

EG&G

Idaho

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INTEROFFICE CORRESPONDENCE

date May 16, 1979
to **D. Goldman**
from R. E. McAtee *REM*
subject RAFT RIVER PRODUCTION TEST PLAN TO FLOW WELL #2, INJECTION INTO WELL #6, FOR 500 HOURS, FET-2-79 - REM-16-79

The hydrochemical results for Test FET-2-79 are attached. This information is to be included in the final report of the test.

SW

Attachment:
As Stated

cc: C. A. Allen
D. W. Allman
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S. G. Spencer
Central File

GEOCHEMICAL RESULTS, 500-HOUR RRGE-2 PRODUCTION
TEST/RRGI-6 INJECTION TEST, FET-2-79

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INTRODUCTION

The chemical testing for the 500-hour RRGE-2 Production/RRGI-6 Injection Test included the following:

1. Collection of water samples of RRGE-2 water every eight hours for the first 72 hours of the test and every 24 hours for the remainder of the test. The samples were analyzed for pH, conductivity, chloride, fluoride, sodium, alkalinity, and hardness.
2. Water samples of 20 liters were flowed through 0.2 micron filters every 24 hours to determine total suspended solids in the RRGE-2 water that was injected into well RRGI-6. These samples were collected at both well sites to determine the origin of the residues.
3. In-line pH, oxidation-reduction, and conductivity probes were placed in the flow line at RRGI-6 to determine changes in water chemistry during the test. Due to the failures of the pH and oxidation probes at the beginning of the test, only the conductivity probes furnished continuous data to determine chemical change.

PURPOSE

The data from the chemical analysis and the in-line chemical probes were used primarily to determine water quality and detect chemical change in well RRGE-2 water during the test. Filter samples were collected at the wellheads of wells RRGE-2 and RRGI-6 to determine the quantity and source of the total suspended solids (TSS) in the water. Filter sample data from

the prior test, FET-22-78, indicated the possibility of erosion from either the RRGE-2 borehole or the flow line between wells RRGE-2 and RRGI-6. During the test FET-22-78, the TSS increased to greater than 1.0 mg/l. The significant implication of this trend was it increased throughout the test. If this trend were detected in test FET-2-79, sampling at both wellheads would determine the source of the TSS.

RESULTS AND EVALUATION

Table I is a list of the average concentrations of the chemical species sampled and analyzed routinely throughout the test.

TABLE I

ROUTINE CHEMICAL ANALYSIS DATA FROM TEST FET-2-79

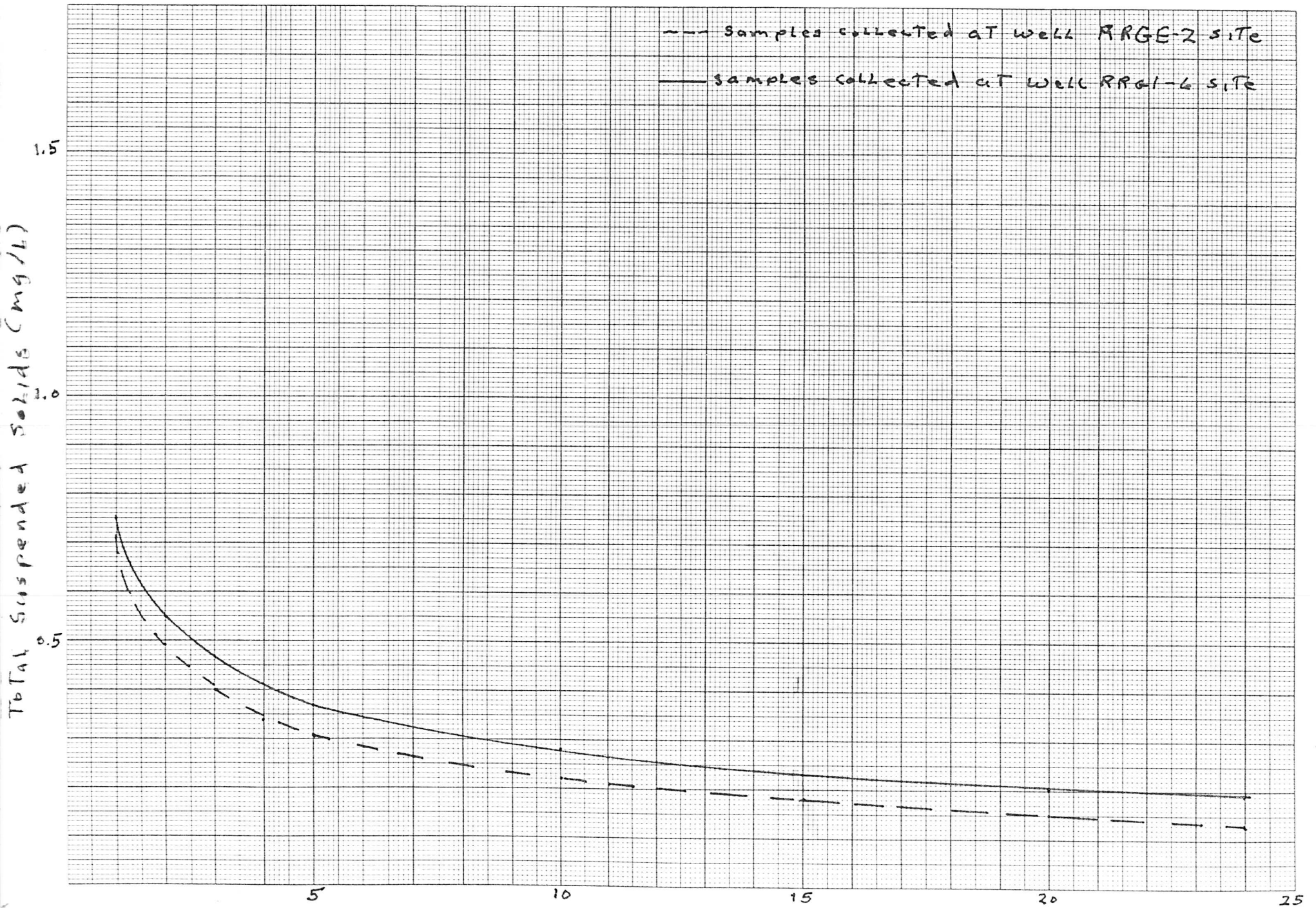
	<u>Conduc-</u> <u>tivity</u>	<u>pH</u>	<u>Hardness</u>	<u>Alka-</u> <u>linity</u>	<u>Na⁺</u>	<u>Cl⁻</u>	<u>F⁻</u>
\bar{x}	2390	7.4	101	41.2	450	651	8.54
S_{x_i}	±38	±0.2	±7.5	±2.2	±41	±56	±0.40
$\%S_{x_i}$	±1.6	±2.6	±7.4	±5.3	±9.0	±8.6	±4.6

Note: All concentrations are in mg/l except conductivity which is in μ s.
 \bar{x} average value
 S_{x_i} standard deviation for a single value
 $\%S_{x_i}$ percent standard deviation

Evaluation of this data showed the fluctuations in concentrations were random and not due to a trend of chemical change. This evaluation is supported by the fact that no trends in chemical change could be observed in the recording of the conductivity of the water during the test.

Figure 1 shows the results of a power curve fit of the TSS measurements. The data were put into an HP-97 calculator programmed for curve fitting. The

Figure 1



resulting curves show a decreasing trend in the TSS concentration. The difference between the curve from samples collected at the RRGI-6 wellhead and the RRG-2 wellhead is ≈ 0.11 mg/l. This difference could be due to a very small rate of erosion in the flow line between well RRG-2 and RRGI-6 or it could be from precipitation resulting from changes in the water environment. In either case, it represents about 8 of the 33 kilograms of TSS in the 74 million liters of water injected during the test.

CONCLUSION

The routine chemical analysis performed during the test showed no trends of chemical change. This data compared very well with the routine chemical data from the test FET-22-78. The in-line conductivity probe supported the routine data that no chemical change took place during the test. The filter test was plotted in mg/l of TSS versus time. The plot is a typical response curve. The higher concentrations of TSS at the start of the test were probably due to deposition and loose debris in the wellbore and flow line. However, the quantity of TSS was small. Taking an average value for the TSS concentration, only about 30 kilograms of solid material entered the injection well. The TSS concentration at the test termination was only ≈ 0.2 mg/l and was decreasing. This would inject ≈ 260 kilograms of TSS into well RRGI-6 in a year. Test FET-22C-78 had an increasing trend in the quantity of TSS. It was indicative of erosion from the wellbore or the flow line. Unfortunately, the filter samples were obtained at well RRGI-6 and the source of the solids could not be determined. This trend was not observed in Test FET-2-79. The only difference in the two tests other than time was the flow rate. The flow rates for FET-22C-78 and FET-2-79 were 2600 and 2270 l/m, respectively. The higher flow rate for Test FET-22C-78 could have caused erosion of the borehole or the flow line. Filter tests on future production-injection tests could determine the source of the erosion.