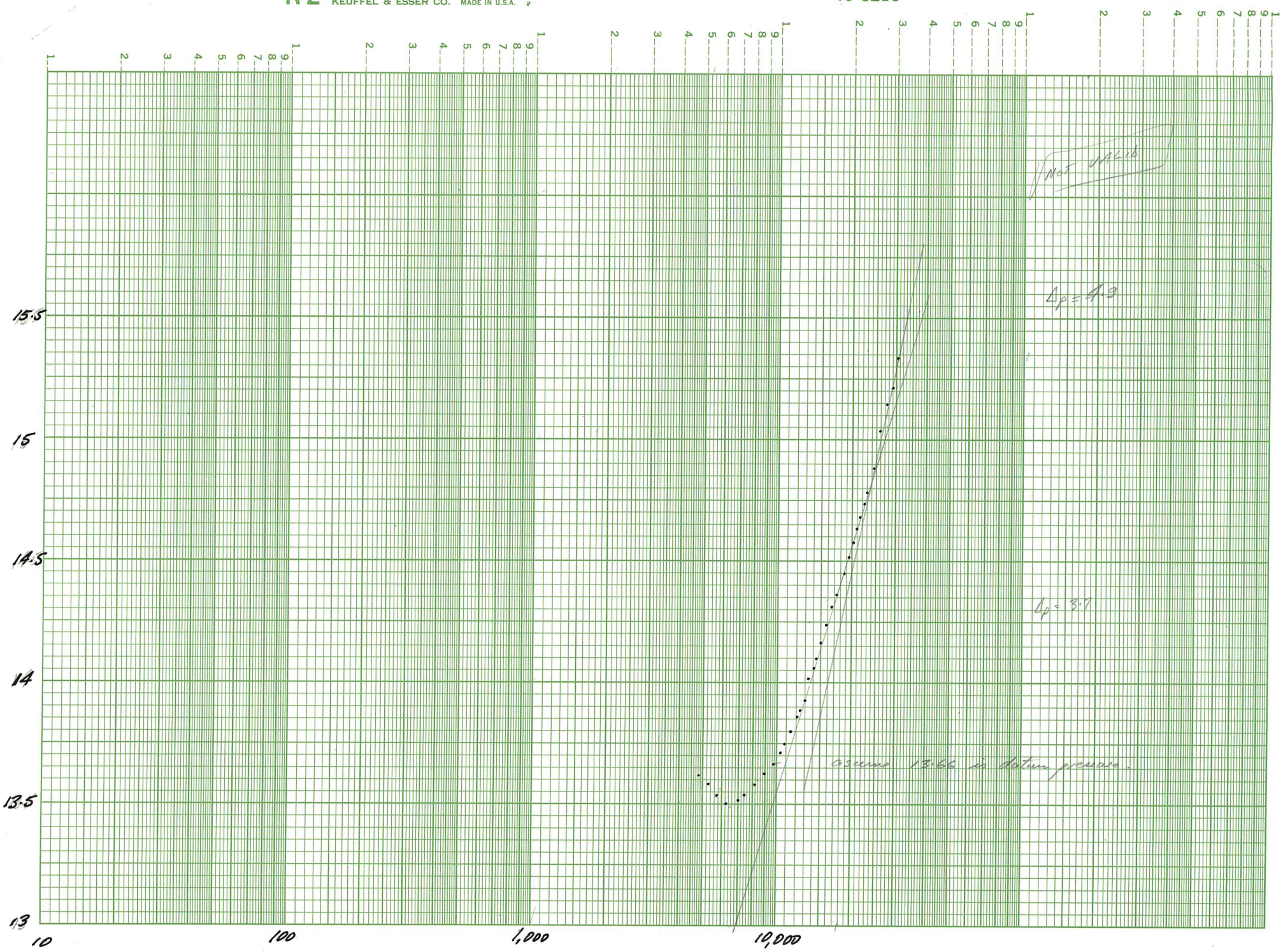
GTL07361

RRGE-2 TO RRGI-6

SUSTAINED 21 DAY TEST

RRGI-7 RESPONSE

KR61-7



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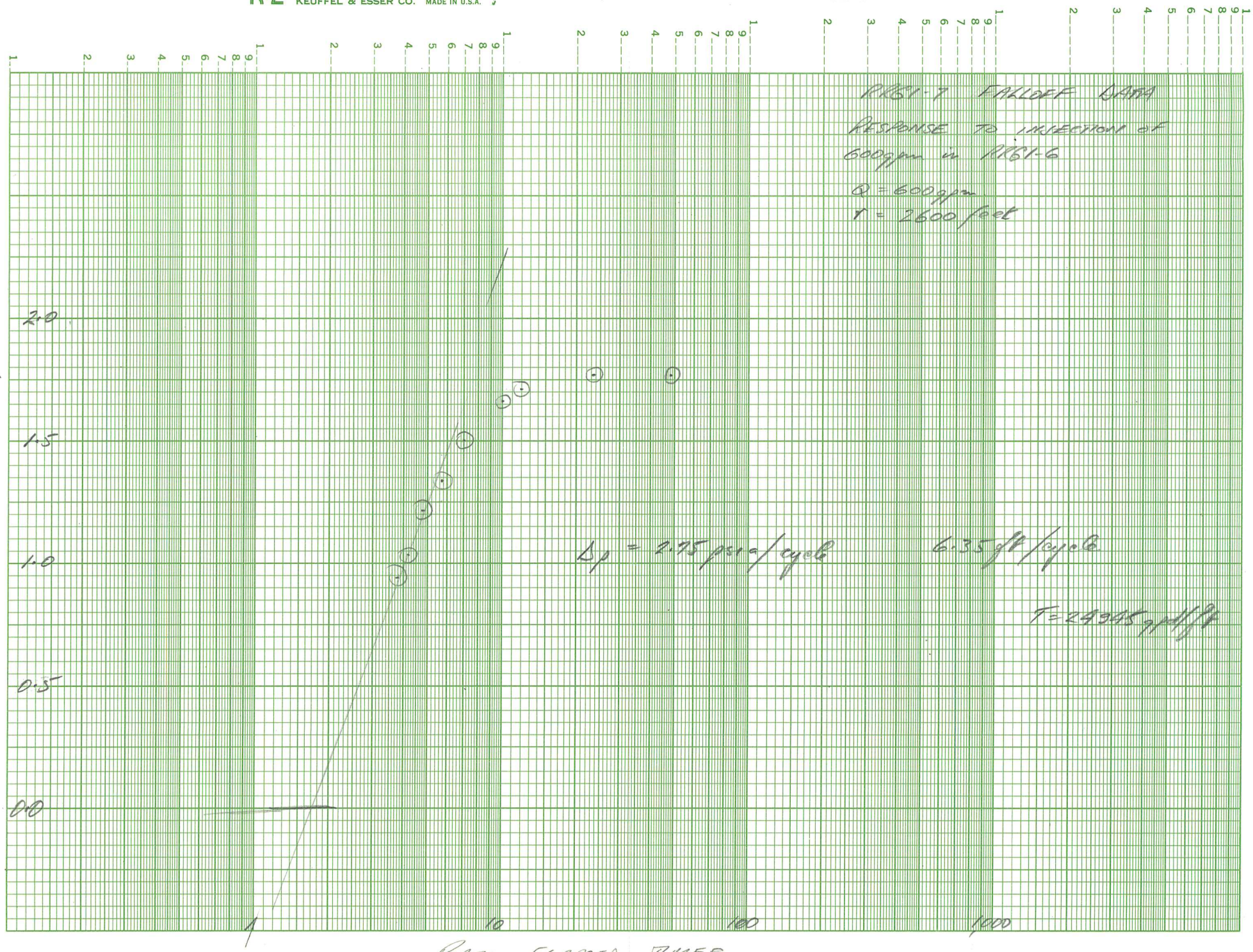


INTERFERENCE EFFECTS

Observations were recorded at RRGI-7, RRGE-3, RRGP-4, RRGE-1 and all monitor wells. Salient construction data, distances and responses are summarized in Table (x).

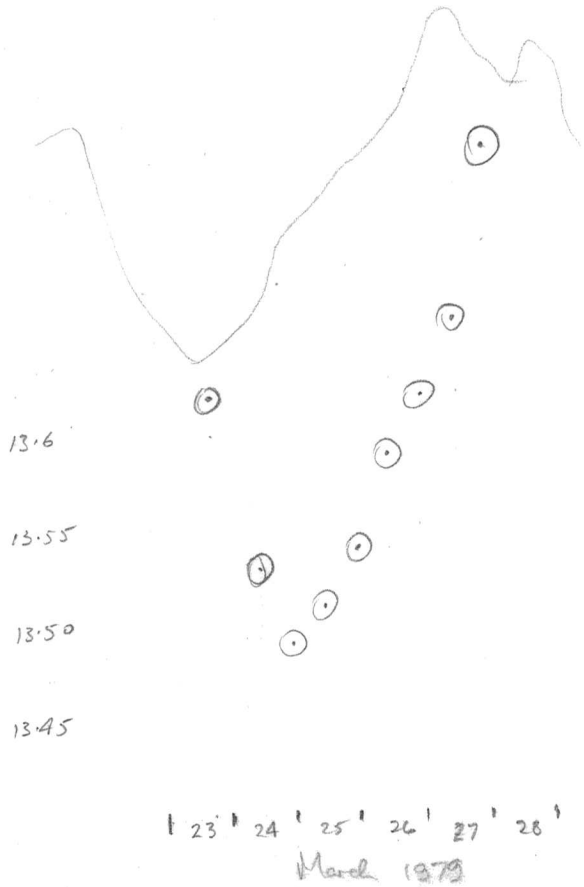
RRGI-7

RRGI-7 is similar in construction and depth to RRGI-6 and lies approximately 2600 feet to the southwest of RRGI-6. This well did not show coherent response to injection until approximately one week after injection commenced. During the initial week (10,000 minutes) of injection, wellhead pressure oscillated by less than 0.2 psi evidently in response to unidentified external loading events. During the final two weeks of injection, wellhead pressure increased steadily, reaching a maximum buildup of 1.68 psi at the end of the injection period. Wellhead pressure continued to build for 12 hours after injection ceased in RRGI-6, reaching a maximum buildup of 1.77 psi. The well did not recover satisfactorily following injection, leaving a residual buildup of approximately 1.0 psi after ratio of elapsed times reached 4. (elapsed recovery period of approximately one week) Wellhead pressures, measured for a further two week period, oscillated by approximately 0.15 psi, again evidently in response to unidentified external loading influences.

Buildup and falloff responses in RRGI-7 are shown in figures (x) and (x) respectively.

RRG-7

COMPARISON TO BAROMETRY



The residual buildup of approximately 1.0 psi is evidently not in response to elevated barometric pressure. Possible reasons include

a) the injection zone may be in leaky communication with less permable materials and the delayed recovery reflects retardation through leakance.

b) unidentified external loading influences.

The lack of satisfactory recovery following injection casts doubt on the reliability of data for analysis without correction. The uncorrected data provide the following estimates for hydraulic properties.

1. Falloff data (Jacob straight-line) late data.

$T = 24,945$ gpd/ft $\quad Q/S_{10}$

$S_{10} = 2.75$ psi/cycle $= 6.35$ ft/cycle

$Q = 600$ gpm

$Q/S_{10} = 94.49$ gpm/ft/cycle $= 218$ gpm/psi/cycle

2. Buildup data (Jacob straight-line). Two segments of response are evident. Early data with slope of $S_{10} = 3.7$ psi/cycle. Late data with slope of $S_{10} = 4.8$ psi/cycle. These responses provide Q/S_{10} values ranging from 162 to 125 gpm/psi/cycle.

T range $\quad$ 33,000

3. Buildup Data (Theis non-leaky curve-fit) Early data does not conform to the non-leaky curve. Late data can be fitted satisfactorily to the non-leaky curve and provides the following values.

$T = 16,371$ gpd/ft and $S = 1.85 \times 10^{-1}$

The storage coefficient appears to be too high to be representative.

Using the apparent properties calculated by the non-leaky, Theis curve-fitting method, the time required to reach conditions which can be represented by the Jacob approximation is:

$$t = \frac{r^2 S}{4 T_u} \qquad \text{where } u = 0.01 \quad r^2 = 6.76 \times 10^6$$

$$t = \frac{6.76 \times 1.85 \times 10^{5}}{4 \times 1.64 \times 10^{2}} = \frac{12.51 \times 10^{5}}{6.56 \times 10^{2}} = 0.911 \times 10^{3}$$

$$= 1910 \text{ min.}$$

However, using Walton's relationship.

$$t_{sl} = 1.35 \times 10^{5} \, r^2 \, S/T \qquad \text{where } r = 2600 \text{ ft.}$$

gives:

$$t_{sl} = \frac{1.35 \times 10^{5} \times 6.76 \times 10^{6} \times 1.85 \times 10^{-1}}{1.64 \times 10^{4}} = \underline{10.29 \times 10^{6} \text{ mins.}}$$

OVER

As stated previously, the reliability of response in RRGI-7 is questionable. The This curve-fitting technique, applied to late buildup data, is the most appropriate of those attempted. The values of the hydraulic properties obtained however are probably not representative of the injection zones in RRGI-7.