5-MW plant is to evaluate the southern Raft River KGRA and develop a master plan to optimize output. Production and injection wells for the second plant will be sited in conformance with the master plan.

Reservoir engineering recommendations for the further development of the Raft River KGRA include:

1. Resource definition of the Raft River KGRA, primarily the Narrows Structure.
 - a. Drill ten 5000-ft (1500 m) slim holes (6 in. in diameter), to bound to Raft River KGRA. A slim hole will cost approximately \$ and could be completed in approximately ten days. A single string of casing would be installed to 3500 ft (1100 m). The slim holes will be tested for ten days, with addition time for appropriate recovery. Adequate disposal methods of produced water must be available. Borehole geophysical logging time is additional to production and recovery time.

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The slim holes will be used as observation wells during the testing of wells penetrating the Raft River KGRA. The slim holes will serve as the basis for the selection of sites for production and injection wells.

b. Analysis of slim hole production data and borehole geophysical logs and report preparation, with duration dependent on results.

c. RRG1-8, if drilled, should be sited so that it penetrates the Narrows Structure at approximately 4500 ft (1400 m). If hydrogeologic information obtained at depths approaching 3500 ft (1100 m) indicate the existence of water temperatures approaching 290 °F (143 °C) at depth, RRG1-8 should be drilled until the Narrows Structure is penetrated.

d. The U. S. Geological Survey shall be consulted concerning the sites for slim holes and future production and injection wells.

2. Preparation of Master Plan (six months)

a. Site location of production and injection (disposal) wells, with perhaps contingency for an additional production and injection (disposal) well then required. The additional wells will be used as back up capacity for maintenance of primary wells. The additional wells would be a functioning part of the system to decrease pumping costs at primary wells.

b. Well Drilling

(1) The cost of a production well is assumed to be \$500,000 and an injection (disposal) well to be \$300,000.

(2) It is estimated that 60 days will be required to drill a production well and 40 days for an injection (disposal) well.

c. Testing Program

(1) A well should be tested as soon as possible upon completion. Testing at such a time will prevent the well from heating up, due to uphole flow of groundwater and give evidence as to the minimum temperature to be expected in a well.

(2) Effective testing, of each well in the Raft River KGRA, shall be conducted for 30+ days. Effective testing is determined by reliable and accurate data production.

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(3) A tested well will be allowed to recover for approximately the same duration as tested.

(4) Borehole geophysical logging time is additional to test and recovery time.

d. Data Analysis and Report Preparation (duration dependent on results)

3. Drilling of slim holes and additional wells shall be on sites selected on the basis of hydrogeologic evidence, rather than land availability. This will require the leasing of land and water and/or mineral rights.

4. If it is decided to inject (dispose) power plant effluent into wells in the vicinity of RRGE-3, RRG1-6, and RRG1-7, the effects of the hydraulic head caused by injection (disposal) on the existing domestic and irrigation ground water flow systems must be considered. To monitor the water table, 15 water table wells, 50 ft in depth, should be drilled. The water table wells should be drilled in irrigated fields adjacent to injection (disposal) wells. It is possible that the increase in hydraulic head caused by injection (disposal) may lead to lawsuits and/or require attaining the water rights adjacent to the injection (disposal) wells.

5. Funding should be established for studying water temperature trends within the Raft River KGRA, primarily within the production geothermal aquifers. All wells should be temperature logged as soon as possible. All wells should then be temperature logged quarterly.

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