GL07336

PRELIMINARY REVIEW OF ATTEMPTS TO INJECT RRGI-7 USING RRGE-1 PRODUCTION (FET-7-79)

1. INTRODUCTION

Attempts to carry out the FET-7-79 testing were made during September - October, 1979. (Ref. RSH-11-79)

These efforts were plagued by equipment malfunction and transmission line failure.

Two useful segments of data were obtained during the period.

An eight hour pulse test at 1200 gpm was carried out 10-12-79 and eighty hours of testing at 1,000 gpm was carried out 10-15-79. The latter test was an attempt to run the intended twenty-one day test; it was terminated after eighty hours as a result of equipment failure.

The responses to each test in both the production well RRGE-1 and the injected well RRGI-7 are addressed below.

2. 10-12-79, 1,200 gpm Pulse Test

2.1 Well RRGE-1 Response:

Pump On	Pump Off
Initial shut-in buble pressure	893 psig
Final bubble pressure t=486m	448 psig
Maximum drawdown: 893-448=	445 psig
Final shut-in bubble pressure: t'=63 min	902 psig (ratio elapsed times 8.7)

2.1.1 RRGE-1 Drawdown: Pumping rate for the initial 7 minutes was 930 gpm. After seven minutes the rate was increased to 1,200 gpm. Temperature stabilized rapidly and remained relatively constant at 279°F. throughout the pulse. Pumping rate was evidently altered after 200 minutes but no record of this as been established. It is inferred from pressure drawdown behavior that the pumping was reduced.

2.1.1 Continued

The _____ between 7 and 200 minutes describes a reasonably straight line semilog trend as shown by Fig.____. Water temperature is stable in this period and pumping rate reasonably constant. The slope of 130 psig/cycle may, therefore, be representative of the well RRGE-1. performance at 1,200 gpm.

This slip-rate-of-drawdown represents $Q/\Delta p_{10} = \frac{1200}{130}$ = 9.23 gpm/psig/cycle

2.1.2 RRGE-1 Recovery

Recovery was observed for 63 mintues or a ratio of elapsed times of 8.7.

Uncorrected recovery pressures, plotted semilogaithmically against the ratio of elapsed times are shown on figure ____.

The data indicates two reasonably well defined trends. Late recovery data provides a slope of 94 spig/cycle. This represents $Q/\Delta p_{10}$= ~~9.23~~ 12.77 gpm/psig/cycle.

2.2 Well RRGI-7 Response

Pump On	Pump Off
Initial Shut-in wellhead pressure	
Final Shut-in wellhead pressure	
Maximum pressure buildup	

2.2.1 RRGI-7 Buildup

Wellhead temperature was continuing to rise during the initial period of injection. Warm-up flow provided a starting line temperature of 220°F. The wellhead temperature stabilized at 264°F after 285 minutes and remained constant throughout the remainder of the test.

Uncorrected buildup pressures are shown on the semilog plate in figure ____. The initial 280 minutes can be anticipated to be temperature influenced. Late buildup data for the period 300 to 480 minutes provides a slope-rate of buildup of 21 psig/cycle. This represents $Q/\Delta p = \frac{1200}{21}$ = 57 gpm/psig/cycle.

2.2.2 RRGI-7 Recovery

Recovery was observed for 170 minutes or a ratio of elapsed time of 4.

Uncorrected recovery pressures, plotted against the ratio of elapsed times are shown in figure ____.

The data indicates a reasonably well defined trend providing a slope of 32psig/cycle. This represents $Q/\Delta p = \frac{1200}{32} = 37.5$ gpm/psig/cycle.

3. 10-15-79; 1,000 gpm Production Injection Test

The 10-15-79 attempt to carry out this test commenced 09:35, October 15th and ran until 17:57, October 18th when a transformer failed at the injection pumps forcing abandonment of the test.

3.1 Well RRGE-1 Response

Pump On	Pump Off
Initial Shut-in bubbles pressure	850 psig
Final bubbles pressure	530 psig
Maximum drawdown (t=300min)	513 psig
Final shut-in bubbles pressure (t=24 min)	850 psig
(ratio elapsed times 202)	

3.1.1 RREG-1 Drawdown

Temperature at wellhead remained reasonably steady at 279°F throughout the test period.

Pumping rate was apparently steady at 1,000 gpm for the first 300 minutes. No satisfactory explanation for water level behavior is available in the field records. Instrument or human error is suspected.

Uncorrected field data are shown on figure ____. The initial 300 minutes provide a slope rate of drawdown of 107 psig/cycle or $Q/5_{10} = \frac{1000}{107} = 9.35$ gpm/psig/cycle.

Minor deviations from this slope probably can be attributed to fluctuation in flow.

3.1.2 RRGE-1 Recovery

Bubbles pressure recovery was observed for 24 minutes after which period a leak in purging regulators forced abandonment of reading. Recovery observations by Heise and digiquartz annula pressure monitoring continued for 834 minutes representing a ratio of elapsed times of 7.2. Recovery data is shown on figure ____. The most reliable segment of data is judged to be Heise guage pressure in the interval represented by ratio of elapsed times 150 to 30. This data provides Δp=43 psig/cycle representing $Q/5_{10} = \frac{1000}{43} = 23.26$ gpm/psig/cycle.

3.2 Well RRGI-7 Response

Pumps On		Pumps Off
Initial shutin wellhead pressure		65 psia
____Wellhead pressure	(t=3985 min)	250 psia
Final shut-in wellhead pressure	approx.	50 psia
Pumping rate		960 gpm

3.2.1 RRGI-7 Buildup

Temperature increased from 198^{o}F to 264^{o}F during the initial 200 minutes of injection. Following this period temperature was relatively stable at 264^{o}F for the remainder of the test.