Double Duty

Using Vibration Monitoring to Improve Construction Methods

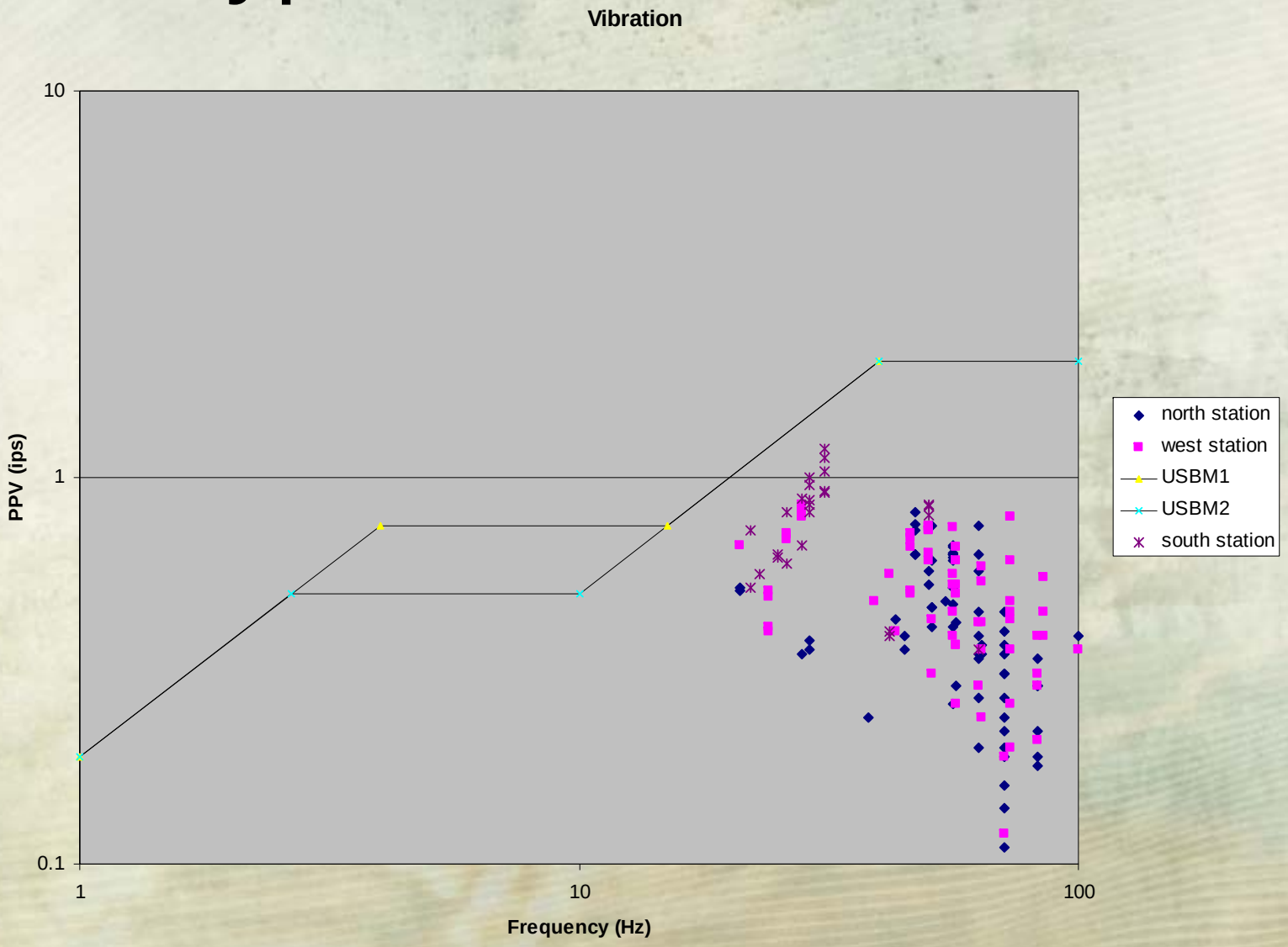
Double Duty

- Look at data in a new way
- One more aspect of construction
- Oh, and its Free!

Why Blast?

- Enlarges bore to reduce velocity into casing
- Fractures the rock to increase 3D flow
- Helps clean out the loose material

Typical Vibration Data



Blasting Math

$$ppv = K \bullet SD^{-1.6}$$

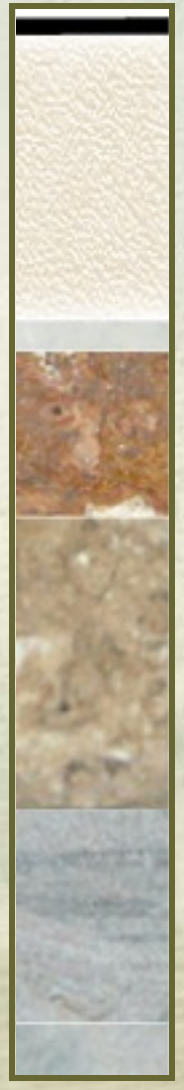
- ppv = peak particle velocity
- K = confining factor

$$SD = \frac{D}{\sqrt{wt}}$$

- D = 3d distance from blast
- wt = pounds of explosives

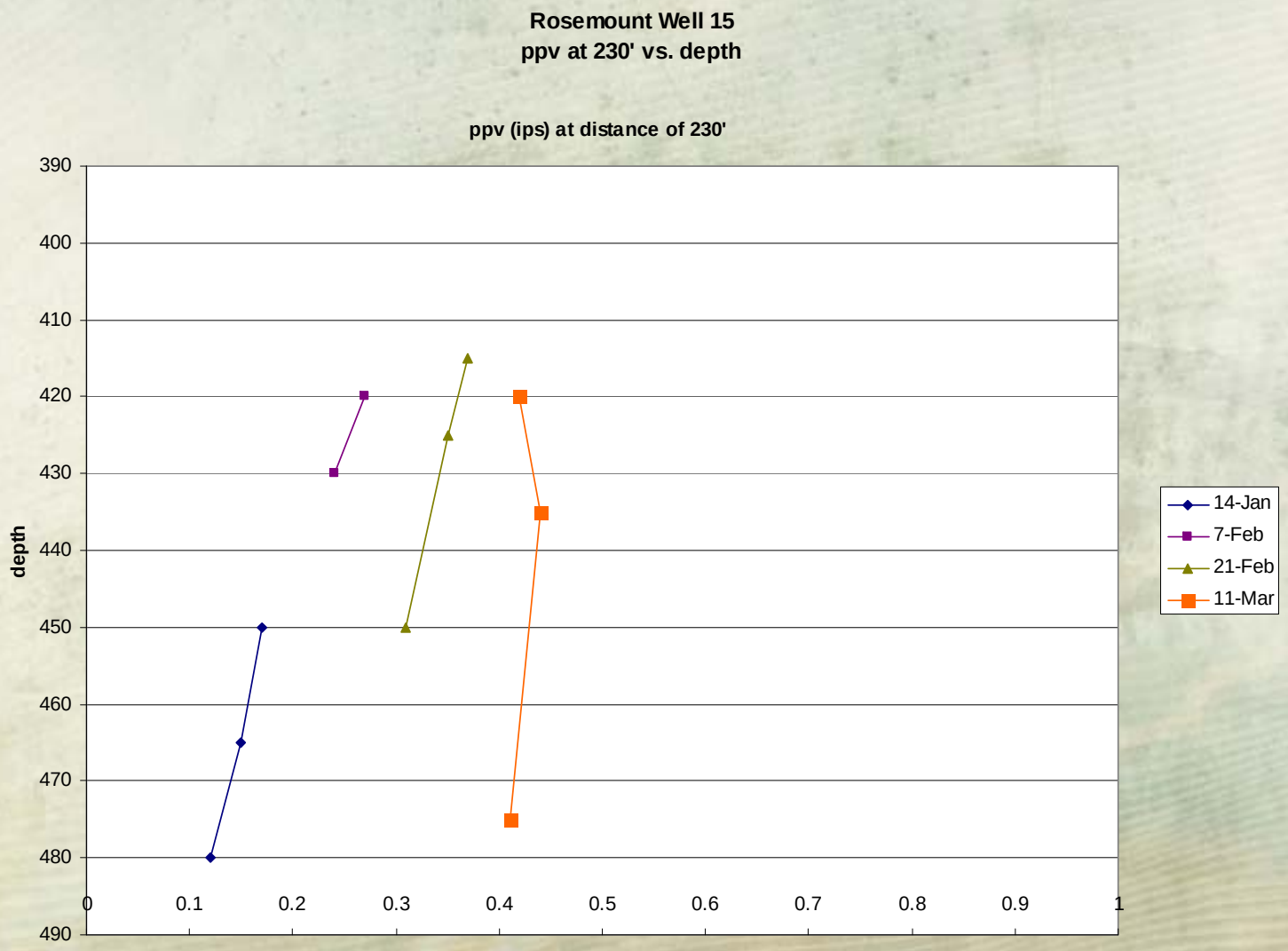
Case Study

Rosemount Well 15

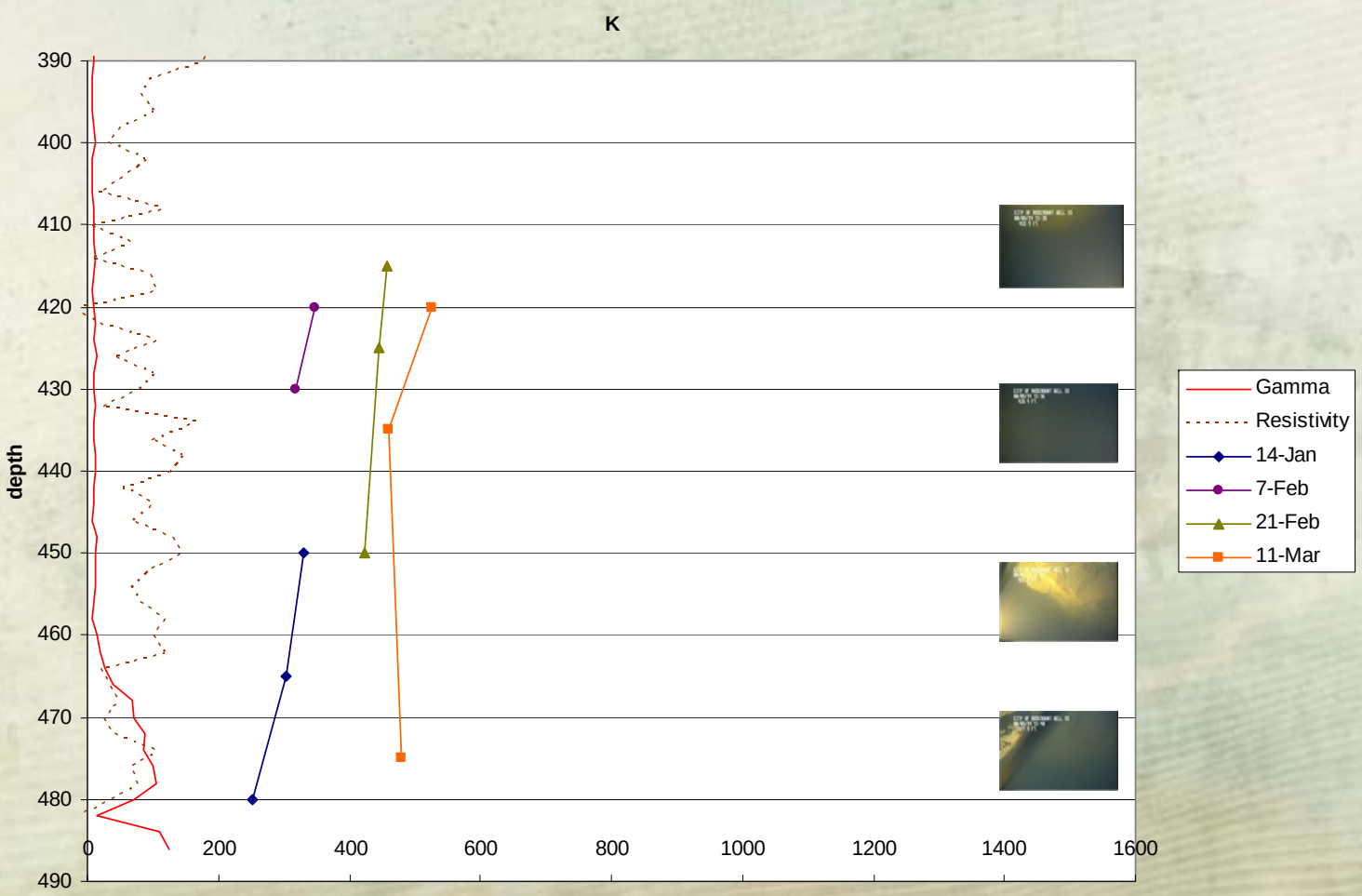


- 145’ Drift
- 15’ St. Peter shaly sandstone
- 75’ Shakopee dolostone
- 145’ Oneota dolostone
- 103’ Jordan sandstone
- St. Lawrence siltstone

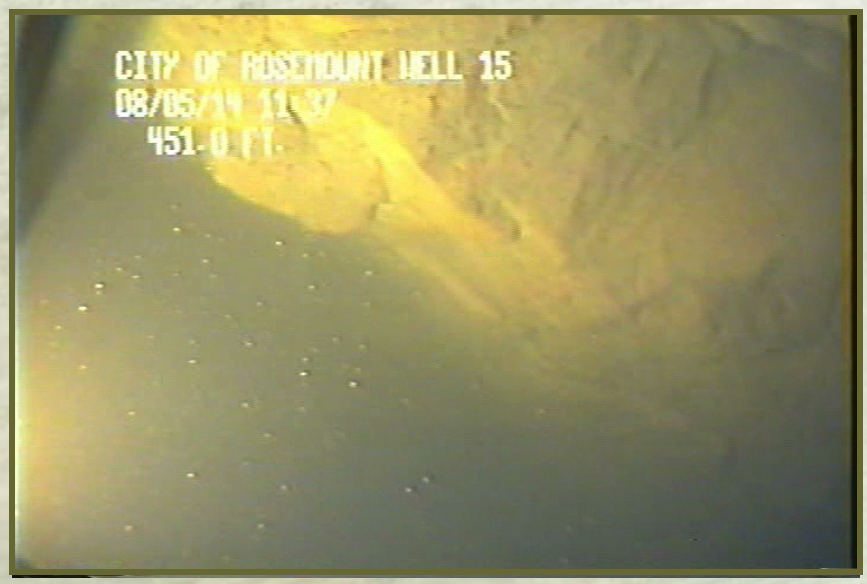
Rosemount Well 15



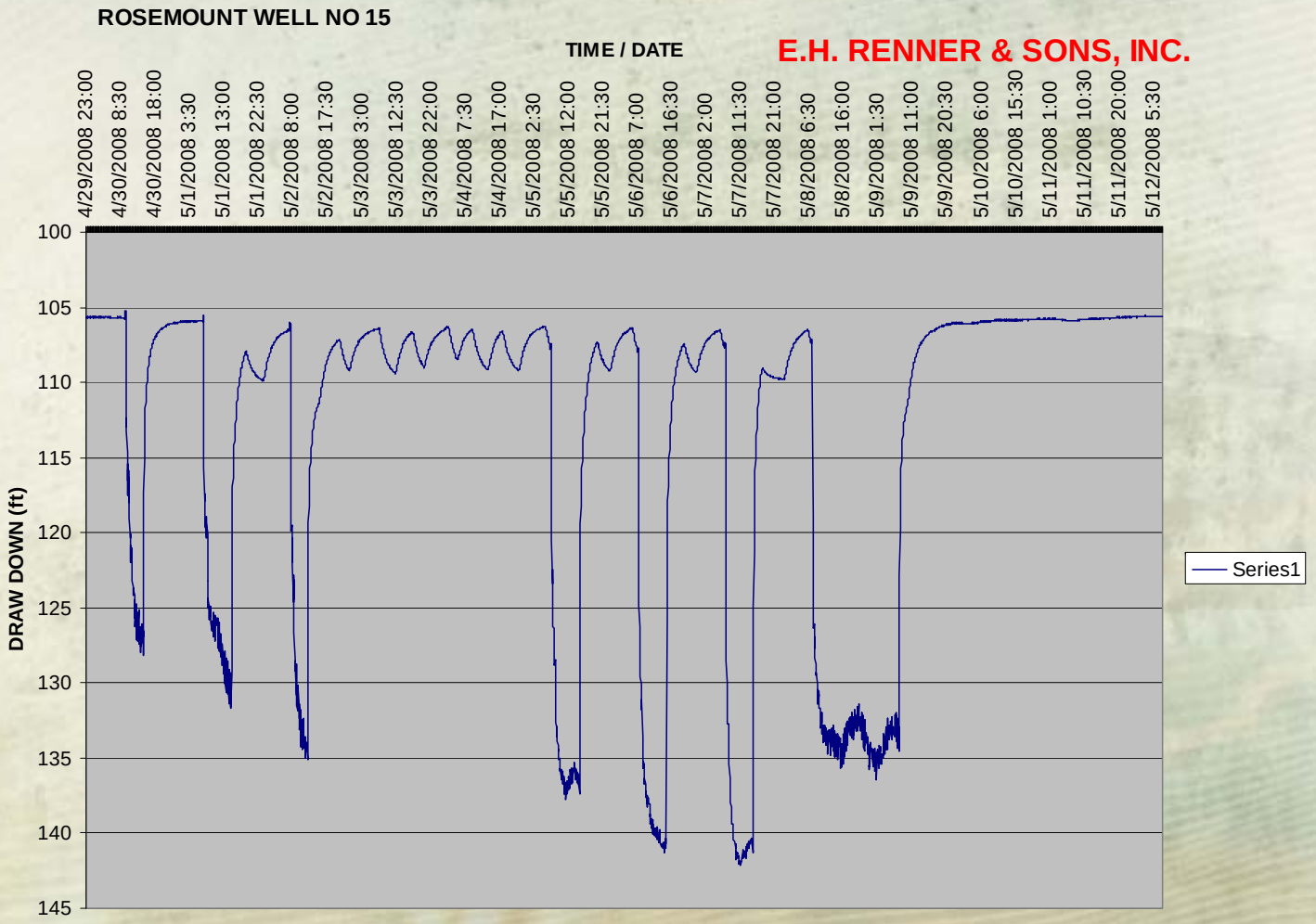
Rosemount Well 15



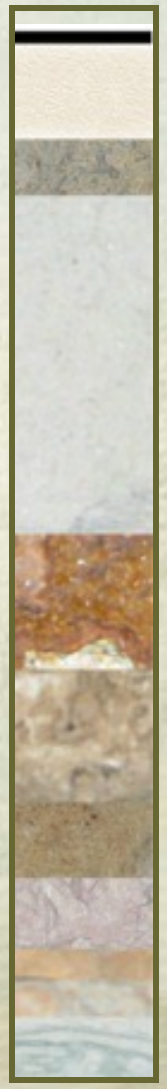
Rosemount Well 15



Rosemount Well 15



Mahtomedi Well 6

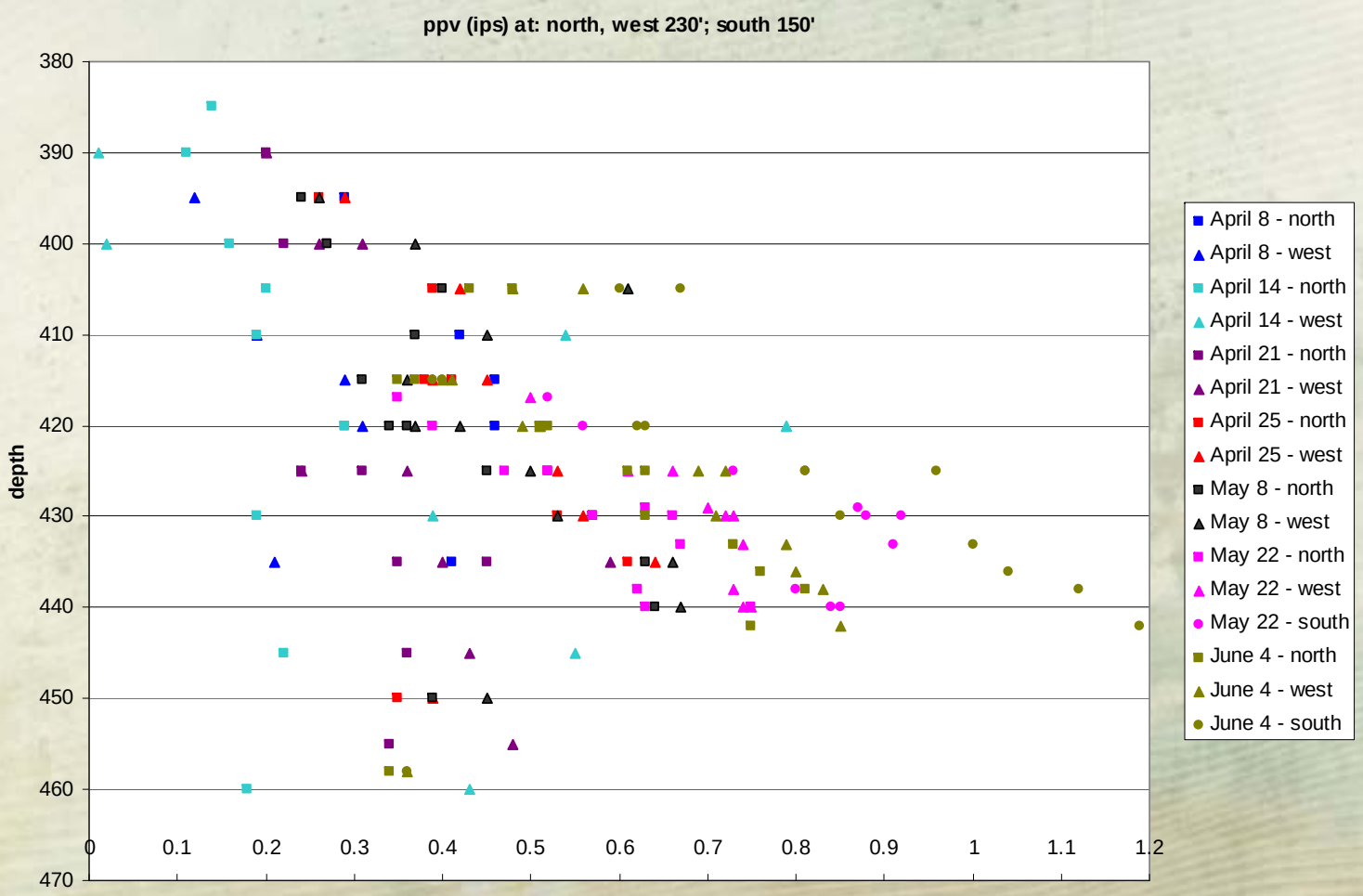


- 51’ Drift
- 25’ Platteville Limestone
- 5’ Glenwood shale
- 156’ St. Peter Sandstone

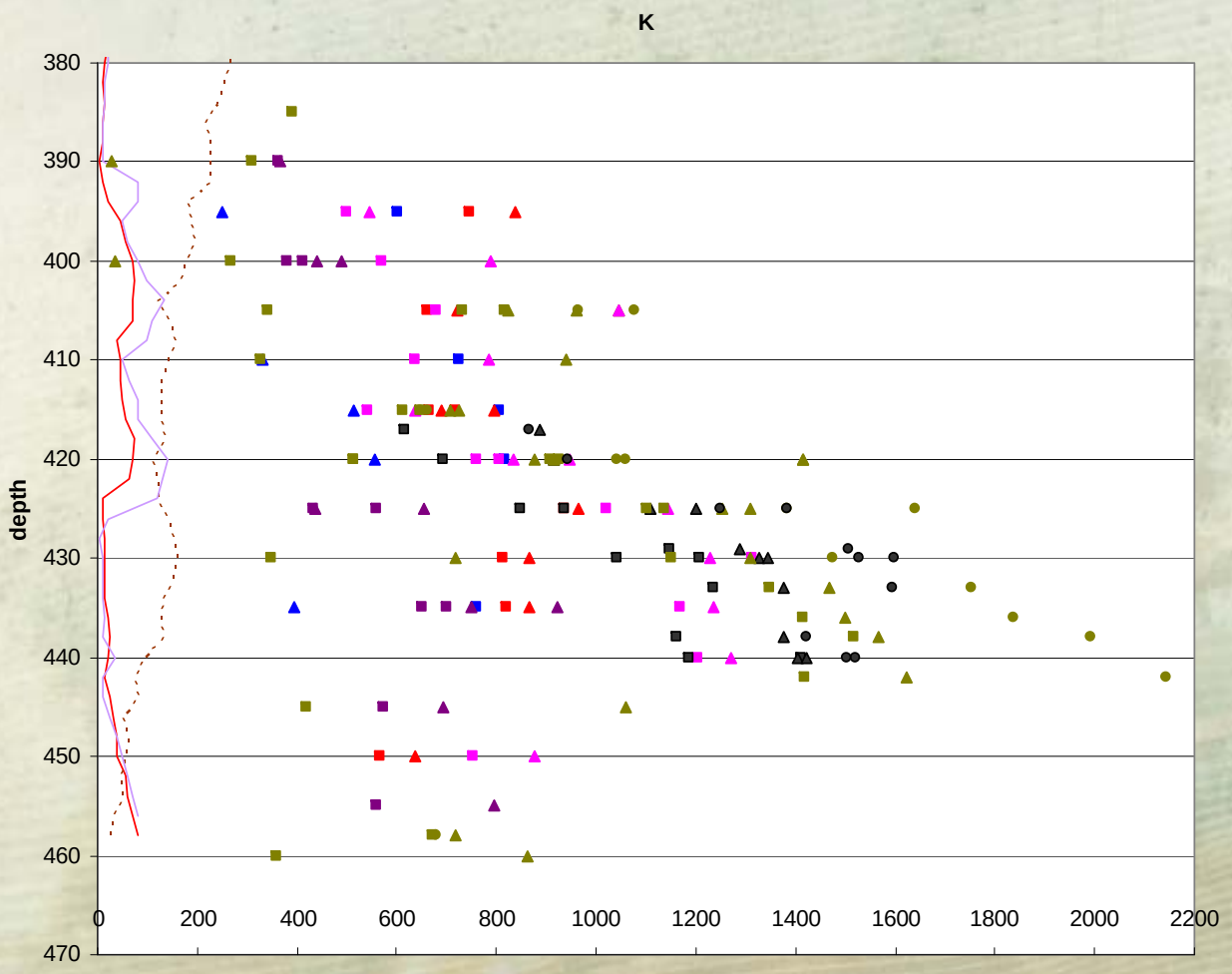
- 63’ Shakopee dolostone
- 64’ Oneota dolostone

- 97’ Jordan sandstone
- St. Lawrence siltstone

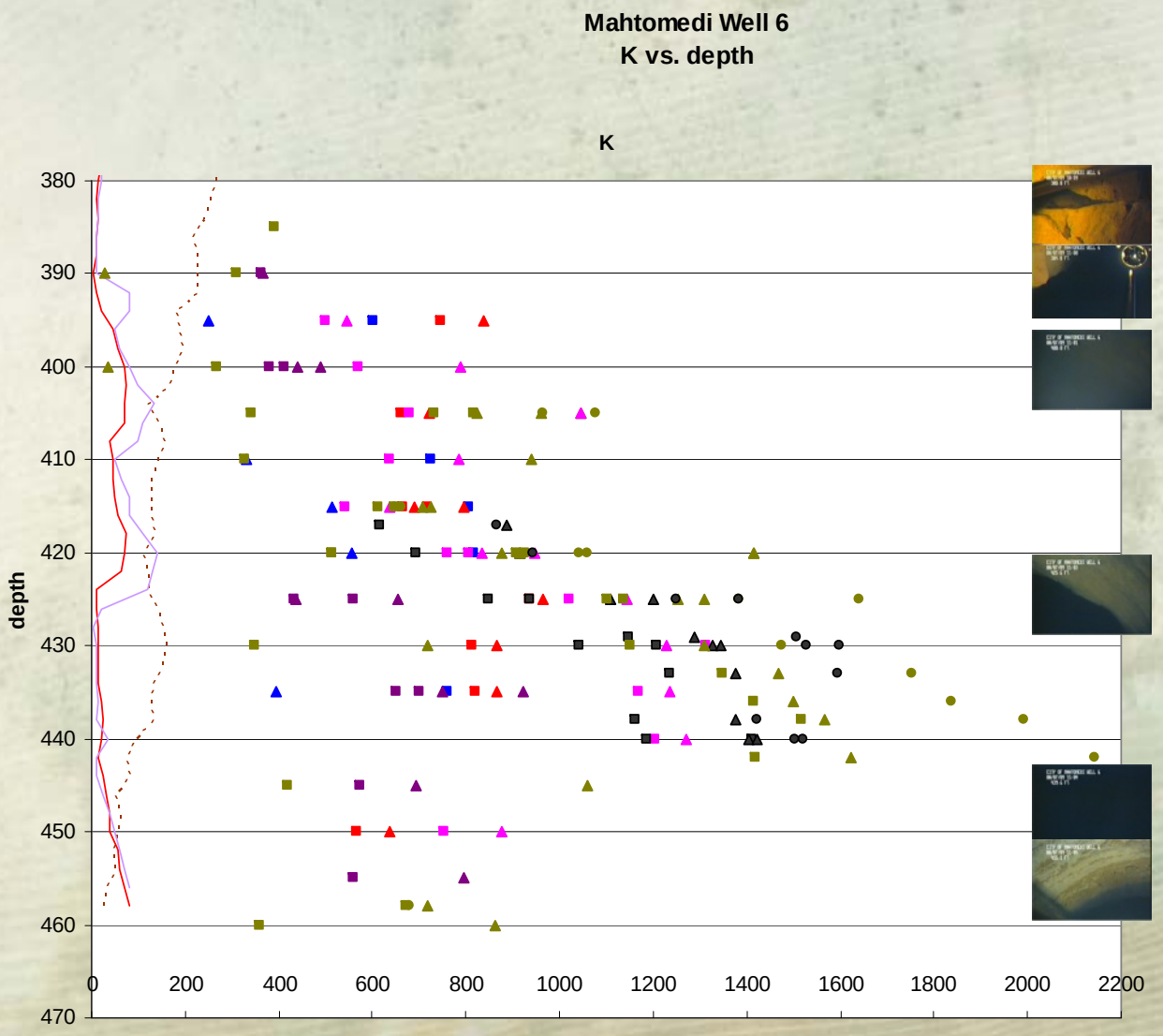
Mahtomedi Well 6



Mahtomedi Well 6



Mahtomedi Well 6



Mahtomedi Well 6

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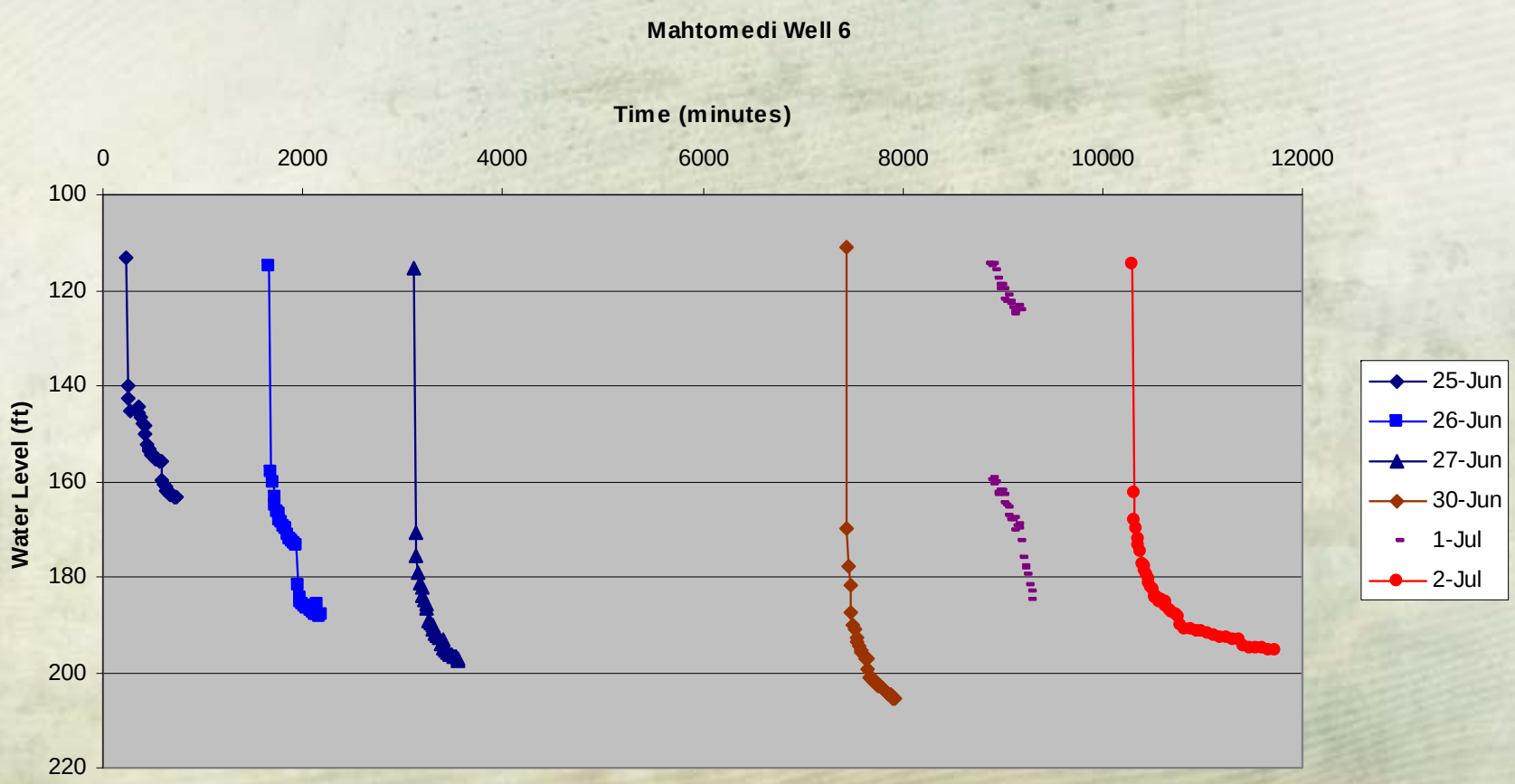
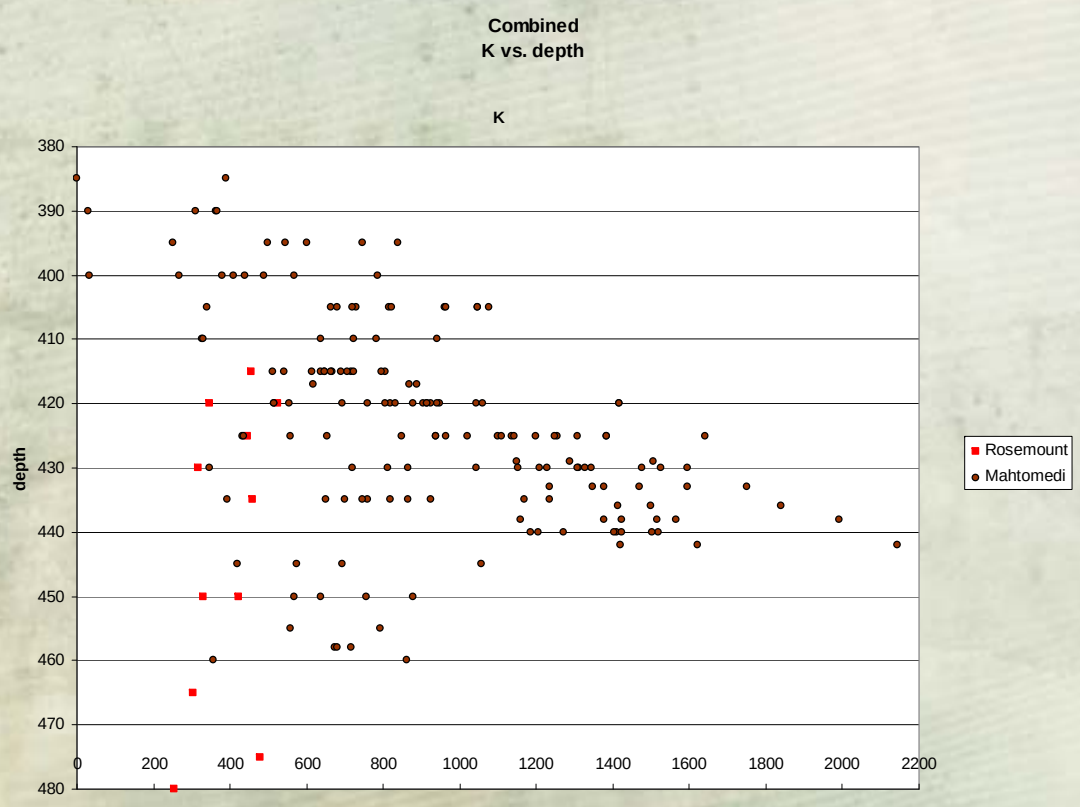
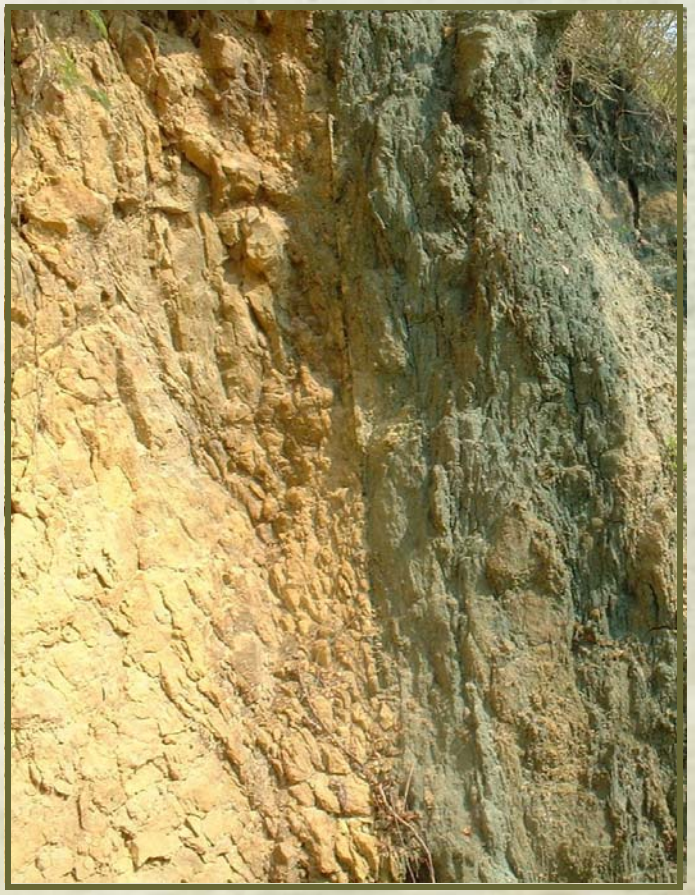


Discussion

- Atypical vibrations indicate atypical conditions
- Atypical conditions may require change in design or construction method



Acknowledgements



- City of Rosemount
- City of Mahtomedi
- E.H. Renner & Sons
- Downhole Well Services
- American Engineering Testing
- McGhie and Betts

Questions?