[1]Linear Flow Systems

For

The RPI Users Group

BJ Services
Conference Room

May 21, 1998

Types of Systems:

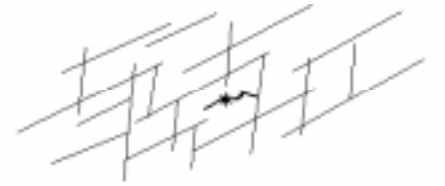
1. **Bar Sand Environments**
   - **Lake Uintah south shore**

2. **Channel Sand Environments**
   - **Morrow/Springer Channels**
   - **Red Fork**
   - **D Sand**

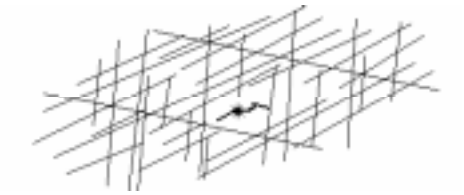
Naturally Fractured Reservoirs[3]

- **Sparsely Fractured**

- **Moderately Fractured (Compartmentalized)**



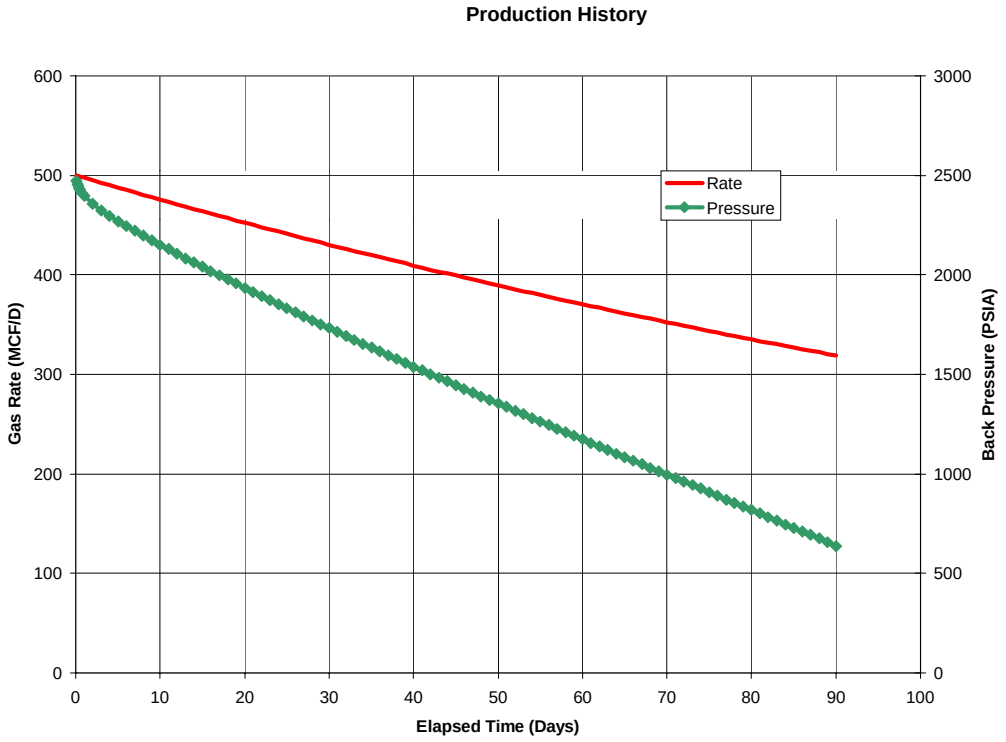
- **Intensely Fractured (approaching Radial Flow)**



Theory:
[4]

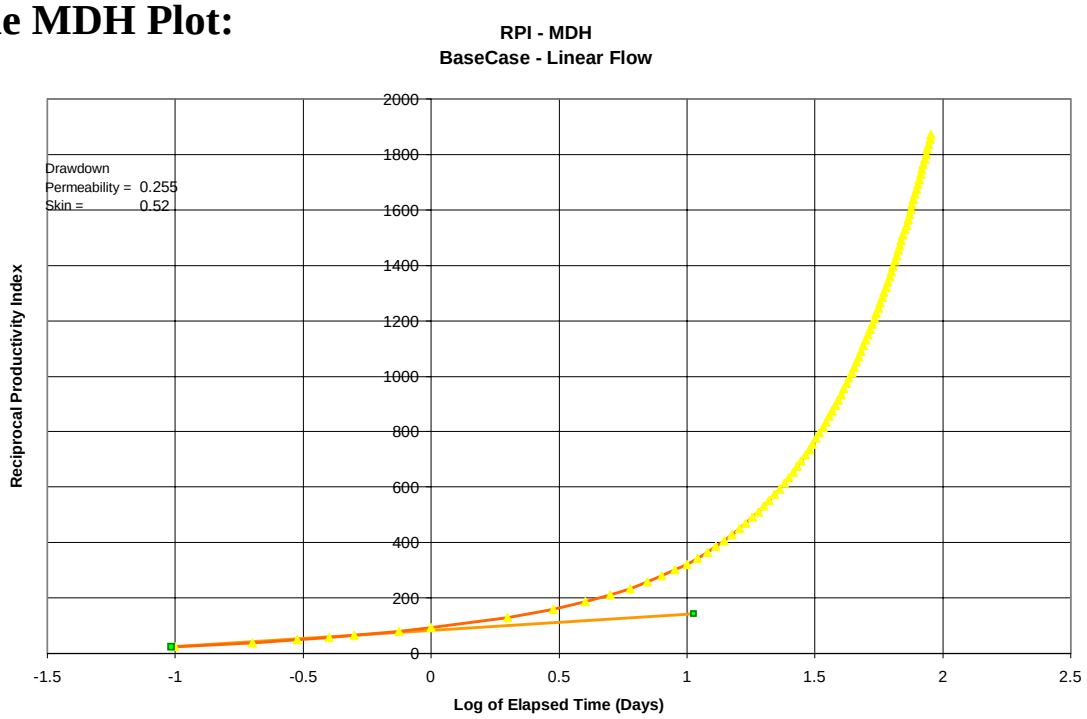
$$\frac{\Psi_i - \Psi_w(t)}{q_s} = \frac{\rho_s}{x_f h \sqrt{k}} \sqrt{\frac{t}{\pi \Phi \mu c}}$$

An Example:[5]



K = .25 mDs. Xe = 200 ft. Xf = 50 ft. Ad = .9183 Ac.

The MDH Plot:



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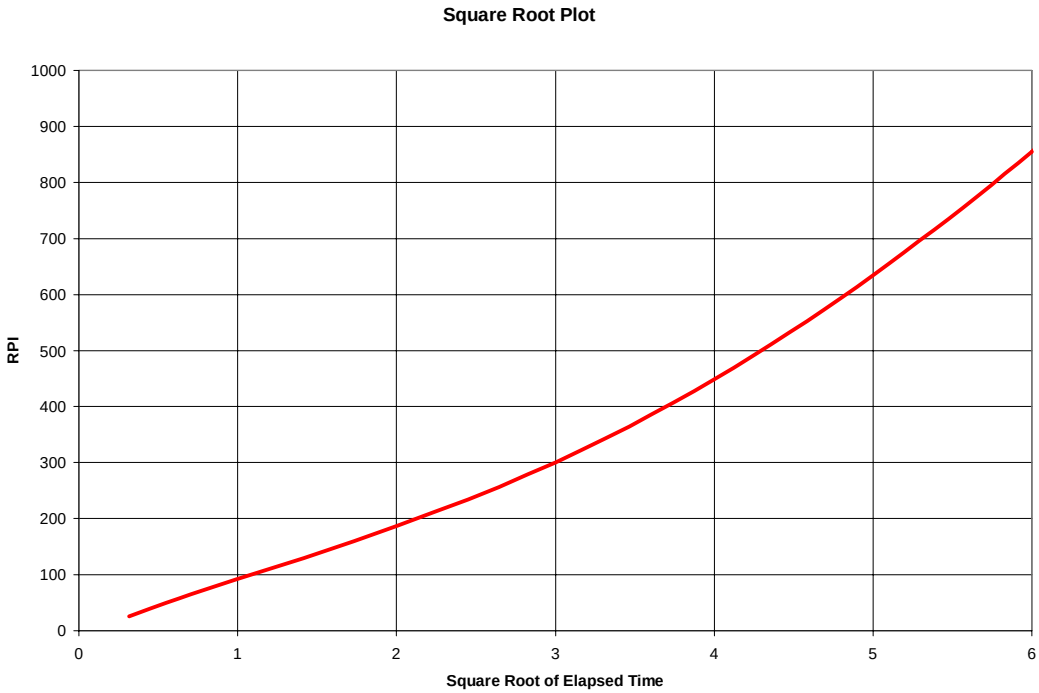
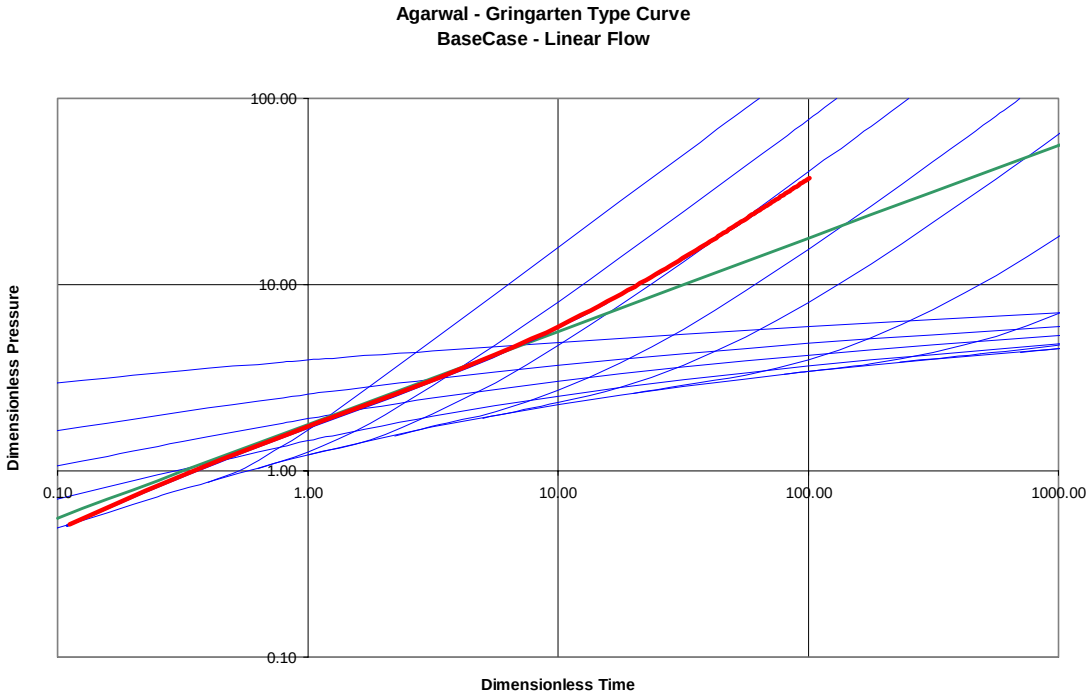
The Root Plot



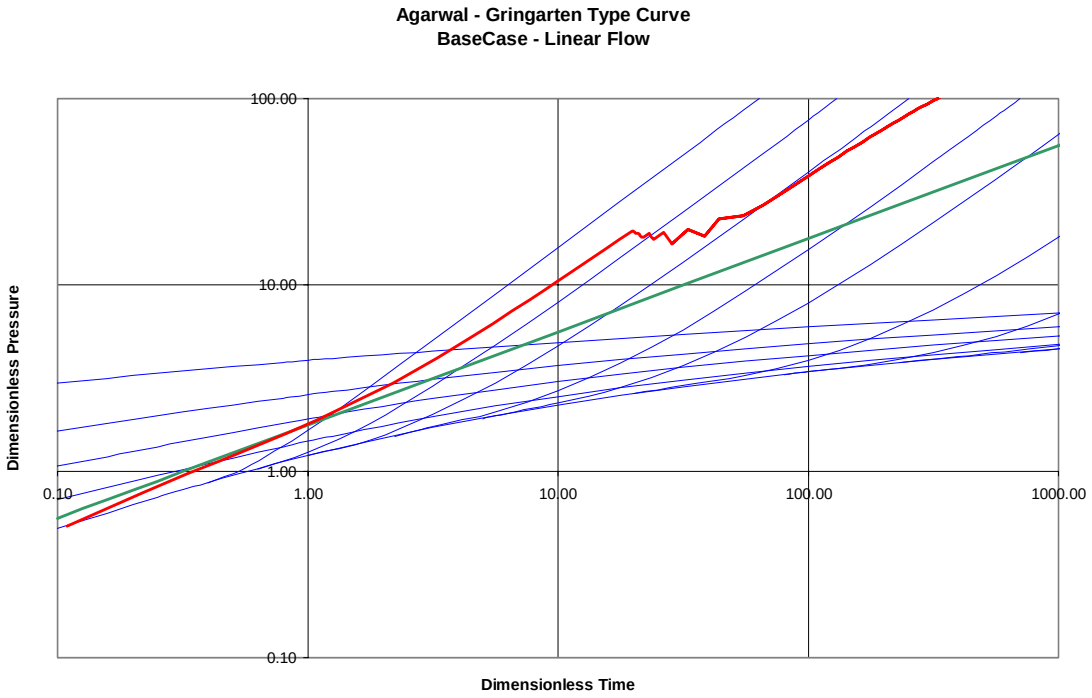
The Agarwal – Gringarten Type Curve

8

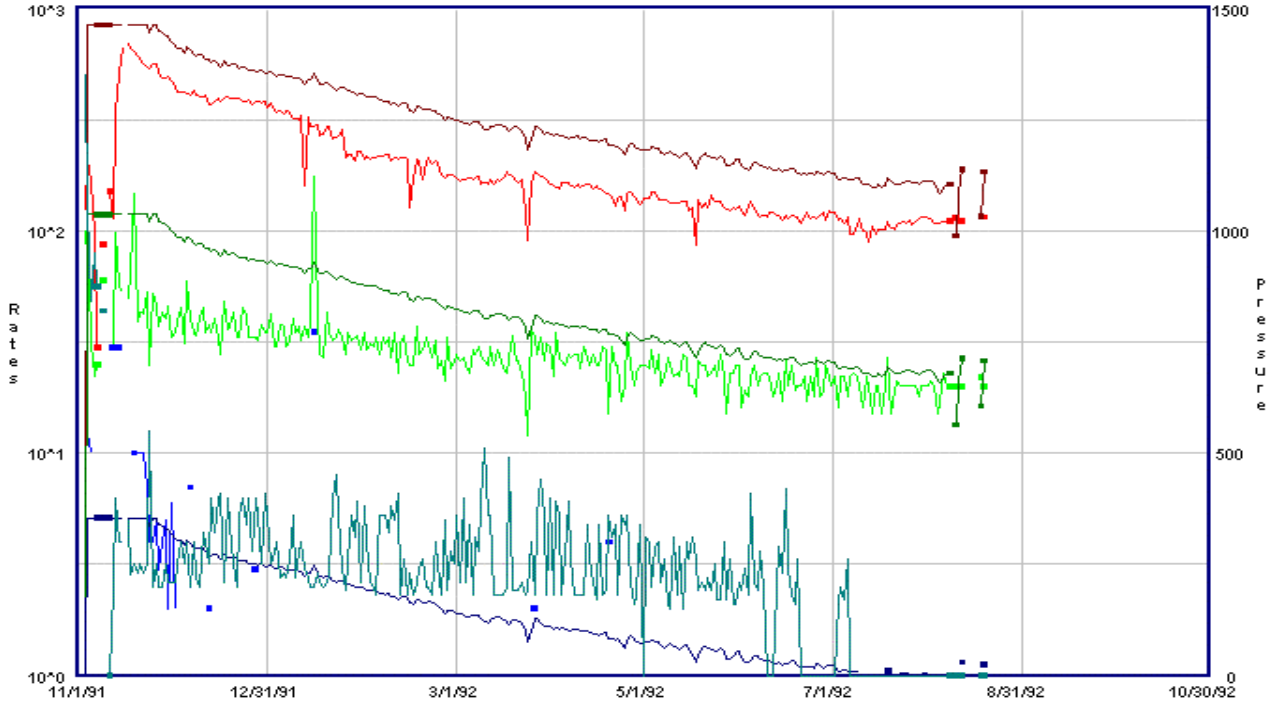


A Compartment Response:

9



K=.25 mDs. xe=200 ft. xf=50 ft. Blk Bdry=75 ft. Threshhold Pressure = 200 psi.



[10] Fig. 3 Production Decline Curve for Expl. #3 – Boundary

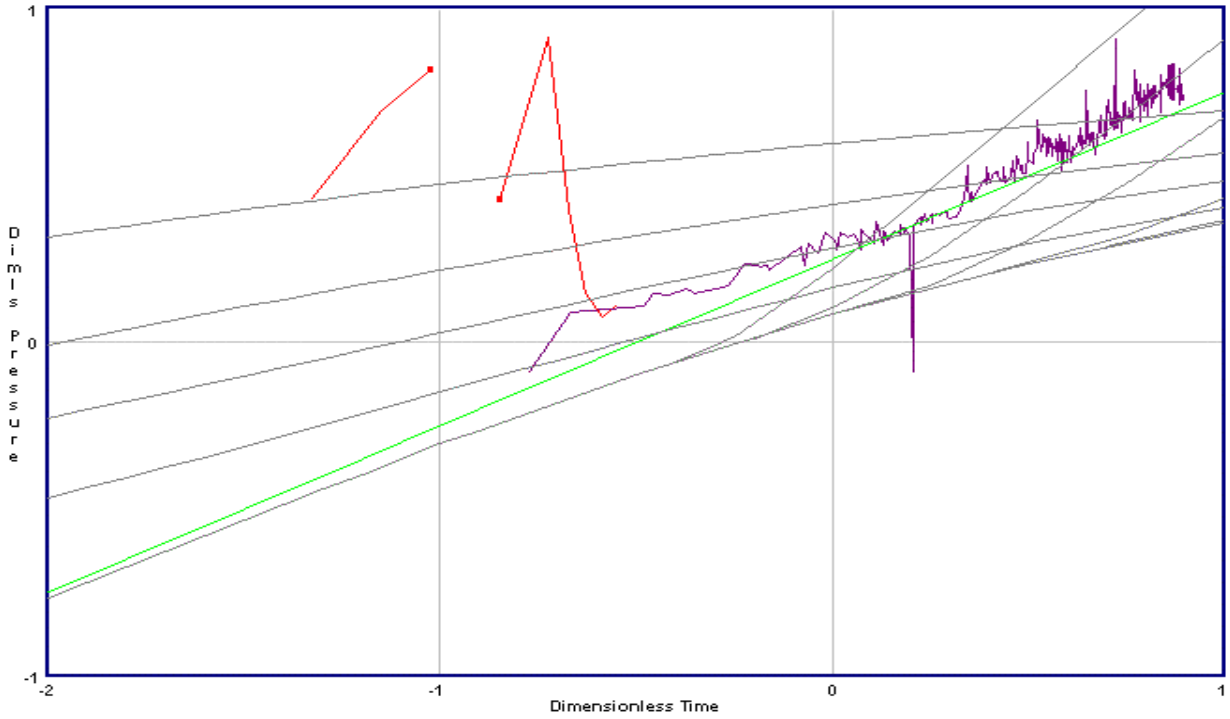
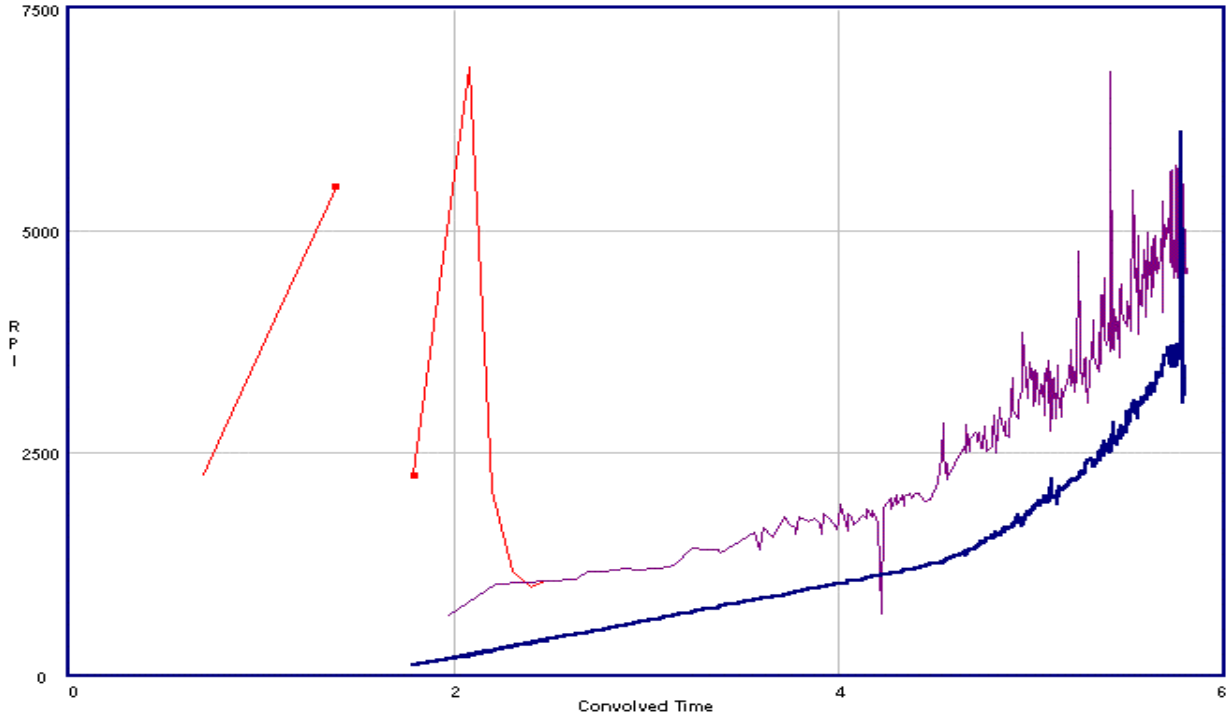


Fig. 1 Agarwal-Gringarten Type Curve for Expl. #3 – Boundary



[12] Fig. 2 RPI-MDH Plot for Expl. #3 – Boundary

Conclusions:

- **Geologically controlled linear flow regimes can be evaluated**
- **Use the MDH plot at “early” time to estimate permeability**
- **Use Root Plot and AGTC to evaluate “length” of fracture face**
- **Expectations created by “assumed” radial flow cause frequent “disappointing completions”**