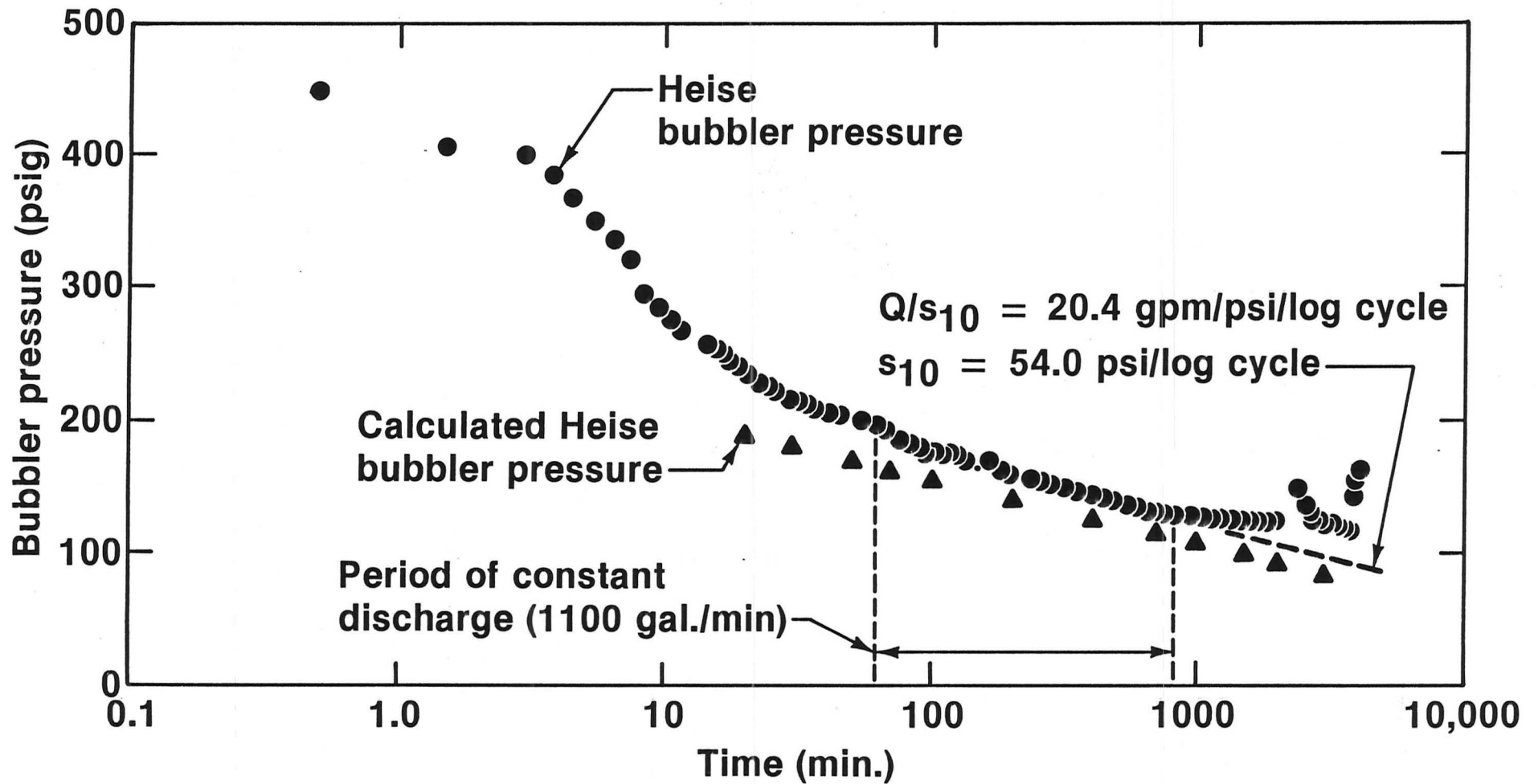
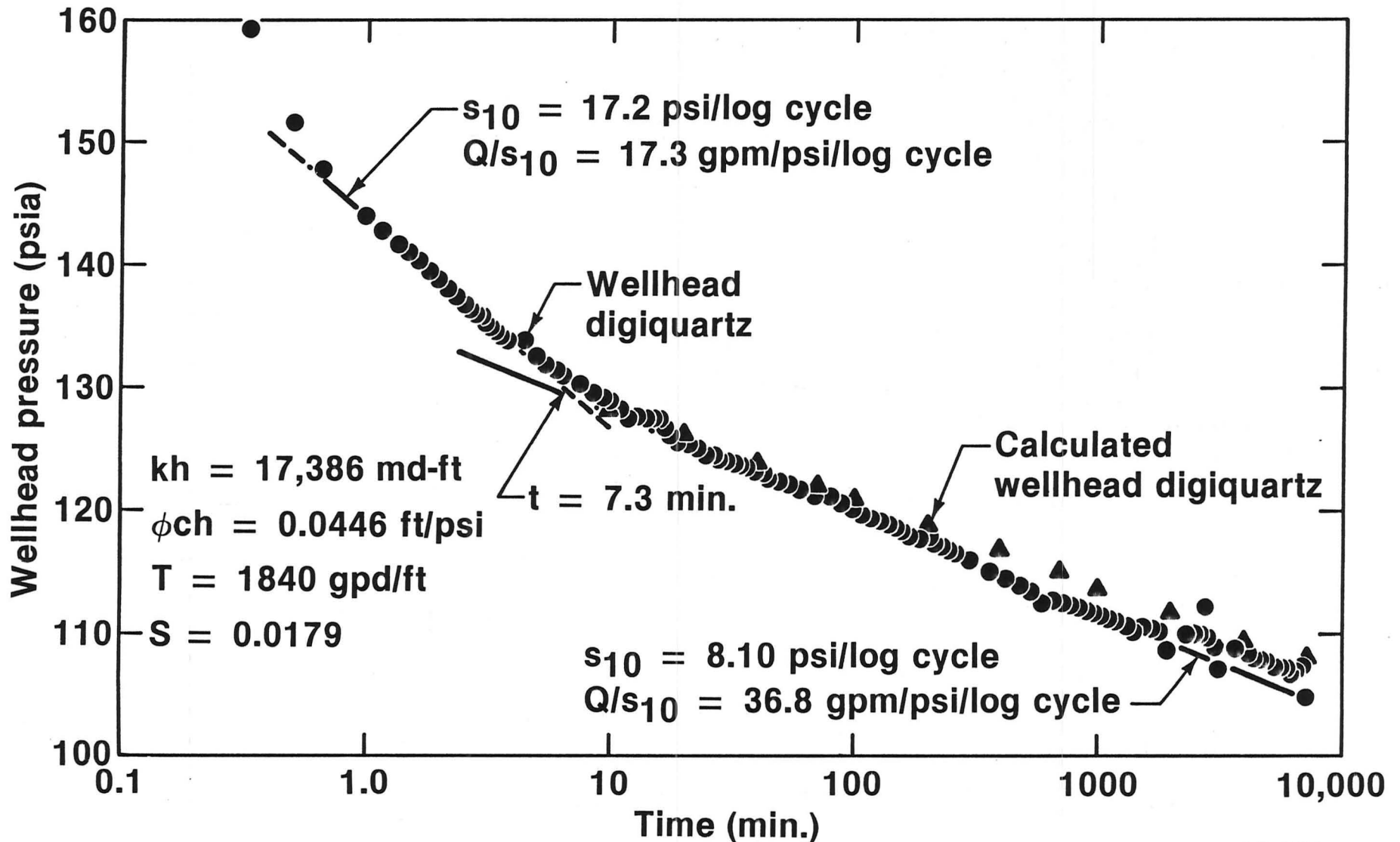


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Semilogarithmic Graph of Bubbler Pressure versus Time for RRGE-1 Test Beginning 10/20/81



Semilogarithmic Graph of Annulus Wellhead Pressure for RRGE-1 Test at 298 GPM beginning 02/03/82



Formula for Predicting Post-Boundary Drawdown/Recovery Pressures for Times to at Least 55,000 Minutes

$$D/R = D/R \text{ at } 1000 \text{ min.} + \text{ post boundary } s_{10} \text{ value } [(\log \text{ time}) - 3]$$

$$D/R = 0.0068573 Q^{1.579632} + 0.0017957 Q^{1.45591} [(\log \text{ time}) - 3]$$

General Analytical Observations

- **Best estimate of characteristics with:**
 - **Late-time drawdown/data**
 - **Early-time recovery data**
- **“Undeterminable” early-time boundary**
(nonlinear drawdown trends for up to 600 min.)
- **Q/s_{10} for post-boundary data for RRGE-1 and RRGE-2 wells dependent on Q**
- **Q/s_{10} for pre-boundary data for RRGP-5 are dependent on Q**

Field Conditions

- **Preheated and post-heated wellbore**
- **Pumping problems**
 - **Tight fitting pump**
 - **Discharge stabilization**
 - **Pump column draining after shut in**
- **Multiple producing zones**
- **Upward flow in open bore hole when shut in**
- **Fracture flow**

Constant Discharge, Variable Head Test

- Semilogarithmic pressure plots vs. time
- Transmissivity calculations

$$T = 110 (Q/s_{10}) \text{ for } 280^\circ\text{F}$$

Where: T = Transmissivity in gpd/ft

Q = Discharge in gpm

s_{10} = Drawdown or pressure
buildup per log cycle in psi

$$kh = 1150 (Q/s_{10}) \text{ for } 280^\circ\text{F}$$

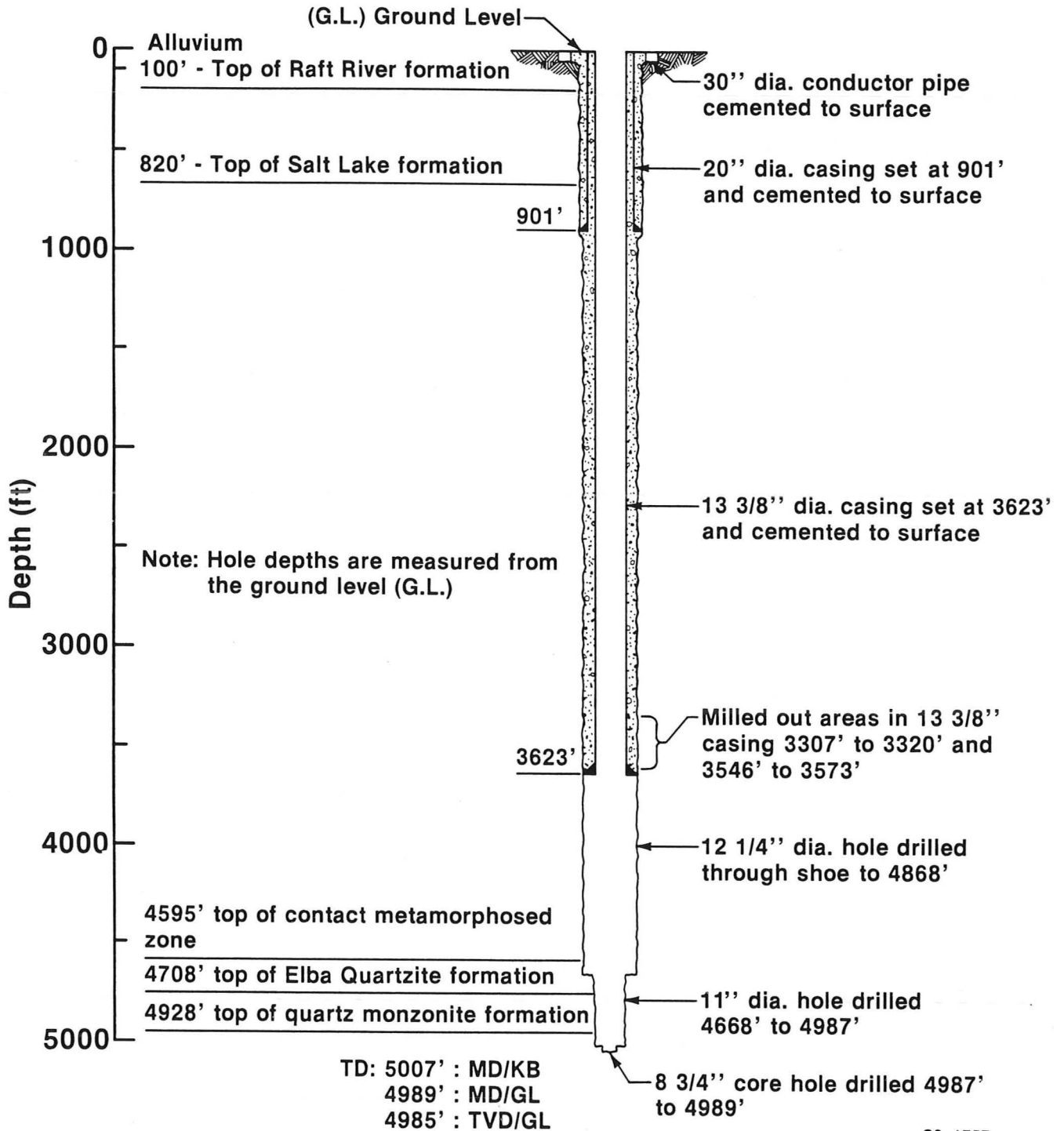
Where: kh = Intrinsic transmissivity in md-ft

Q/s₁₀ Post-Boundary Values for Tests Conducted

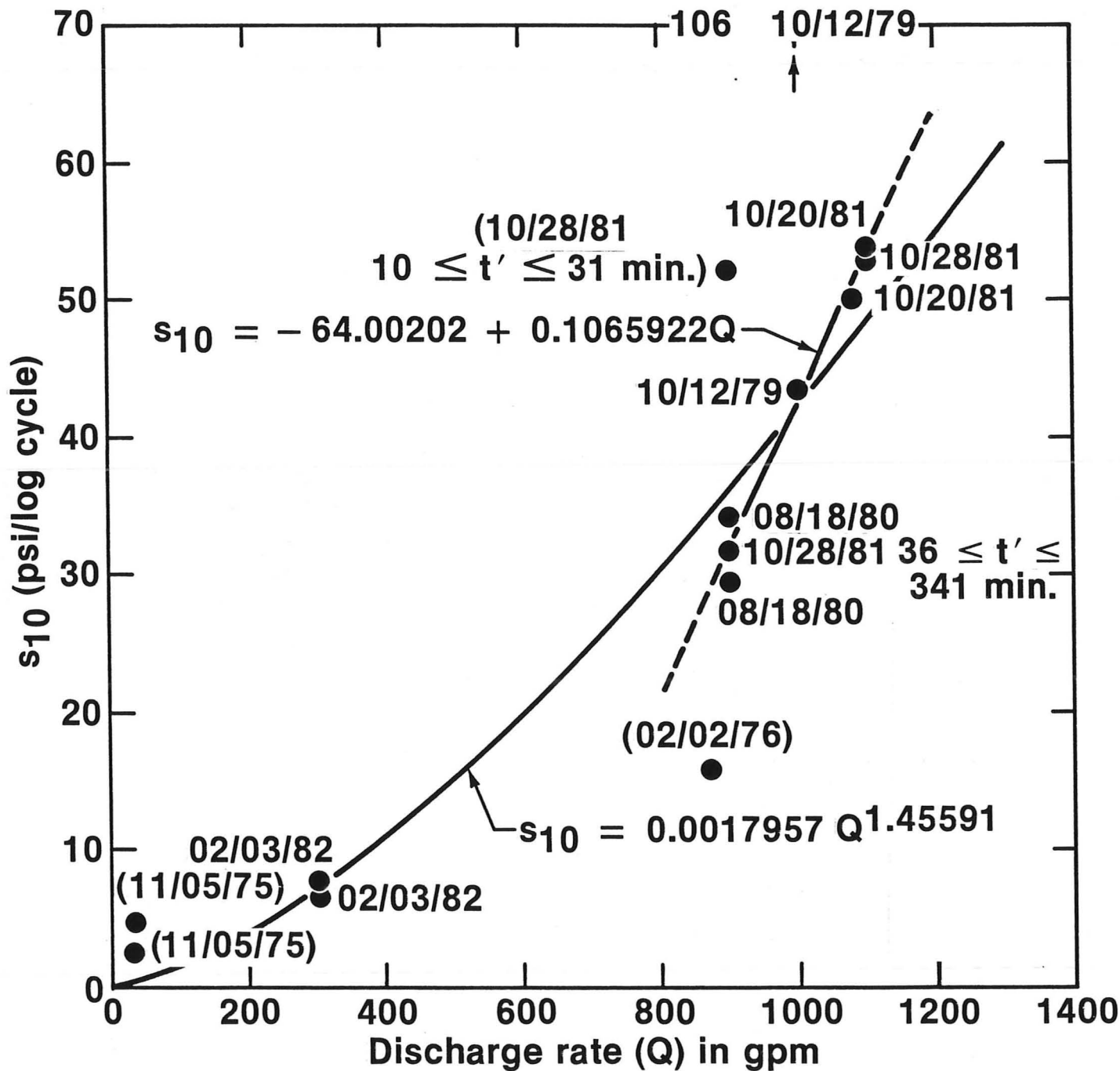
<u>Date</u>	<u>Q (gpm)</u>	<u>Q/s₁₀ (gpm/psi/log cycle)</u>	<u>Data Type</u>
11/05/75	26.5	131.2	D
	26.5	68.9	R
02/02/76	871*	54.6*	D
10/12/79	1000*	9.4*	D
	1000	23.0	R
08/18/80	900	30.6	D
	900	26.3	R
10/20/81	1100	20.4	D
	1080	21.6	R
10/28/81	1100	20.8	D
	900*	17.2*	R
	900	28.4	R
02/03/82	298	38.4	D
	298	41.8	R

* - Estimated value D - Drawdown R - Recovery

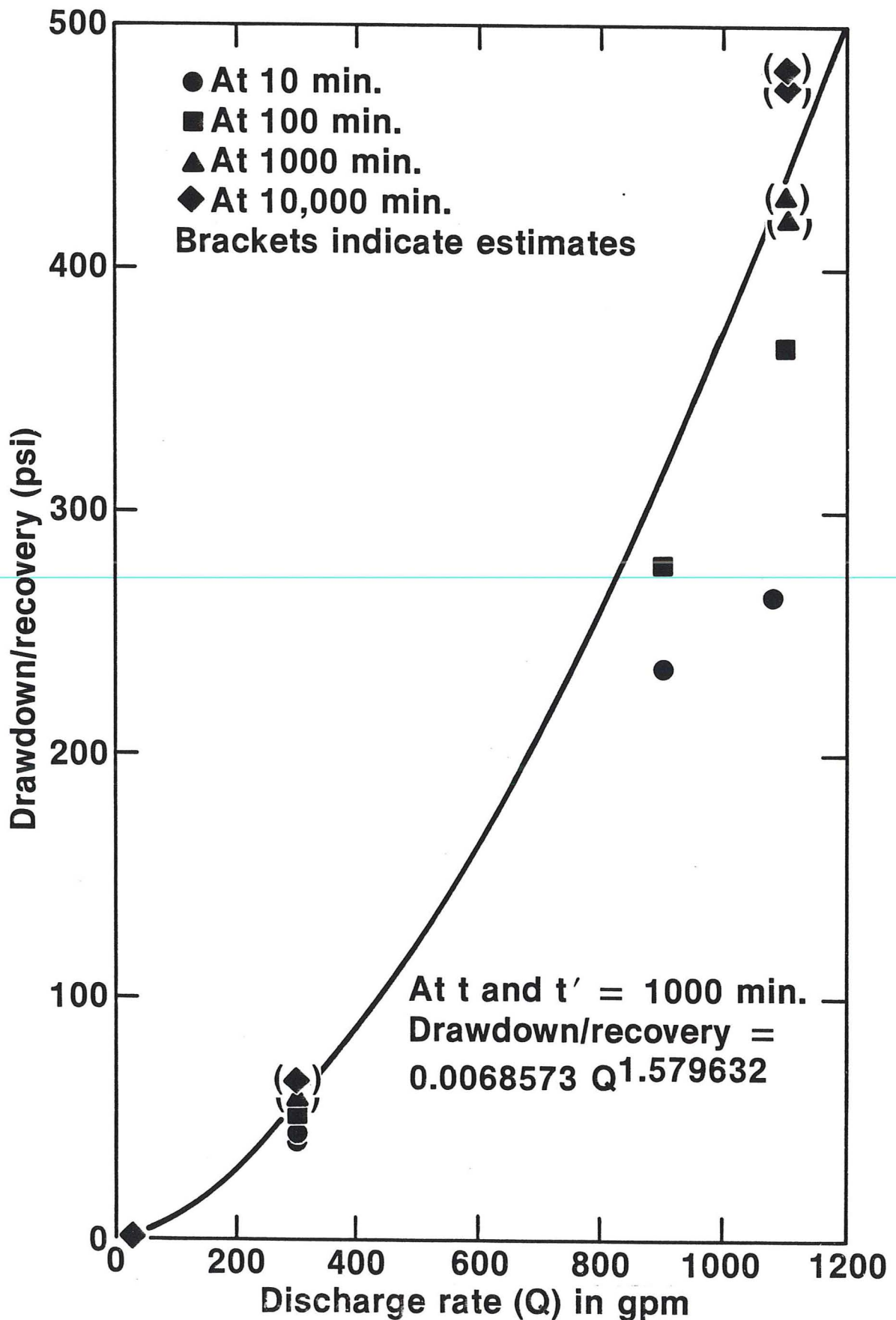
Present Subsurface Well Status

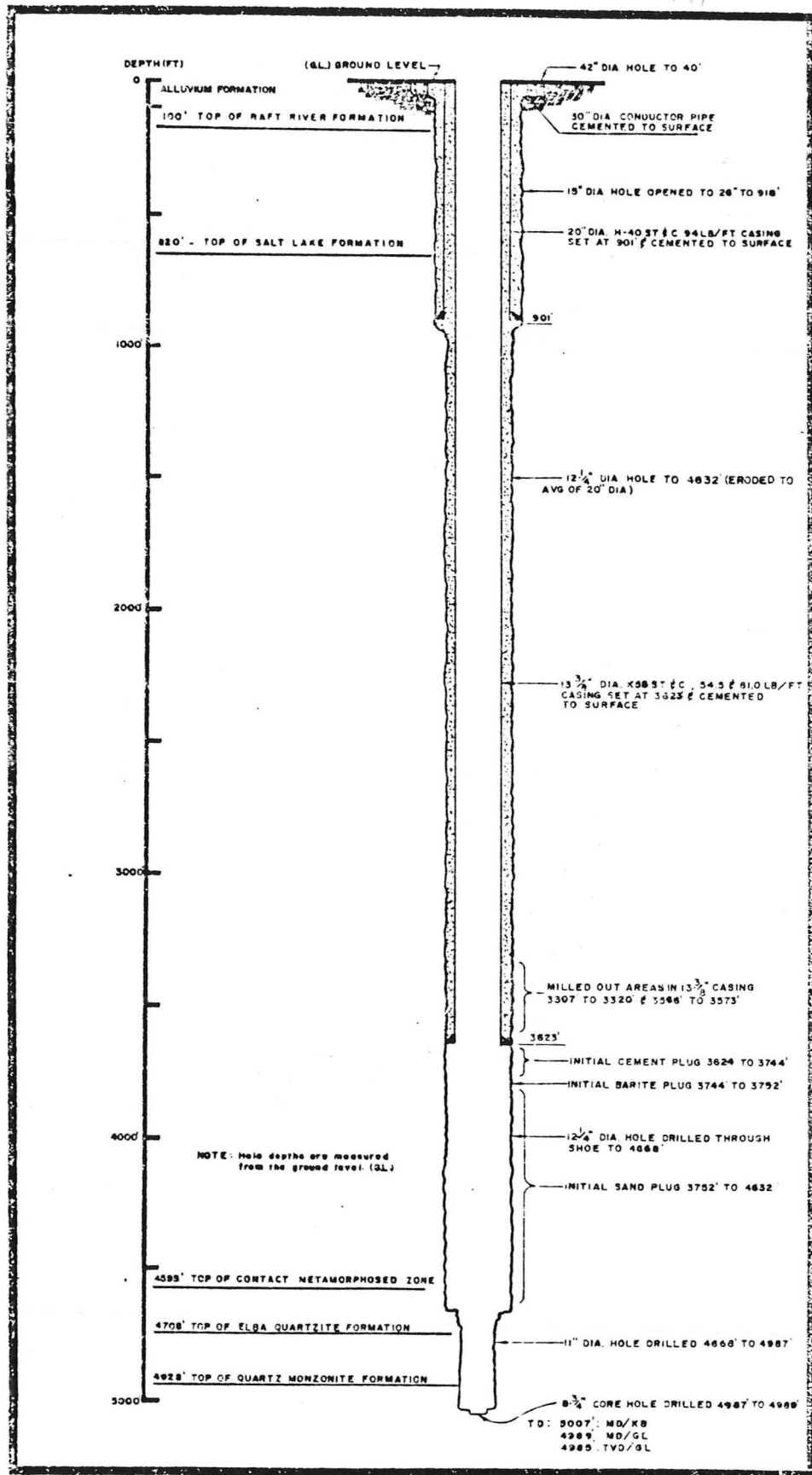


s₁₀ versus Discharge Rate for RRGE-1 for t > 3 min. and t' > 3 min.



Drawdown/Recovery vs Discharge Rate at Various Times





~~Present~~ Present Subsurface Well Status

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Summary

- Nonideal drawdown/recovery pressure trends for post-boundary data can be predicted using an empirically derived equation
- Equation errors are approximately 15 psi (3.4%) for 437 psi of drawdown after 1000 min.