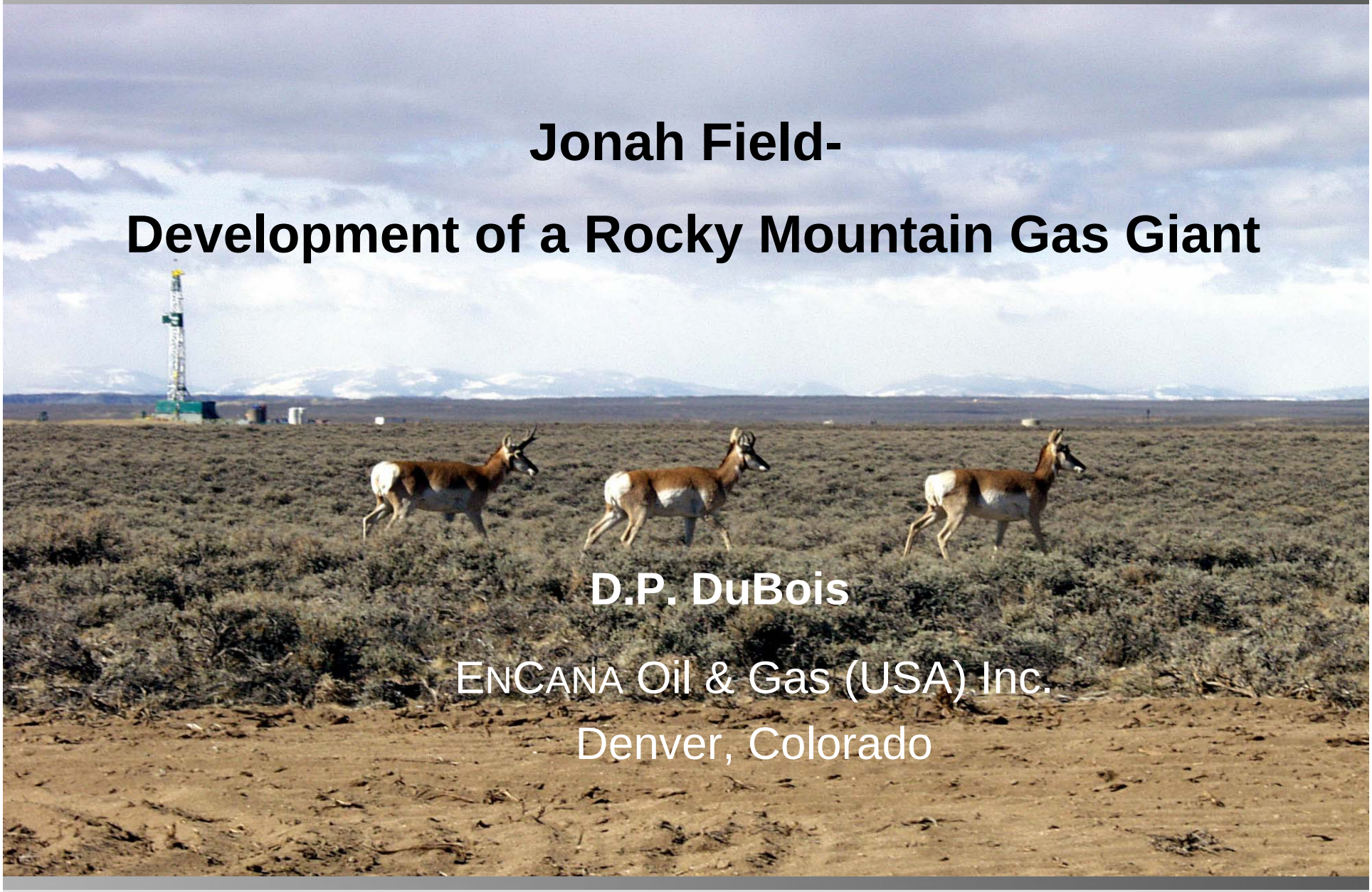
ENCANA



Jonah Field-

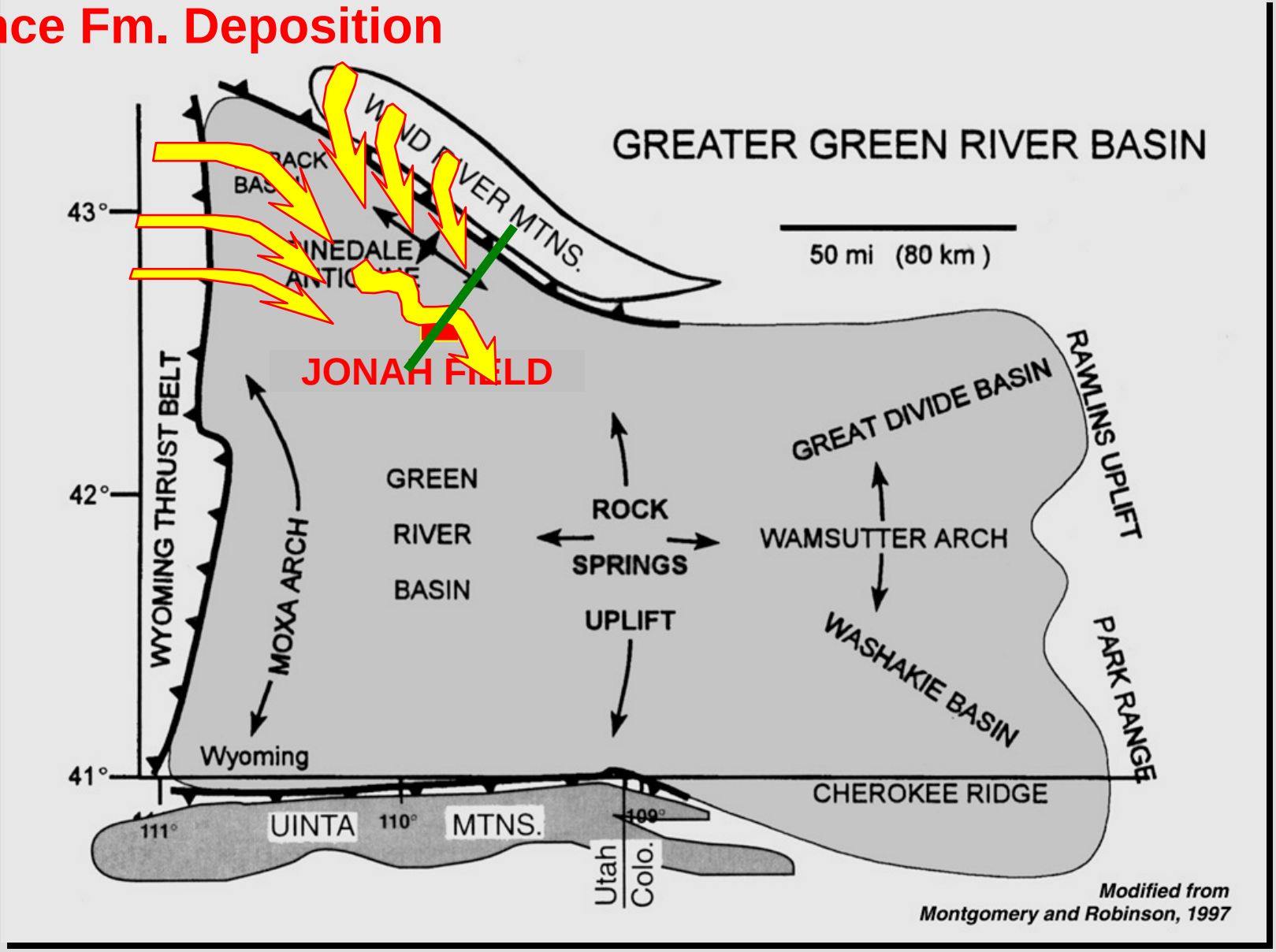
Development of a Rocky Mountain Gas Giant

D.P. DuBois

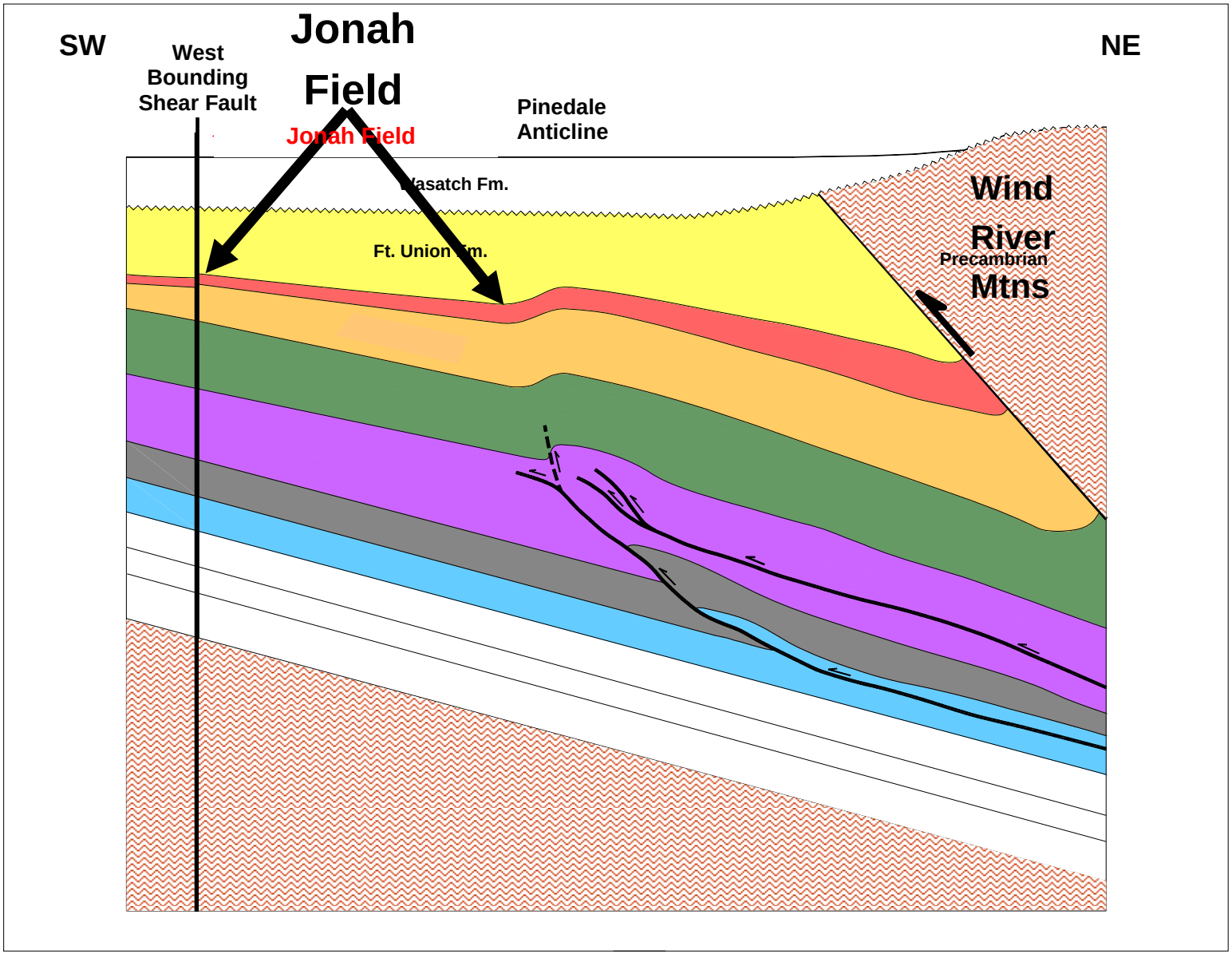
ENCANA Oil & Gas (USA) Inc.
Denver, Colorado

Location of Jonah Field - SW Wyoming

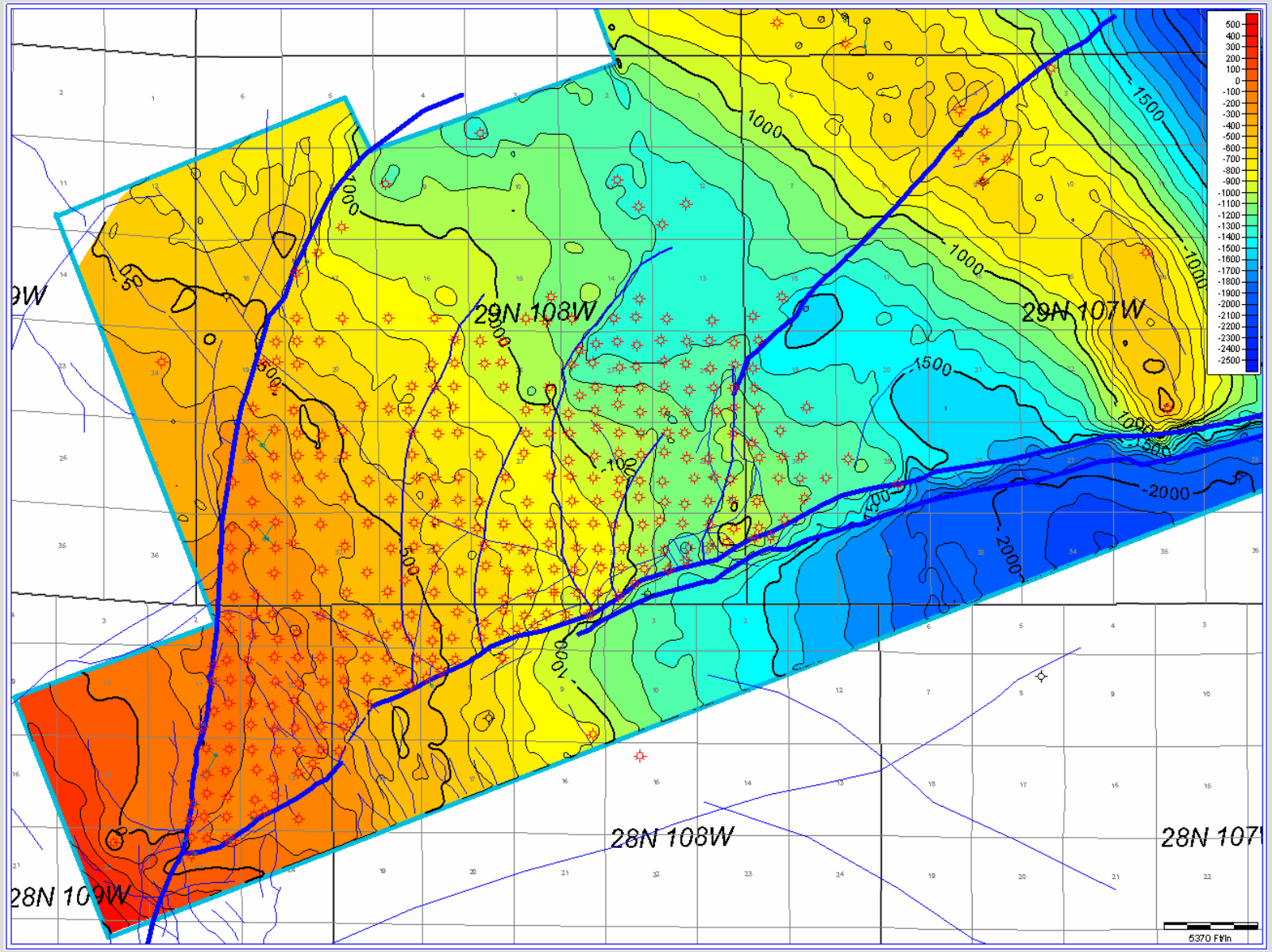
Lance Fm. Deposition



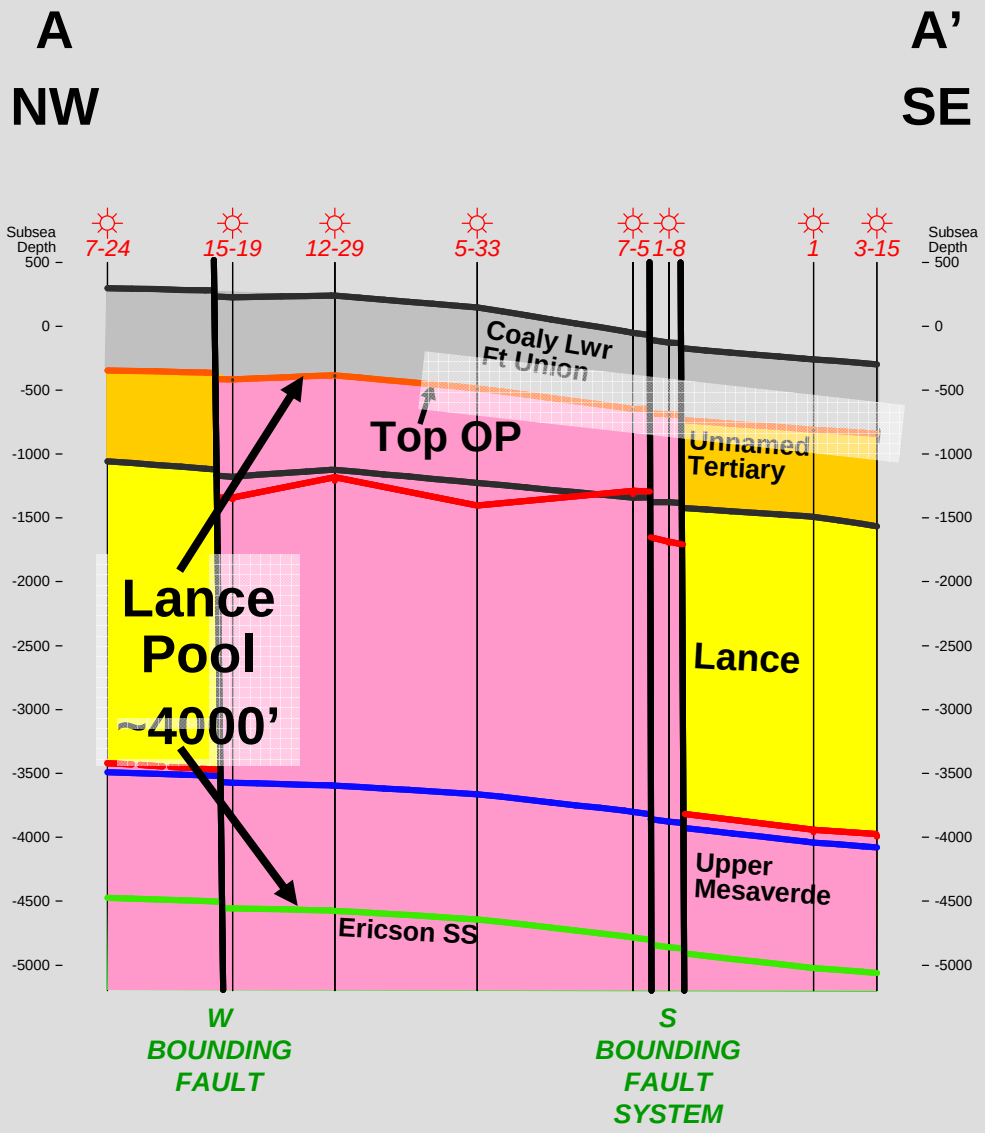
Structural Cross-Section



Structure Contour – Base Fort Union

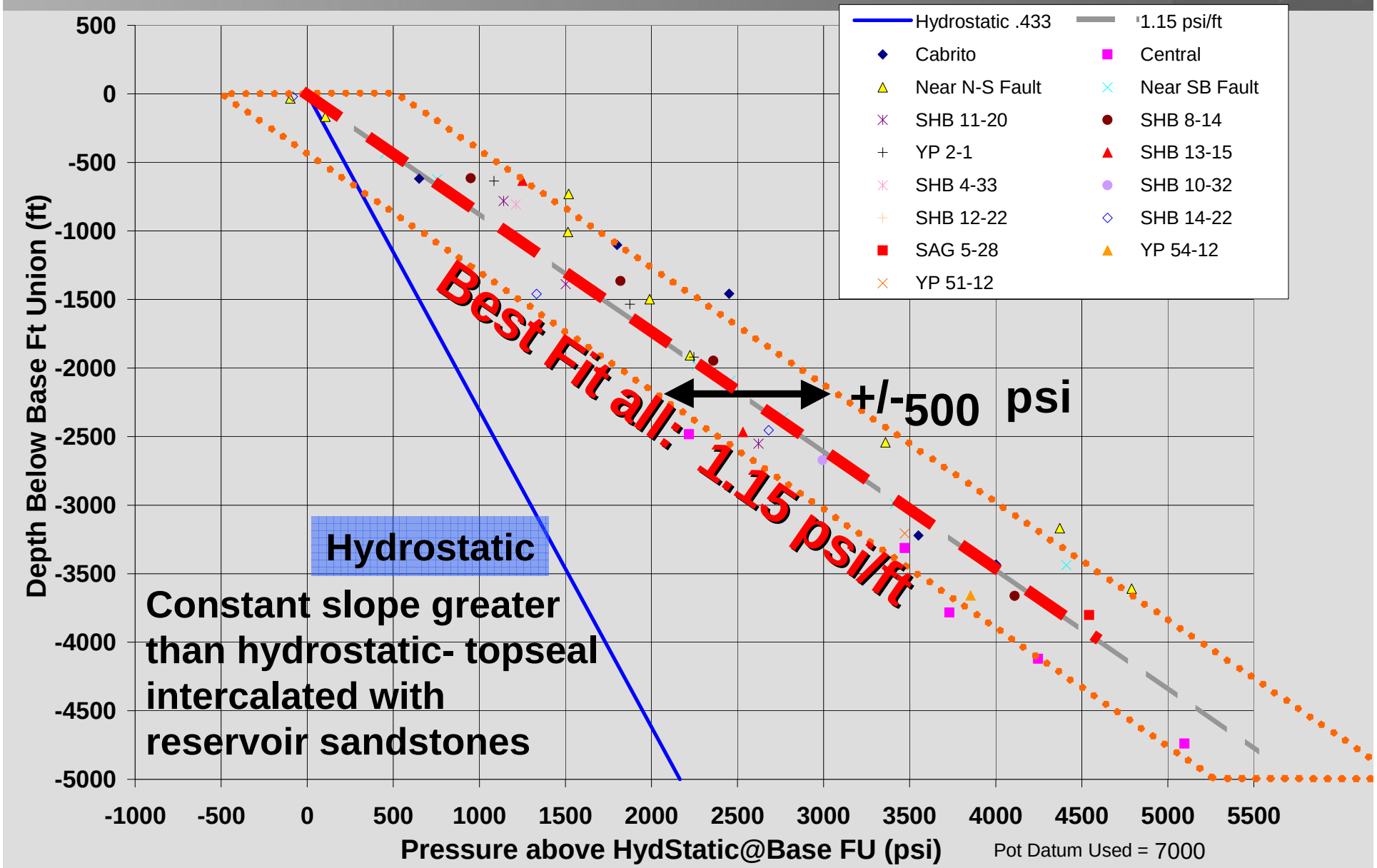


Jonah Field - Structural/Stratigraphic Trap

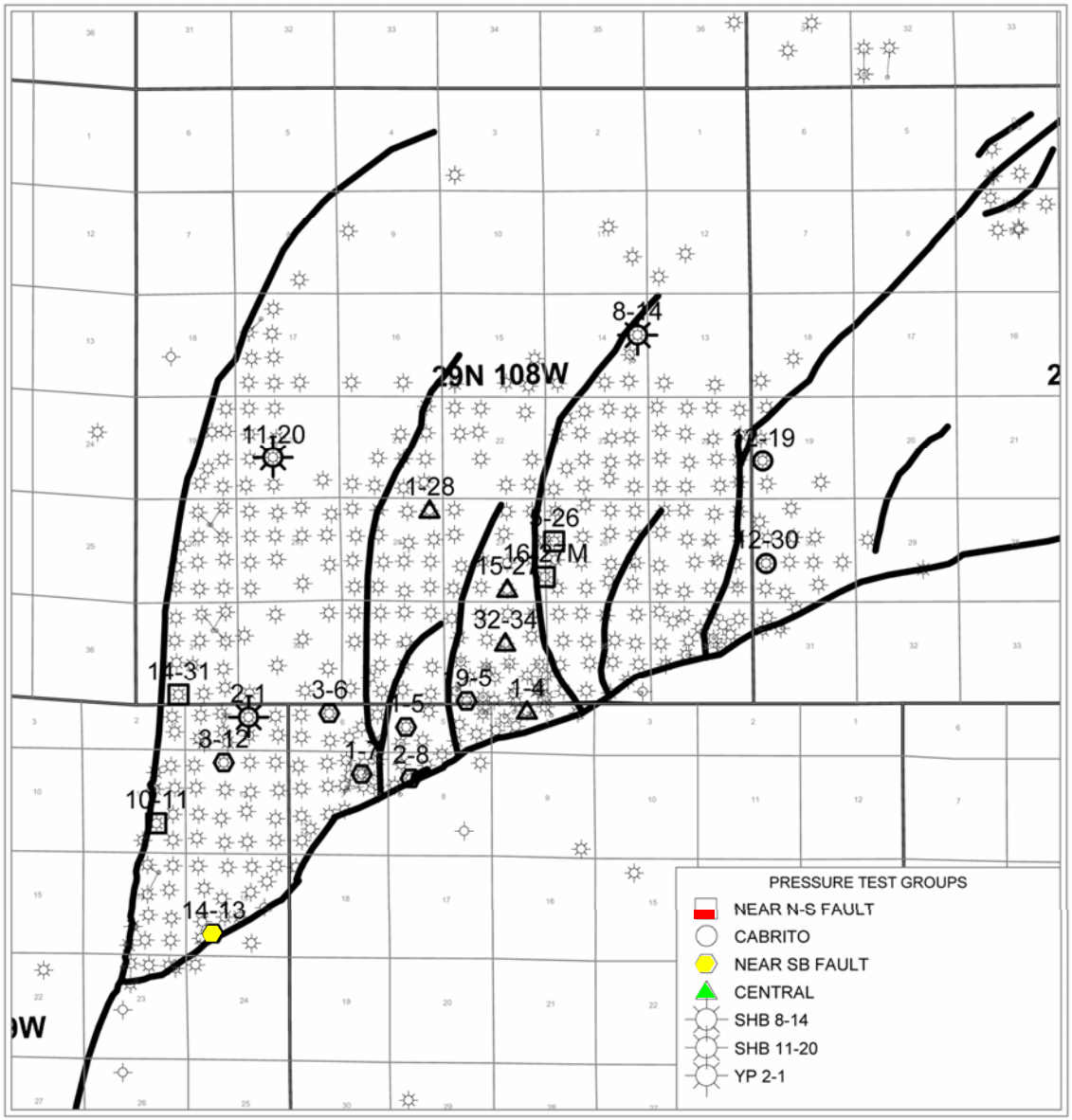


- **Sealing strike-slip faults create compartment**
- **Overpressure is critical to economics**
  - **Increases storage**
  - **Preserves porosity and permeability**
  - **Enhances relative permeability**

Virgin Pressure Data - Stratigraphically flattened



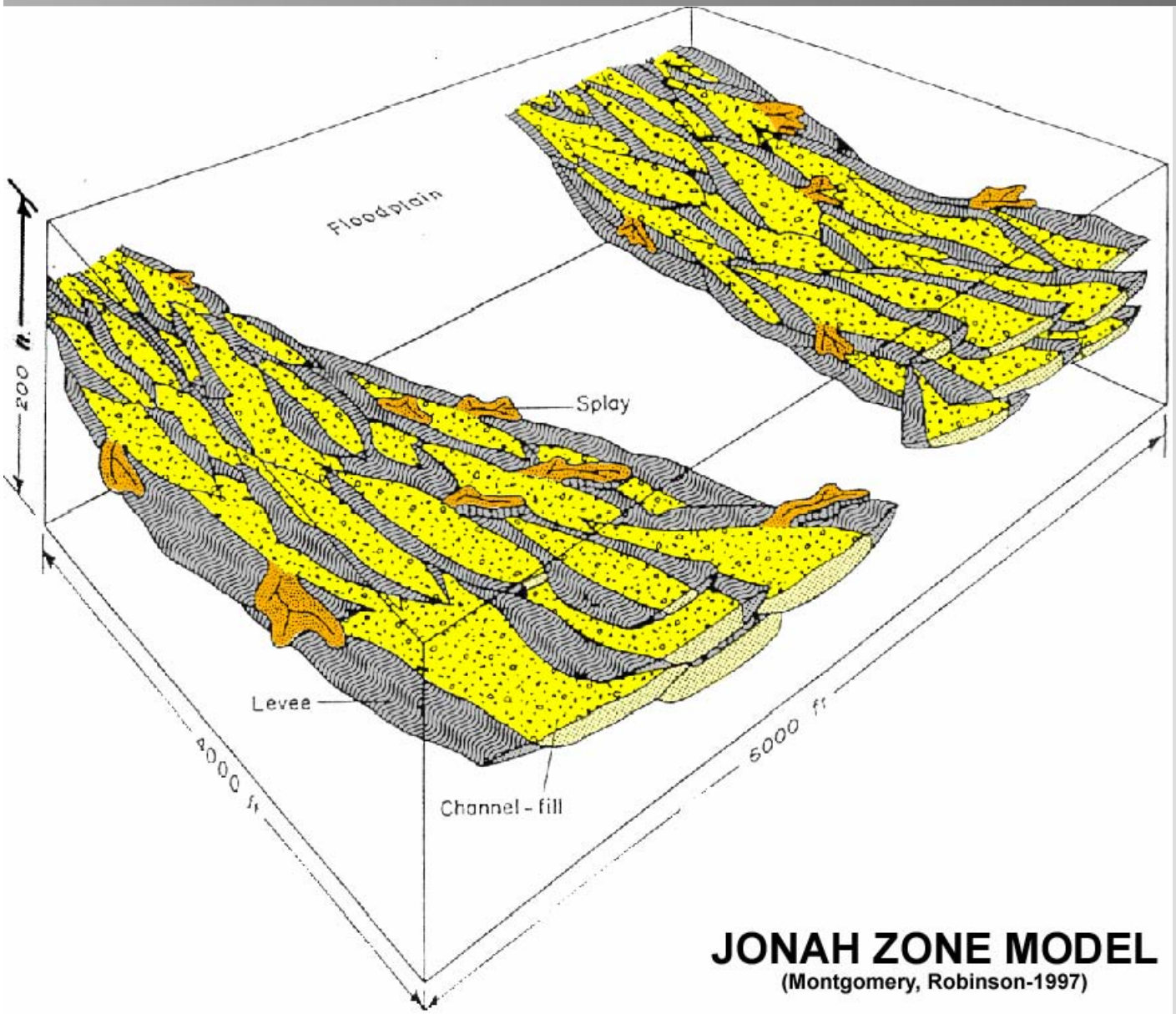
Pressure Data - Location Map



- Good geographic distribution of data

Fluvial Deposition of Lance Fm. – Modern Analog

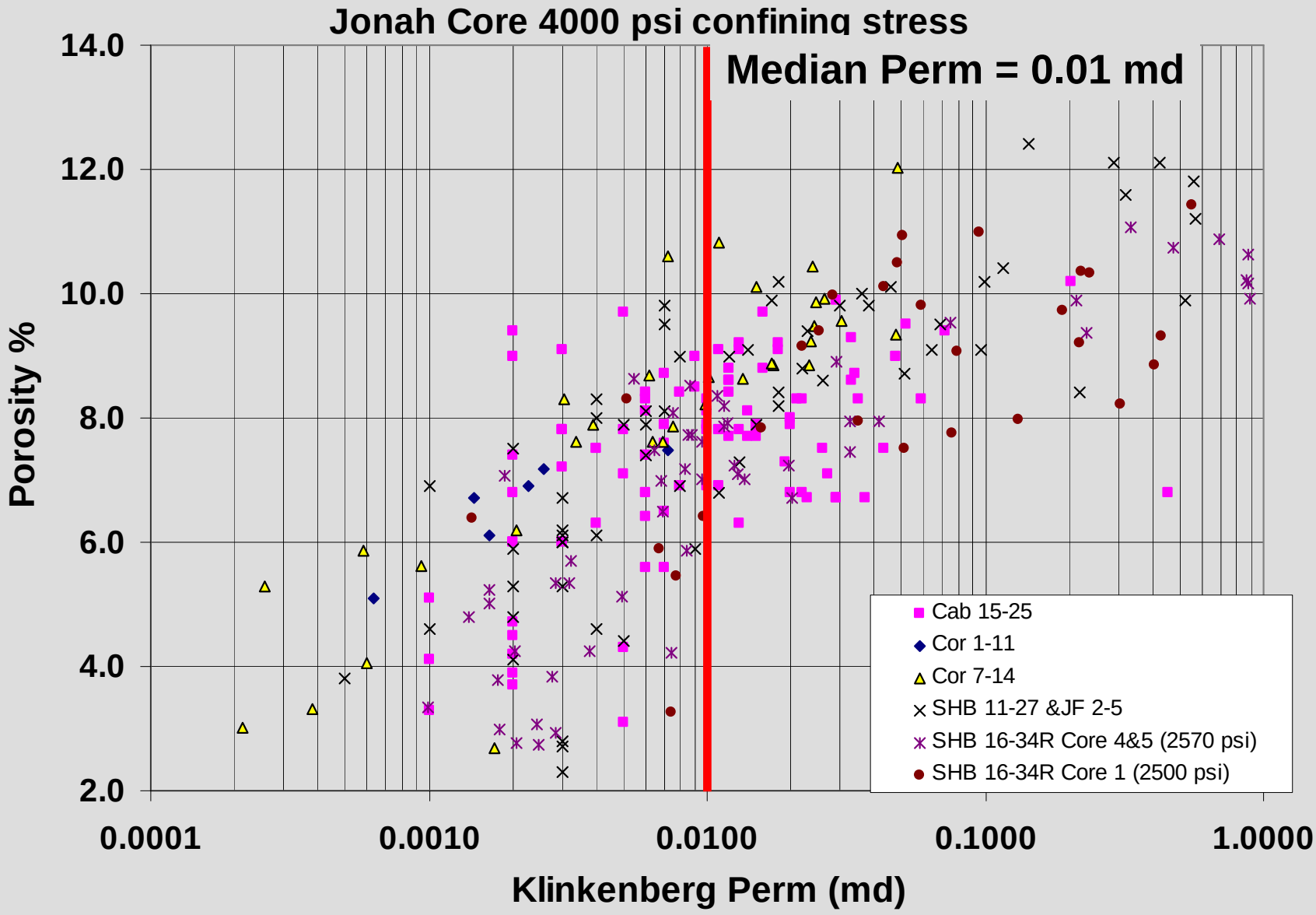
Model of 3D Reservoir Geometry



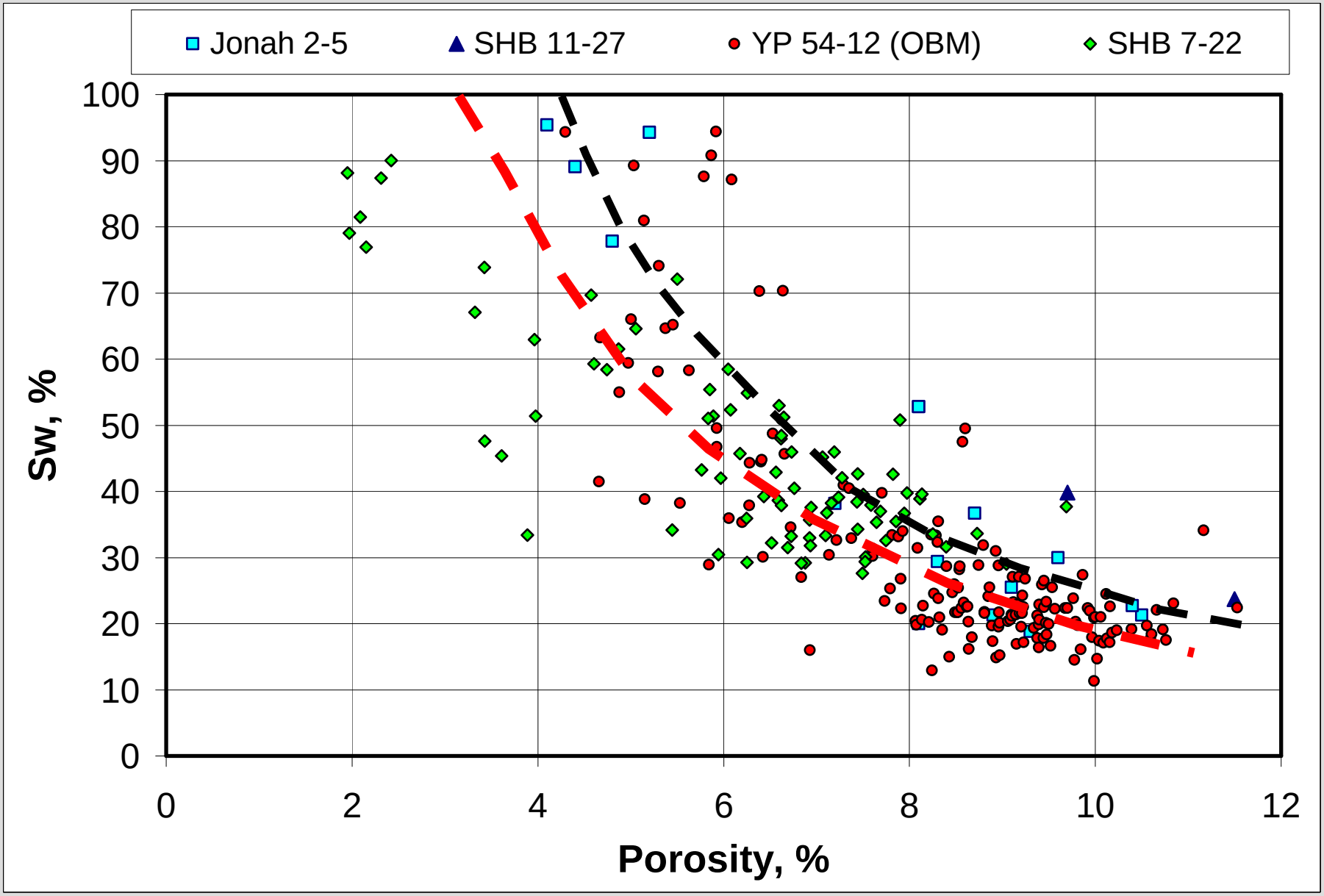
JONAH ZONE MODEL
(Montgomery, Robinson-1997)

- **Discontinuous, lenticular sandstone bodies aligned principally in NW-SE orientation**

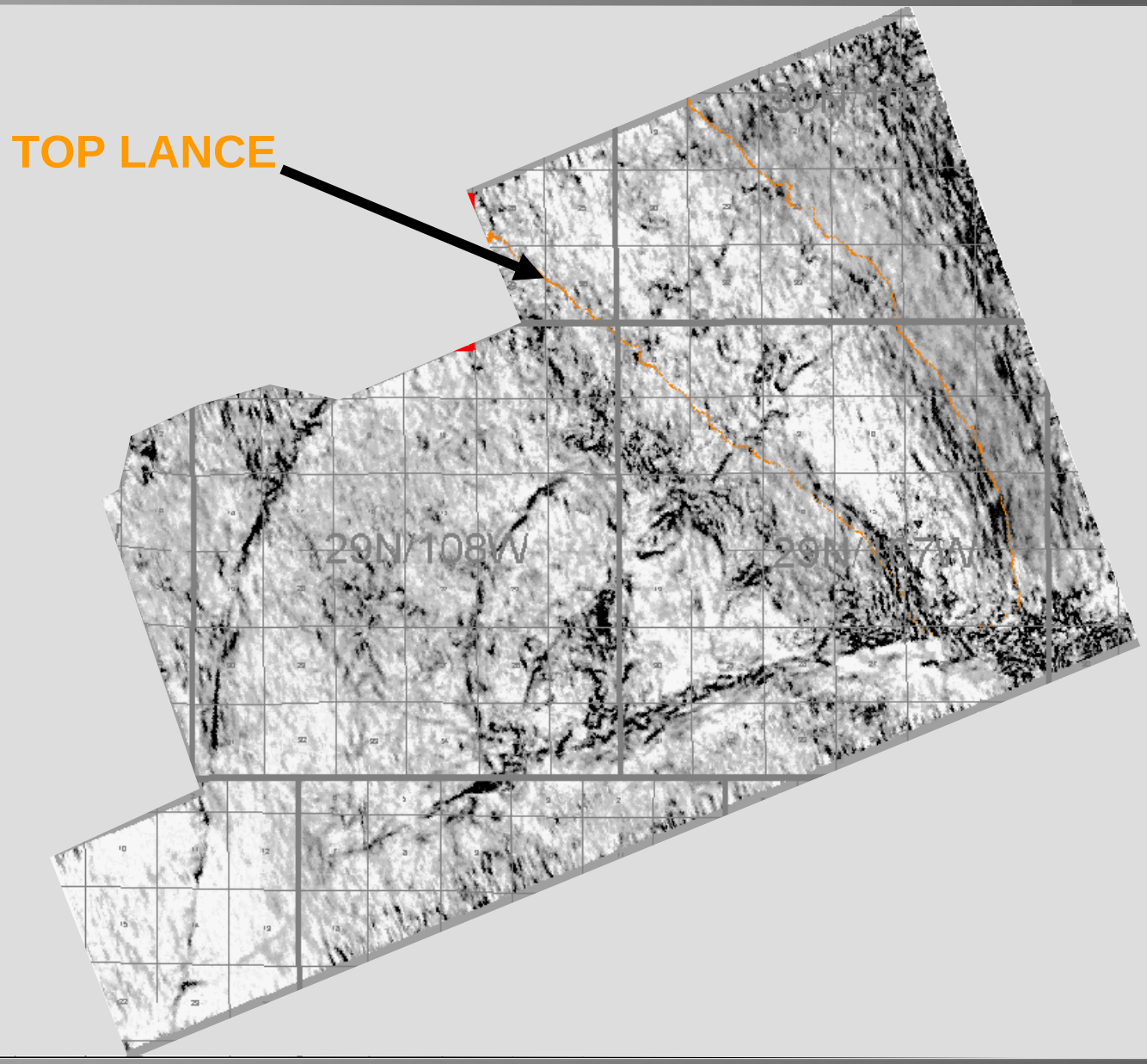
Porosity and Permeability



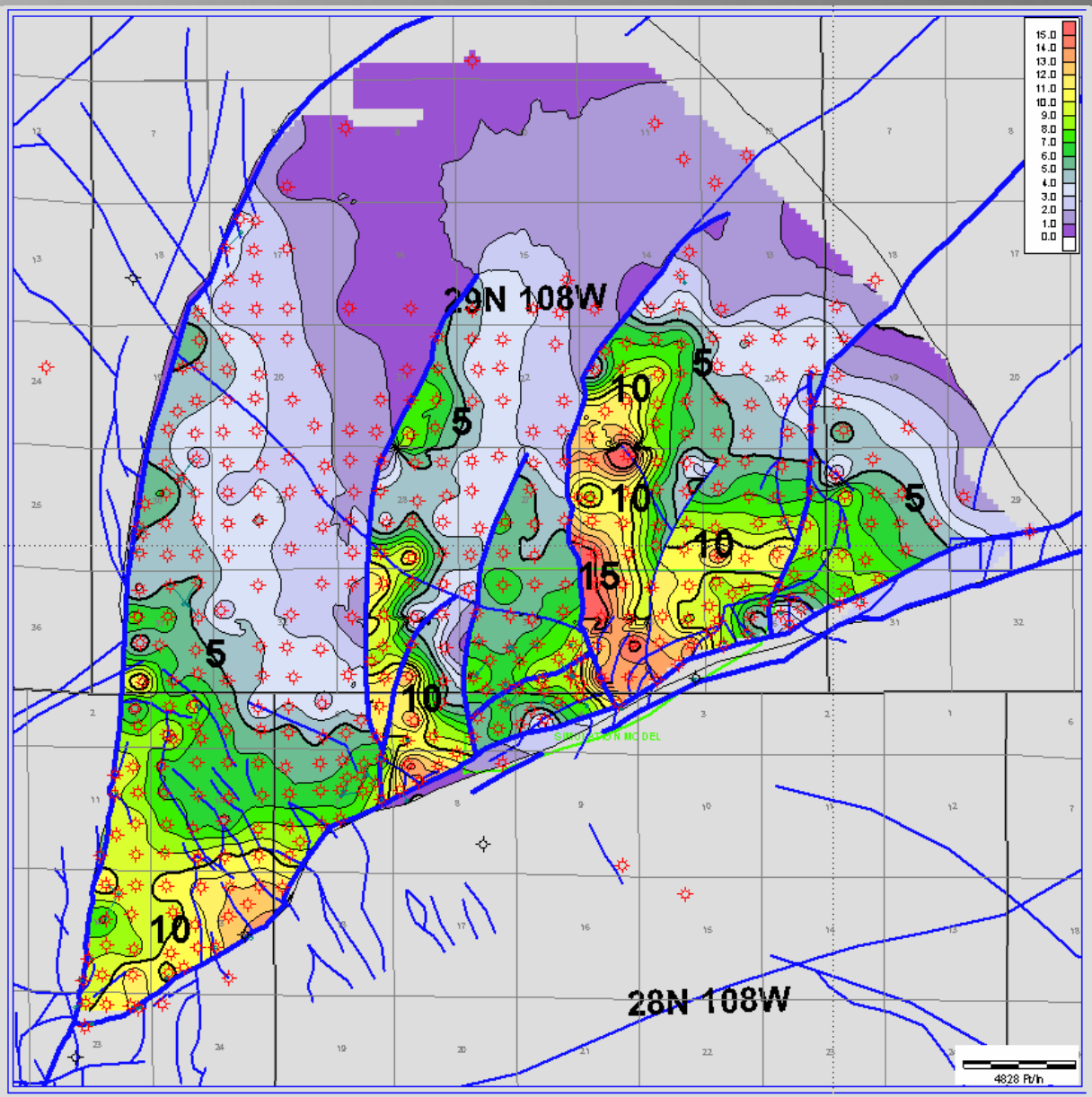
Water Saturation Update



Seismic Discontinuity Illustrates Faults



Fault Compartments Control EUR per well



- Each sub-compartment improves updip
- Contours of pre-2001 wells- relatively consistent completion style

Original Gas-in-Place (OGIP)

- Virgin Pressure Model curve for each well
- Temperature model curve for each well
- Temperature, pressure, Sg (1-Sw) and porosity curves combined to generate OGIP value (MMCF / acre) for each well

OGIP – MMCF/Acre

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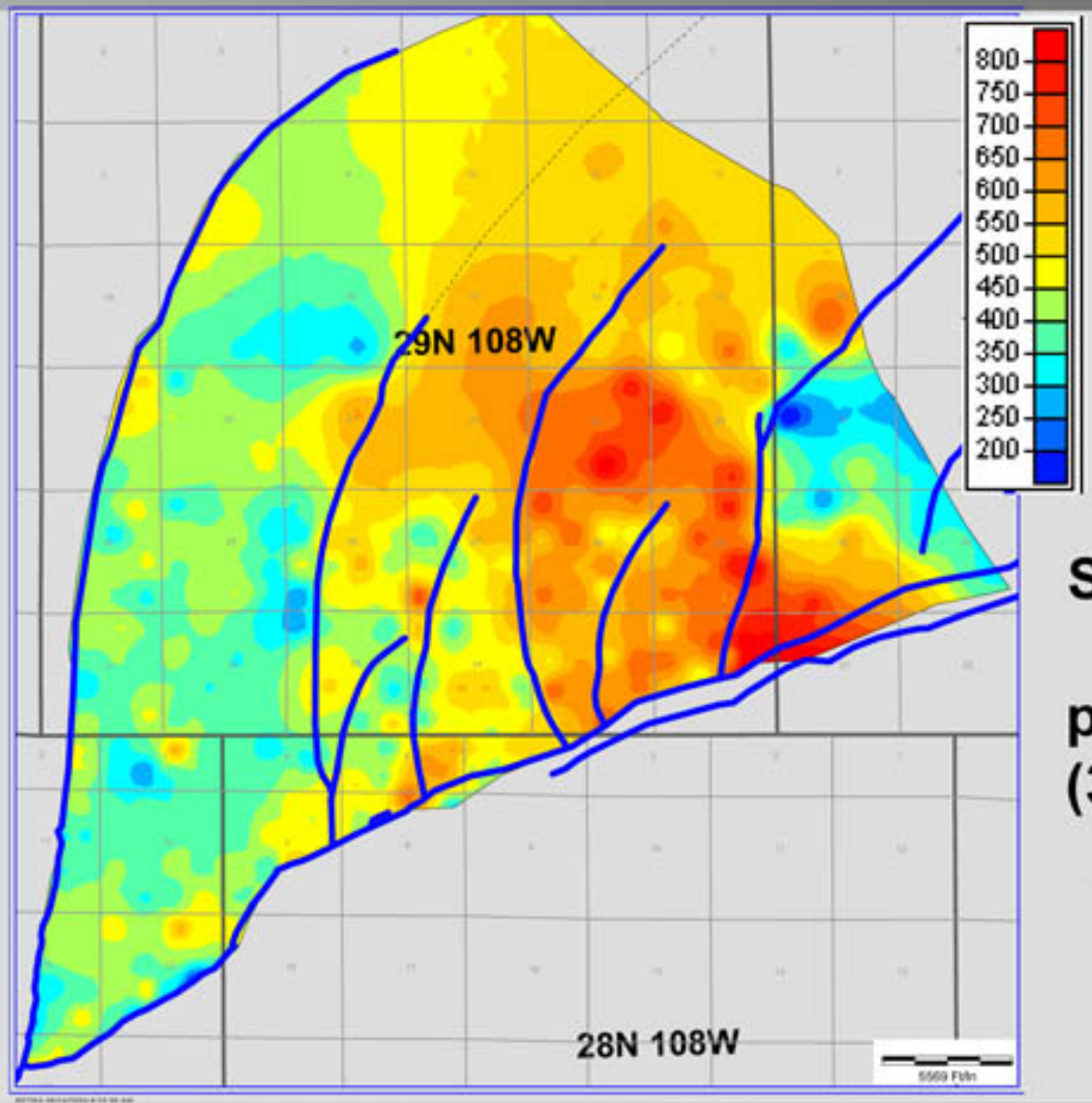


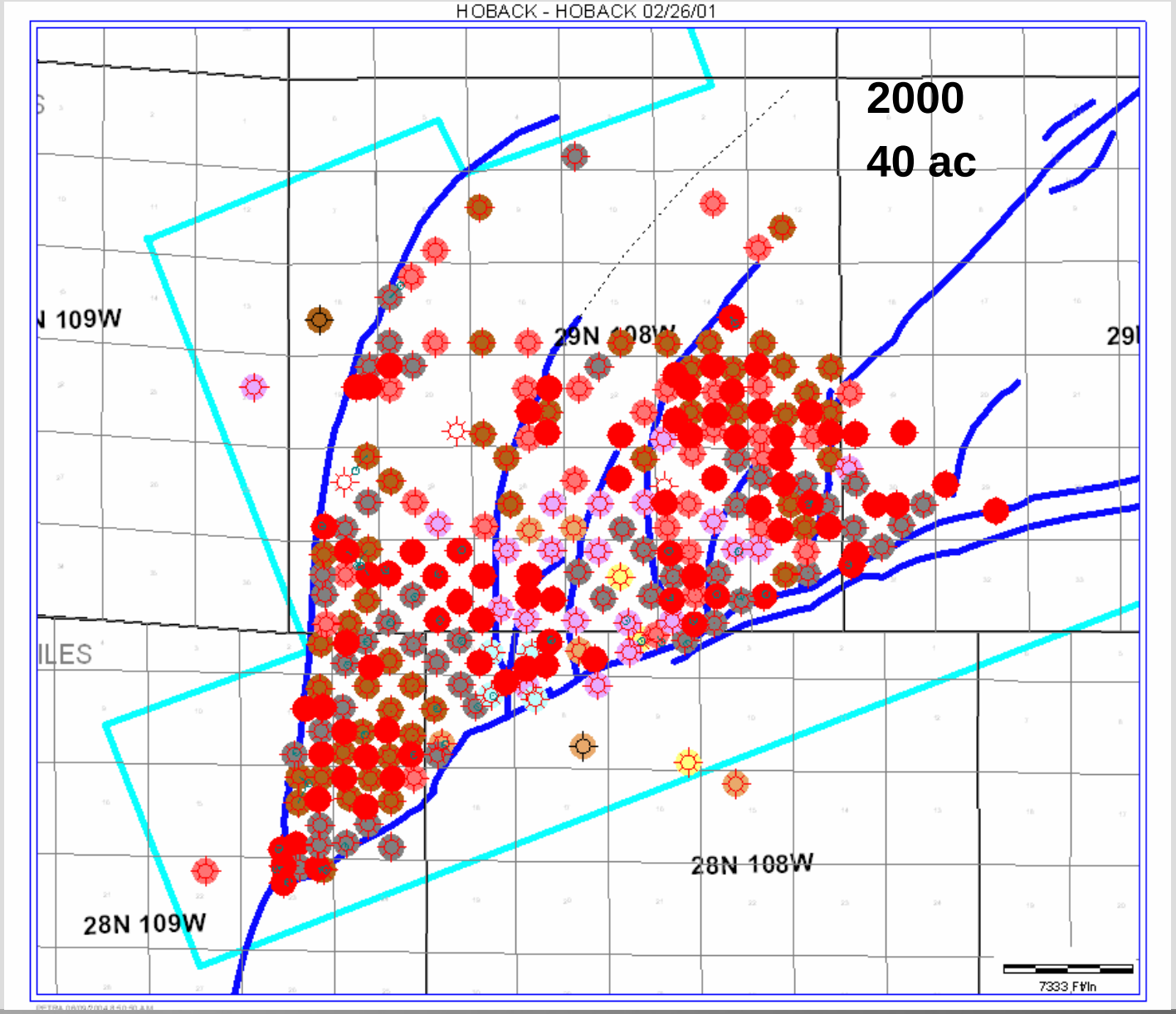
Sum of grid over 23,282 productive acres (36.4 sq miles) is

~10.5 TCF

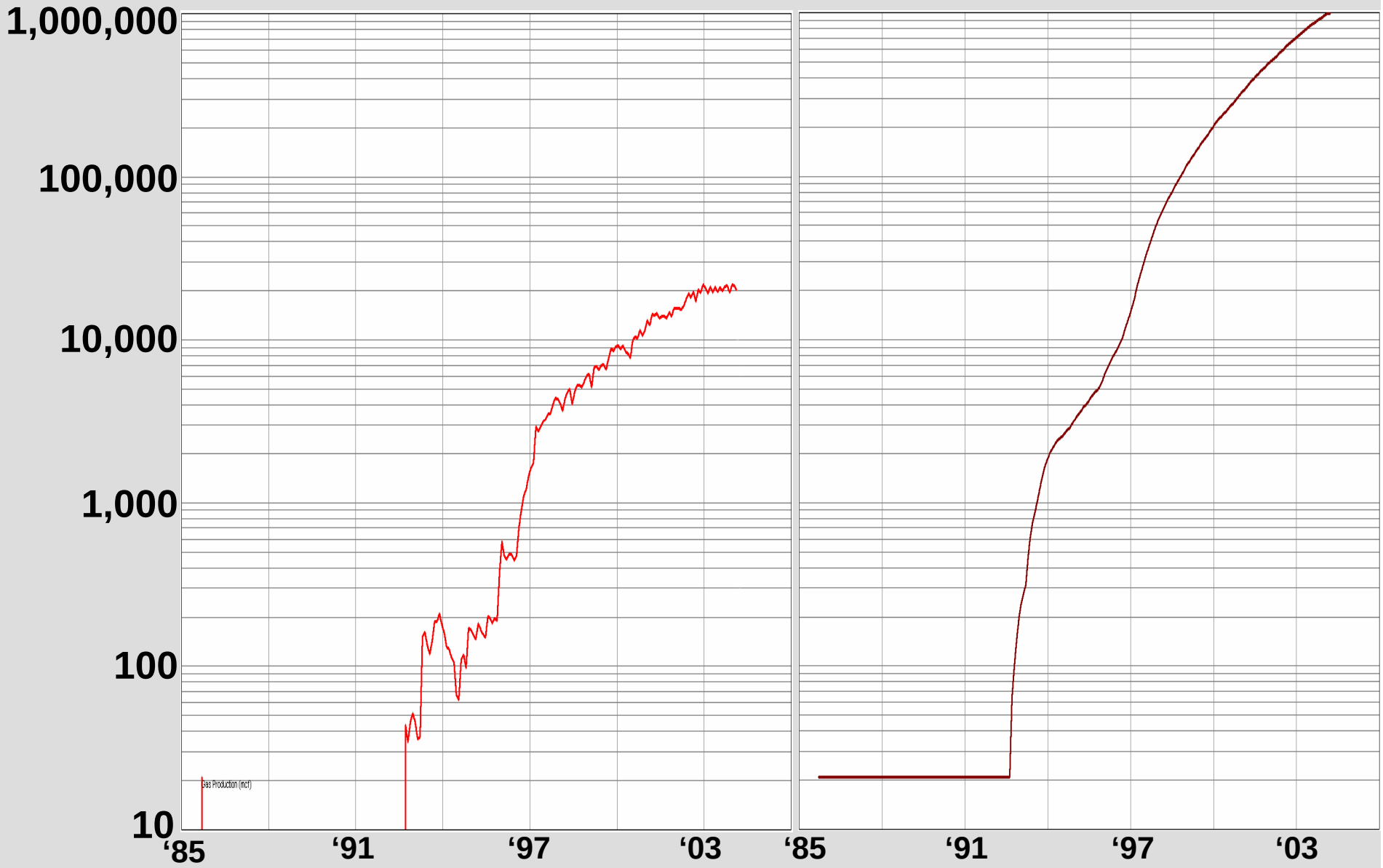
Future revisions to OGIP

- **Water Saturation decrease (core data)**
- **Porosity increase (core data & petrophysical model)**
- **“Non-Reservoir” facies contribution**

Early Drilling History

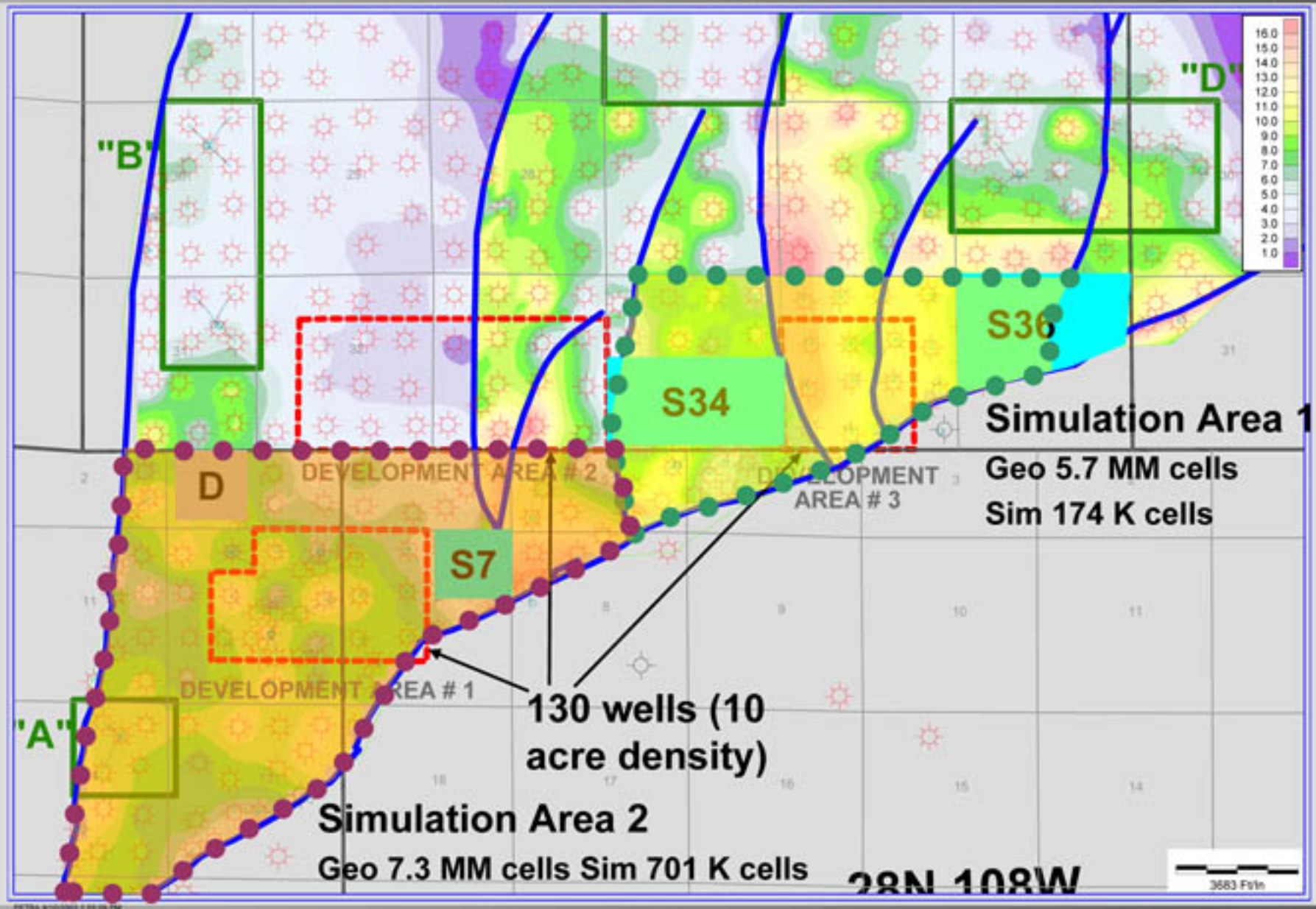


Jonah Field Production History

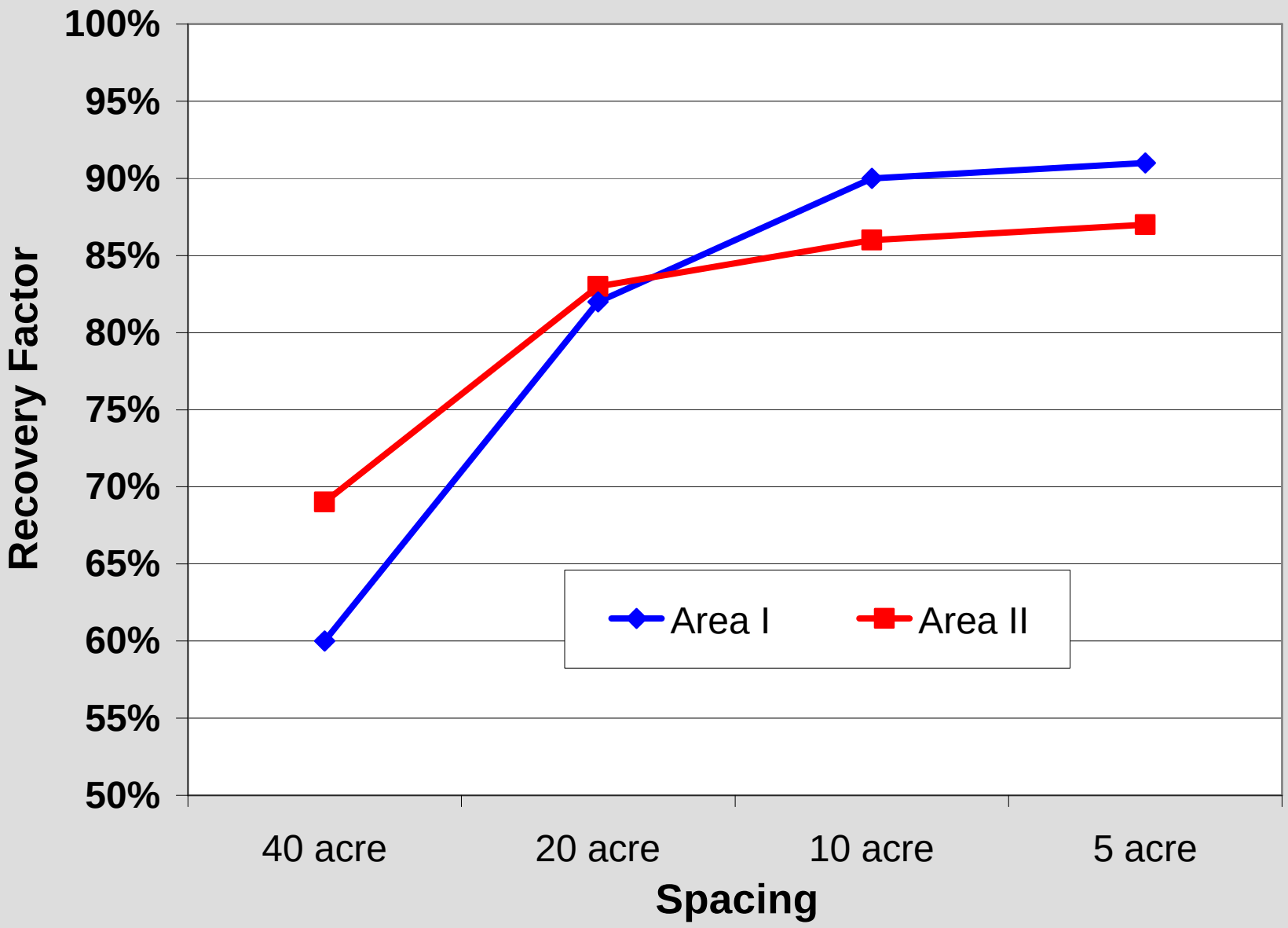


Current Infill Development Programs

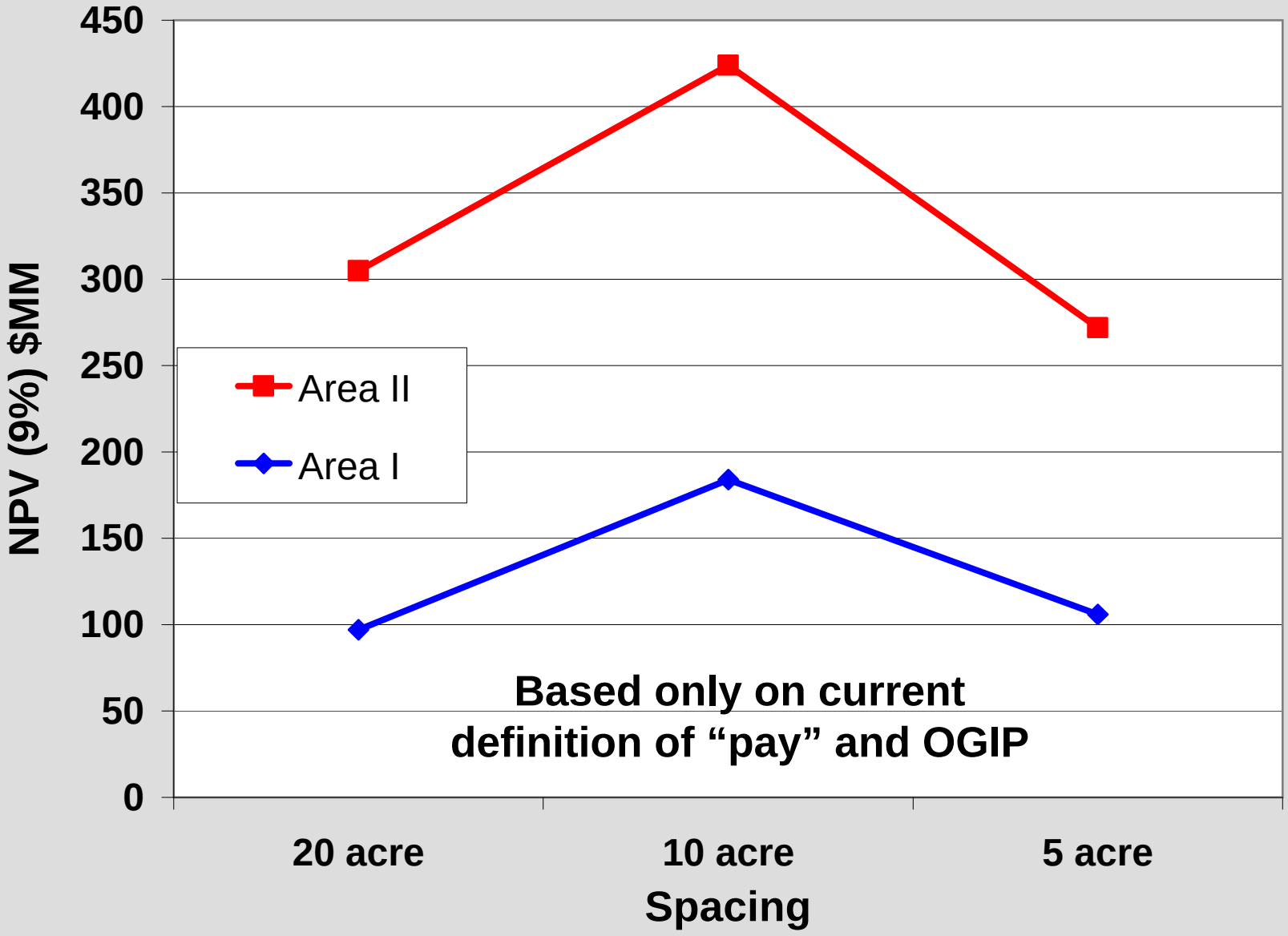
ENCANA



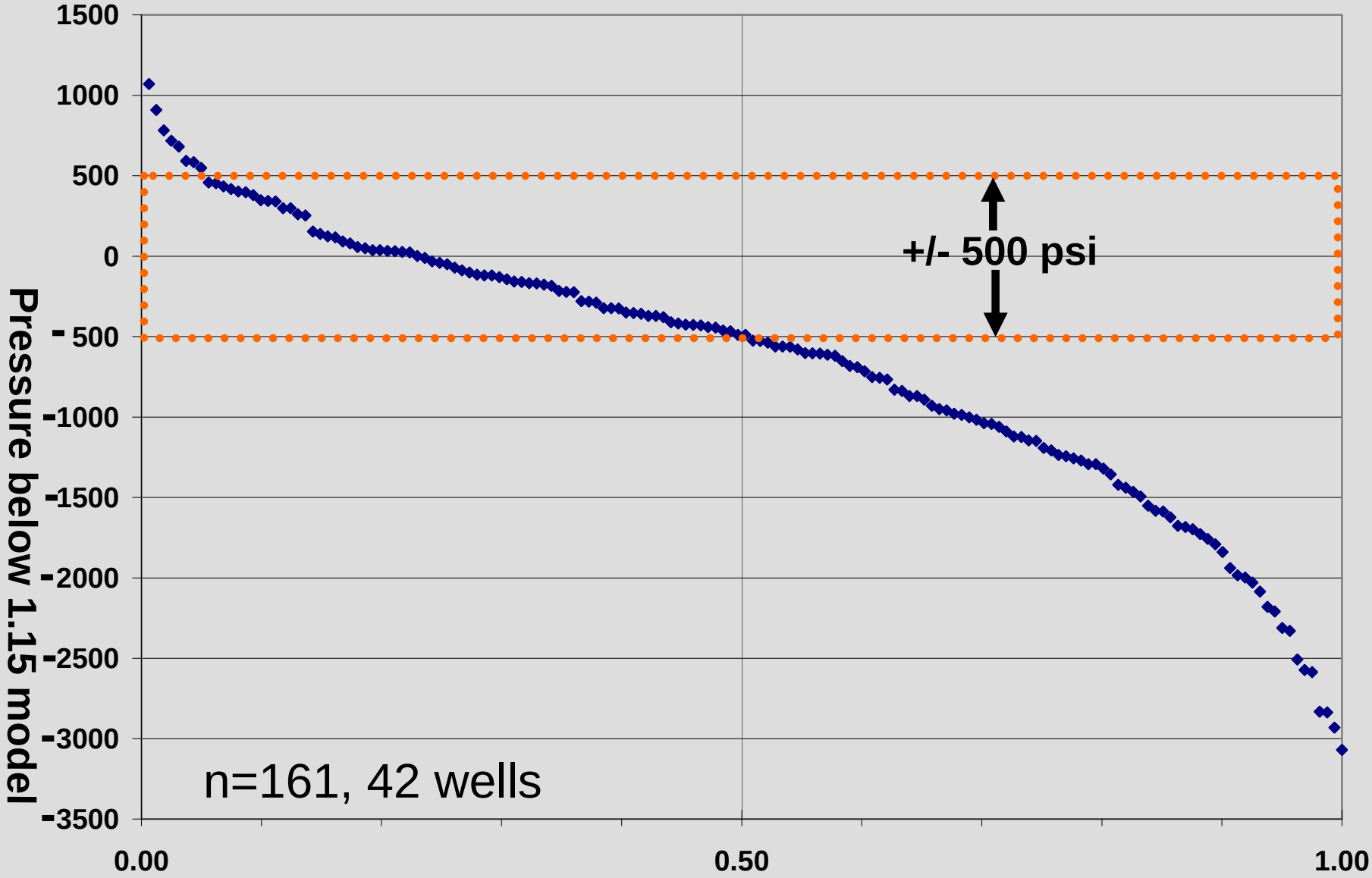
Simulation Results



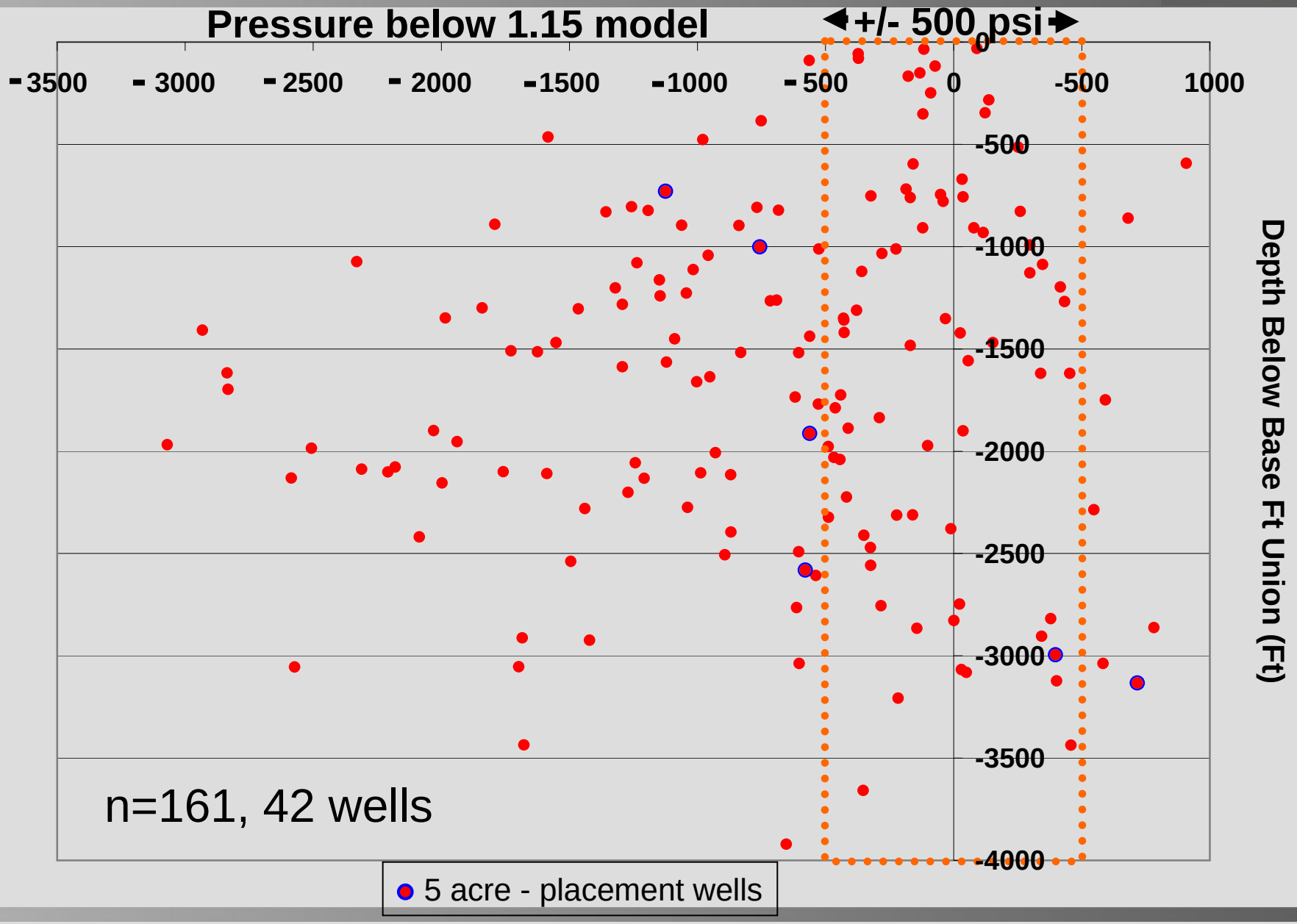
Simulation Economics



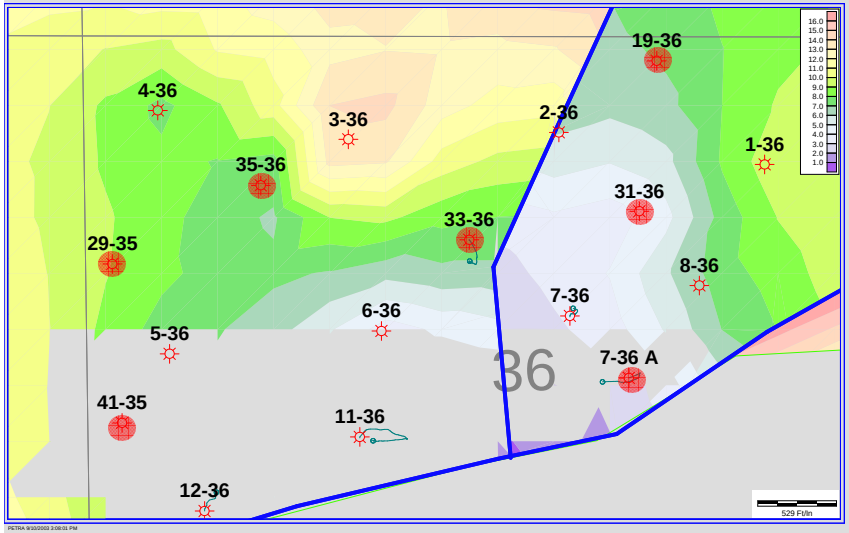
Infill Wells – Pressure Relative to Virgin Model

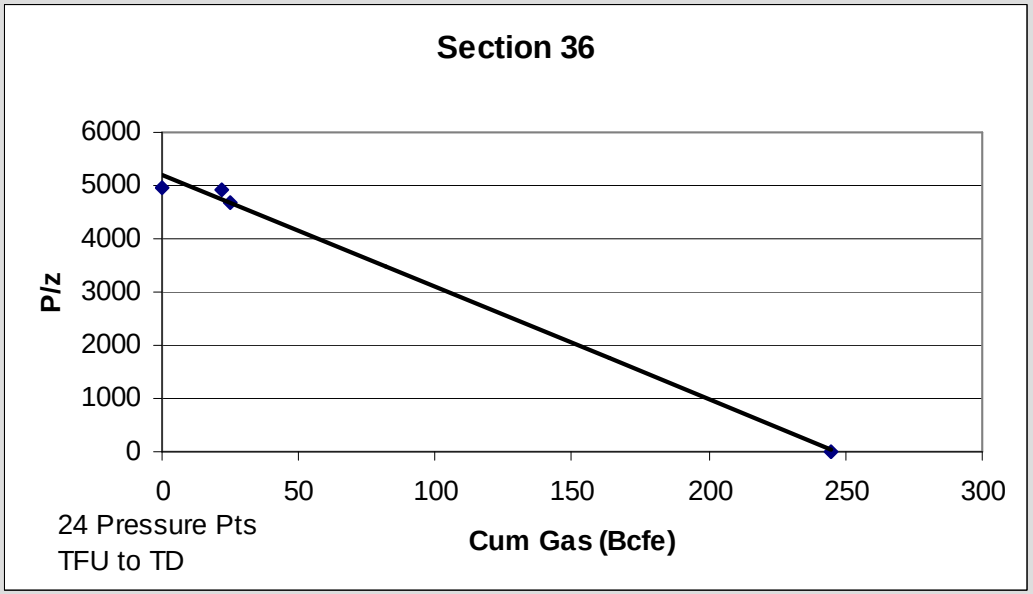


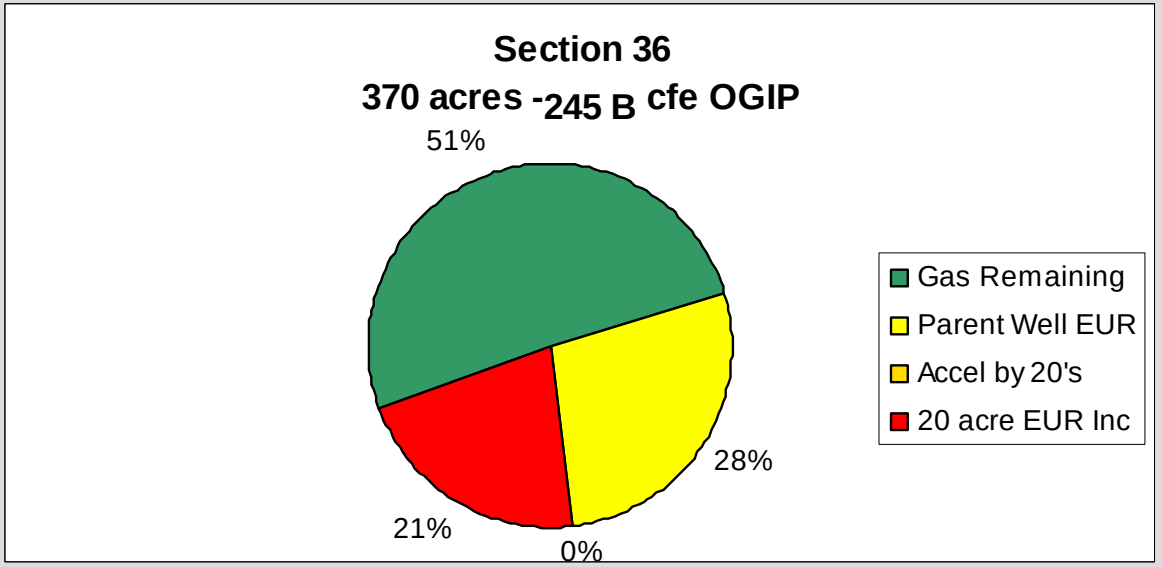
Infill Pressures by Stratigraphic Depth



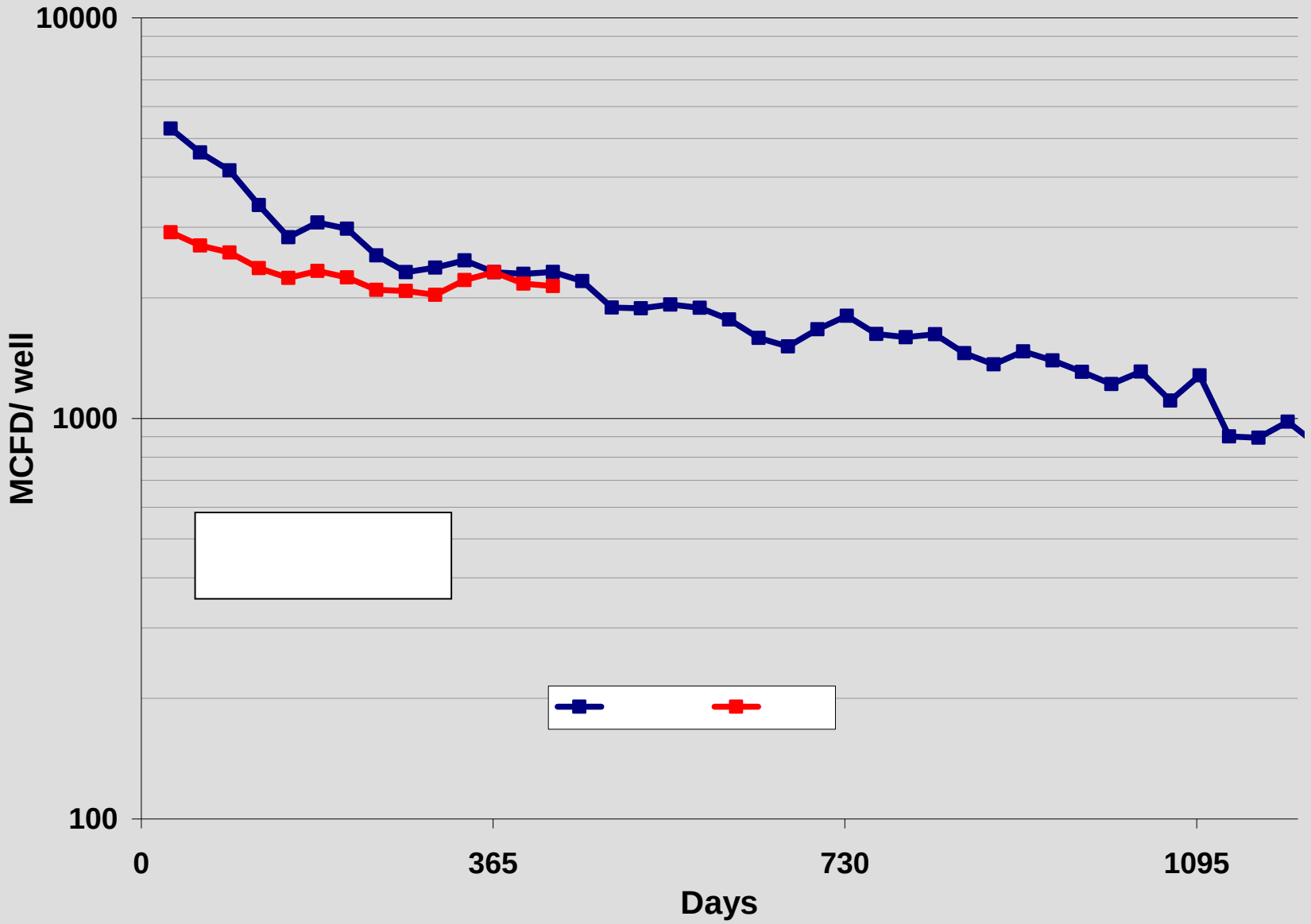
Section 36 Infill Pilot Results



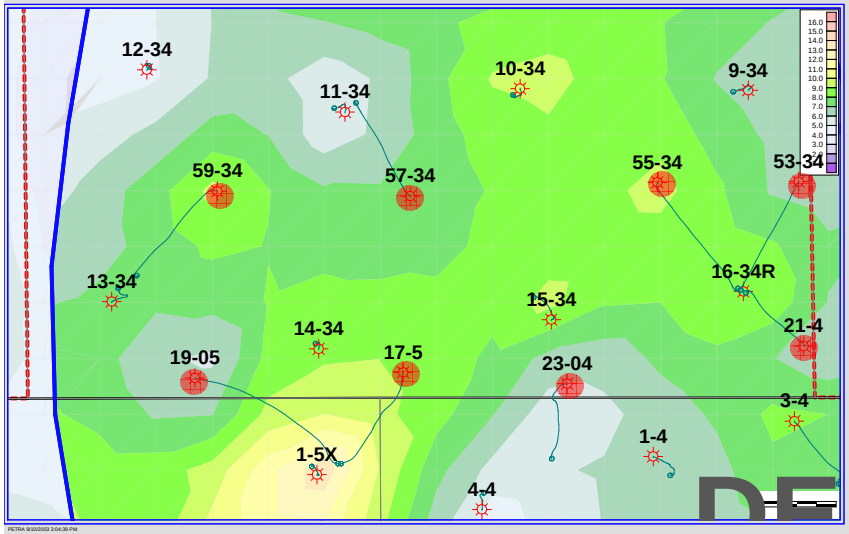


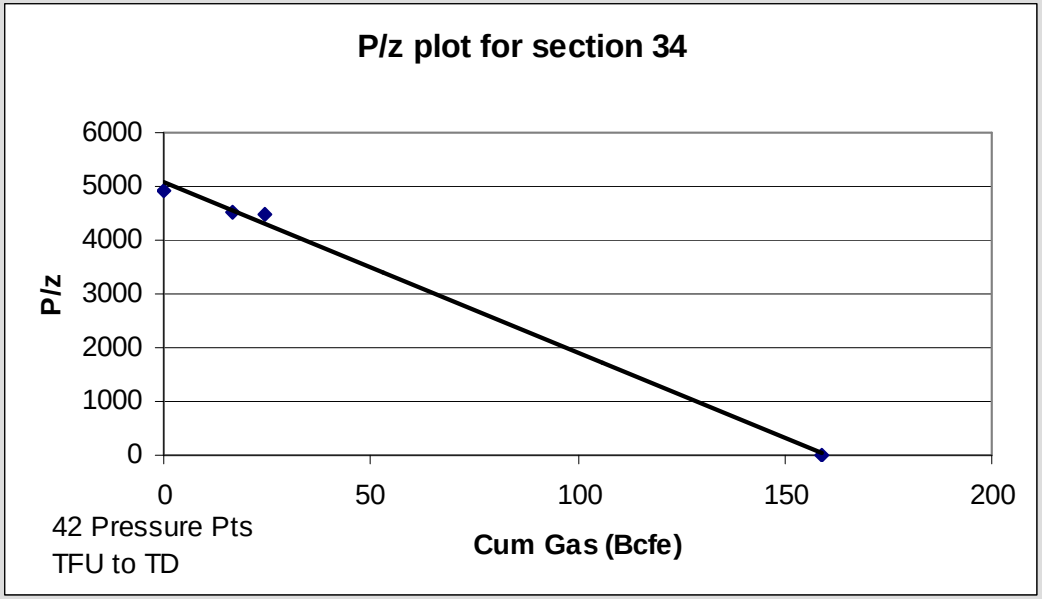


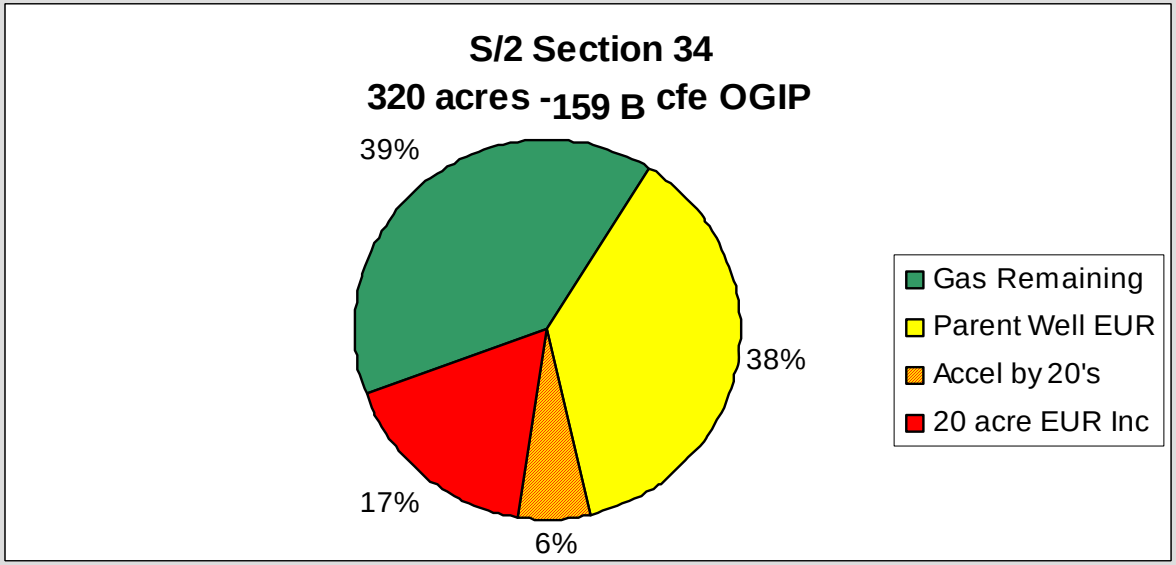
Section 36 Infill Results



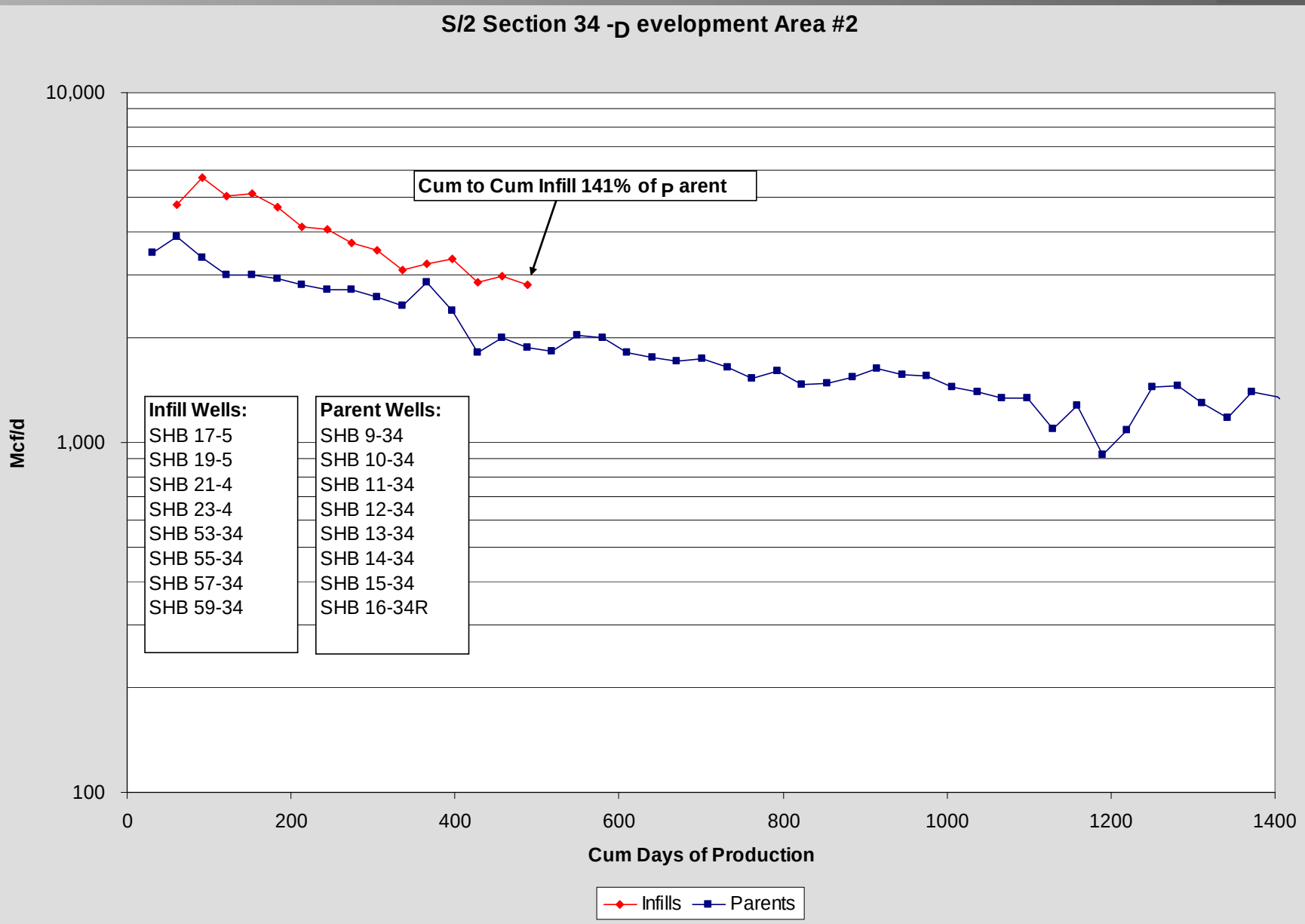
Section 34 Infill Pilot Results



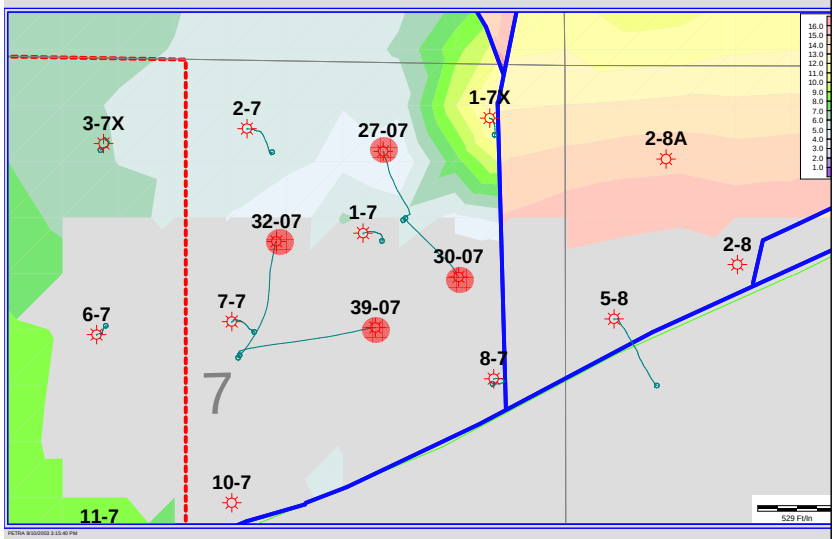


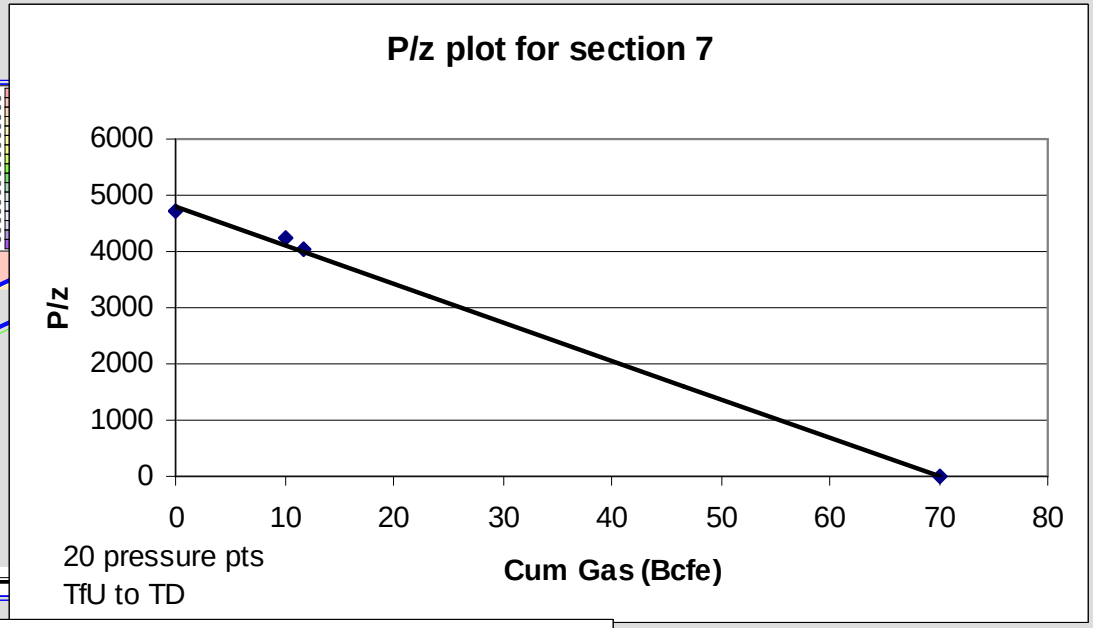


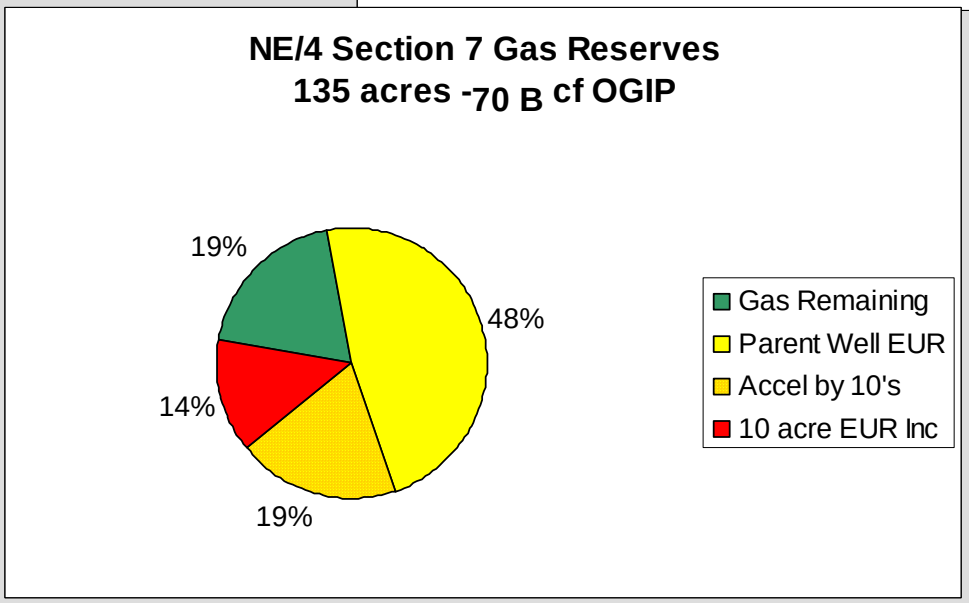
Section 34 Infill Pilot Results



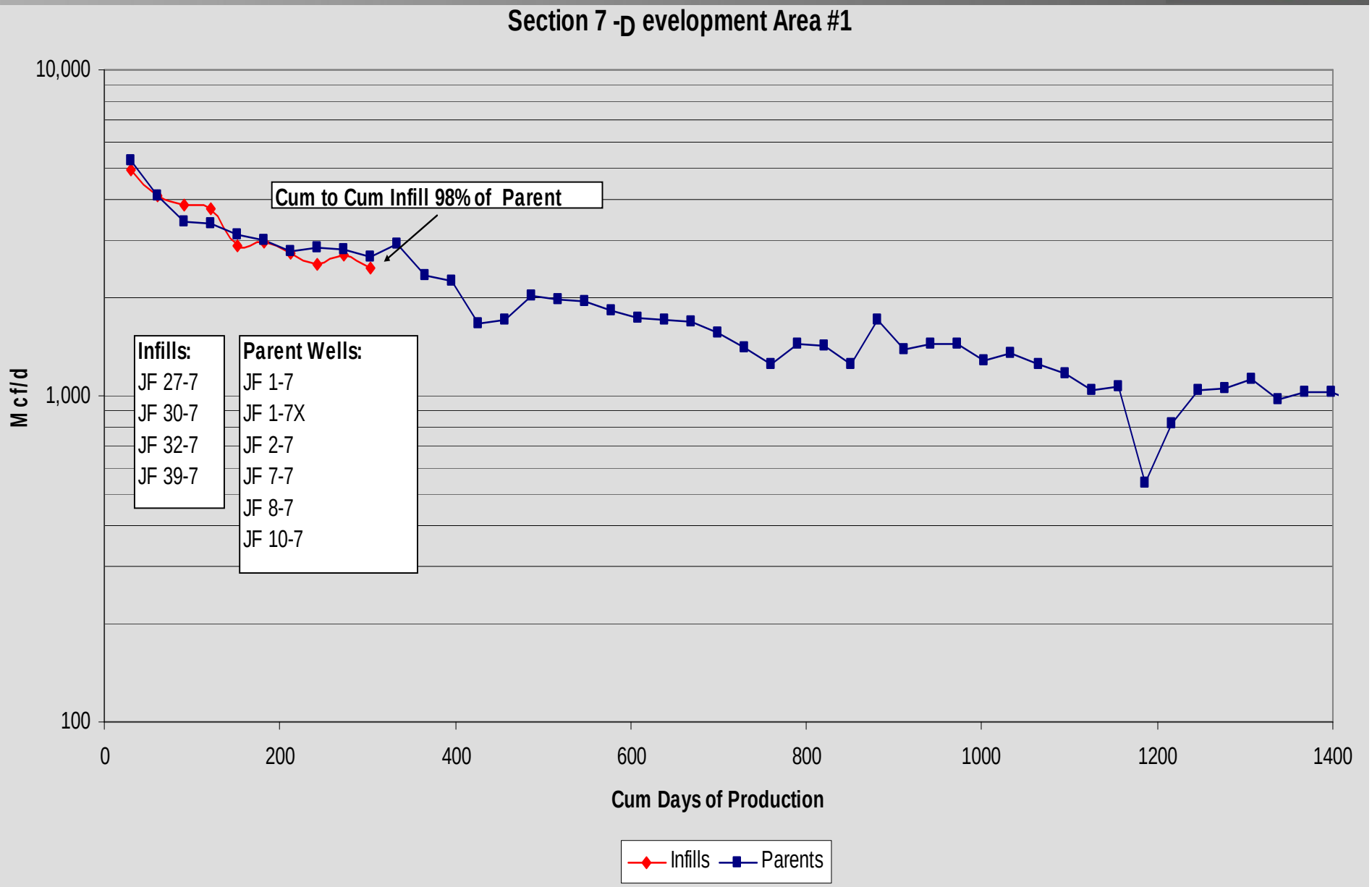
Section 7 Infill Pilot Results



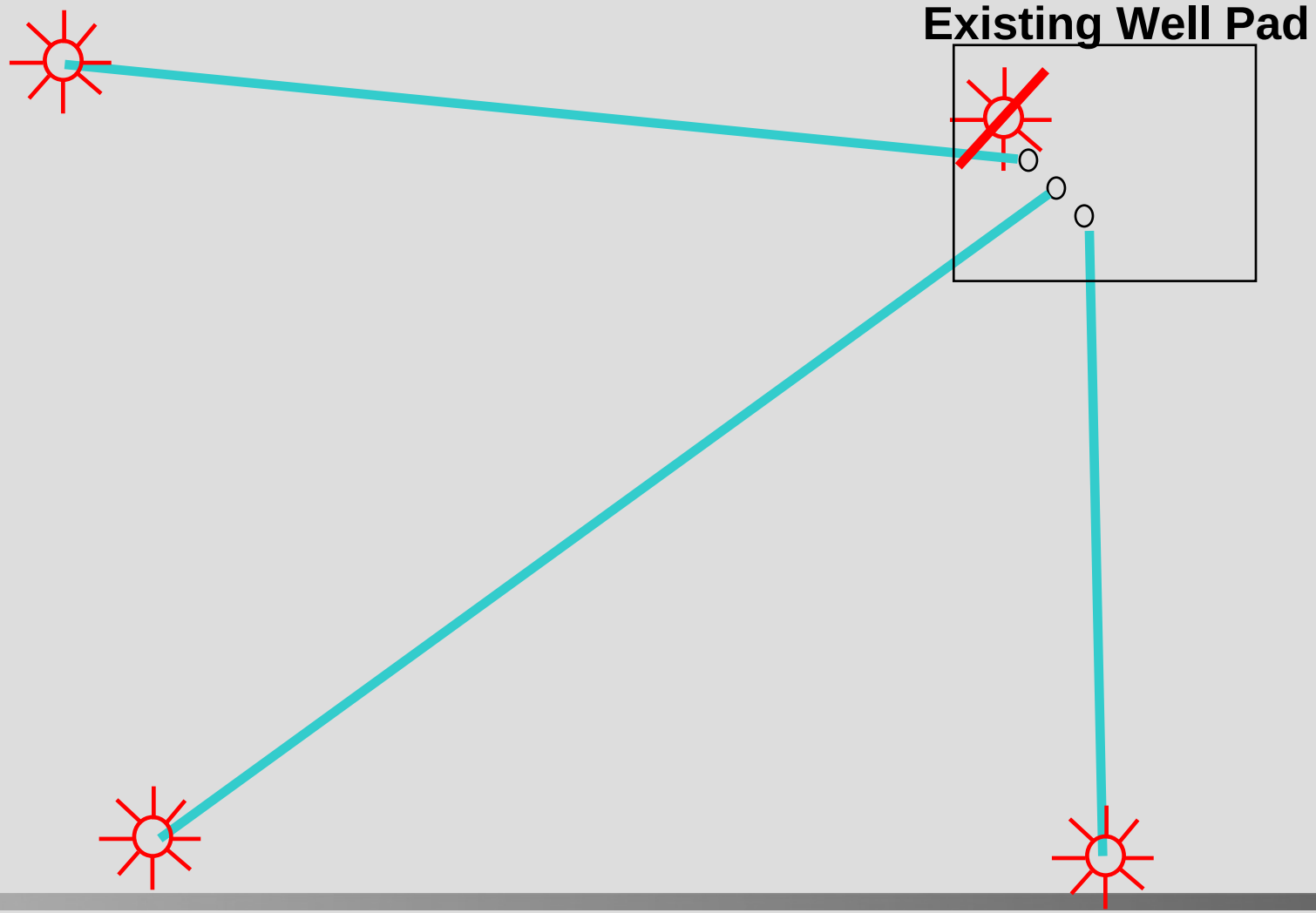




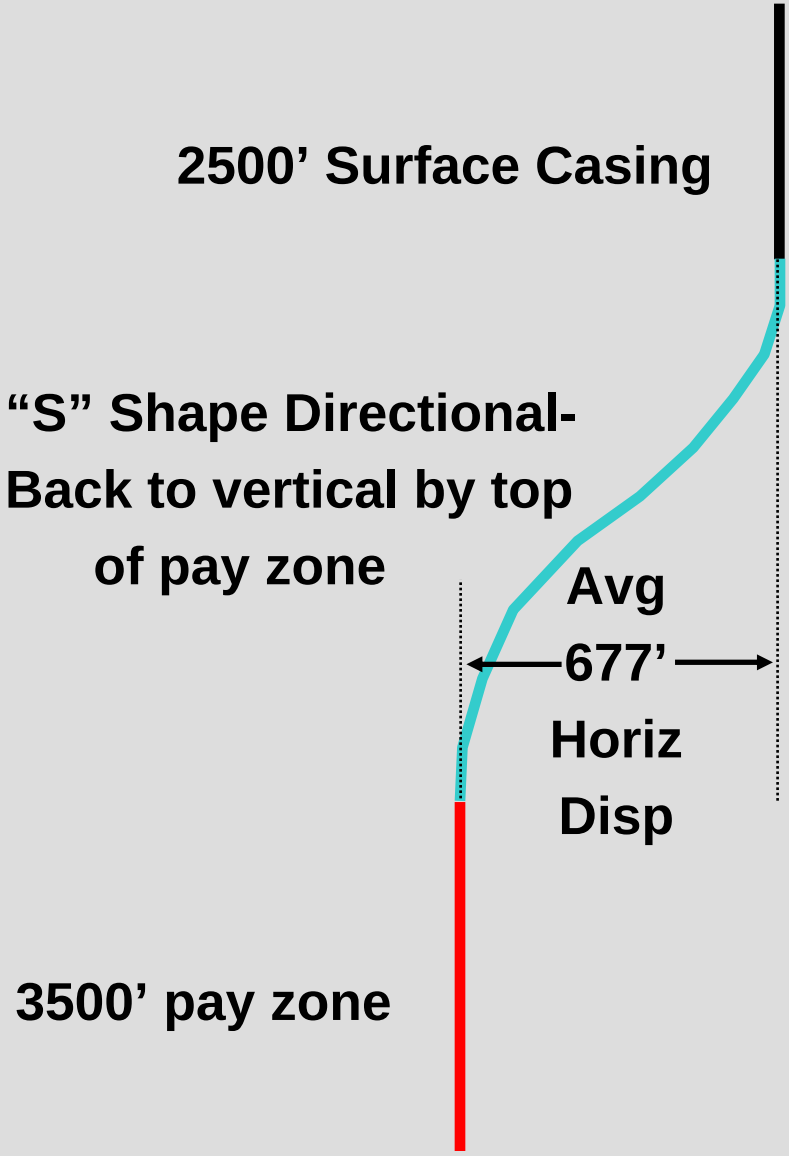
Section 7 Infill Pilot Results



Directional Drilling - Map View

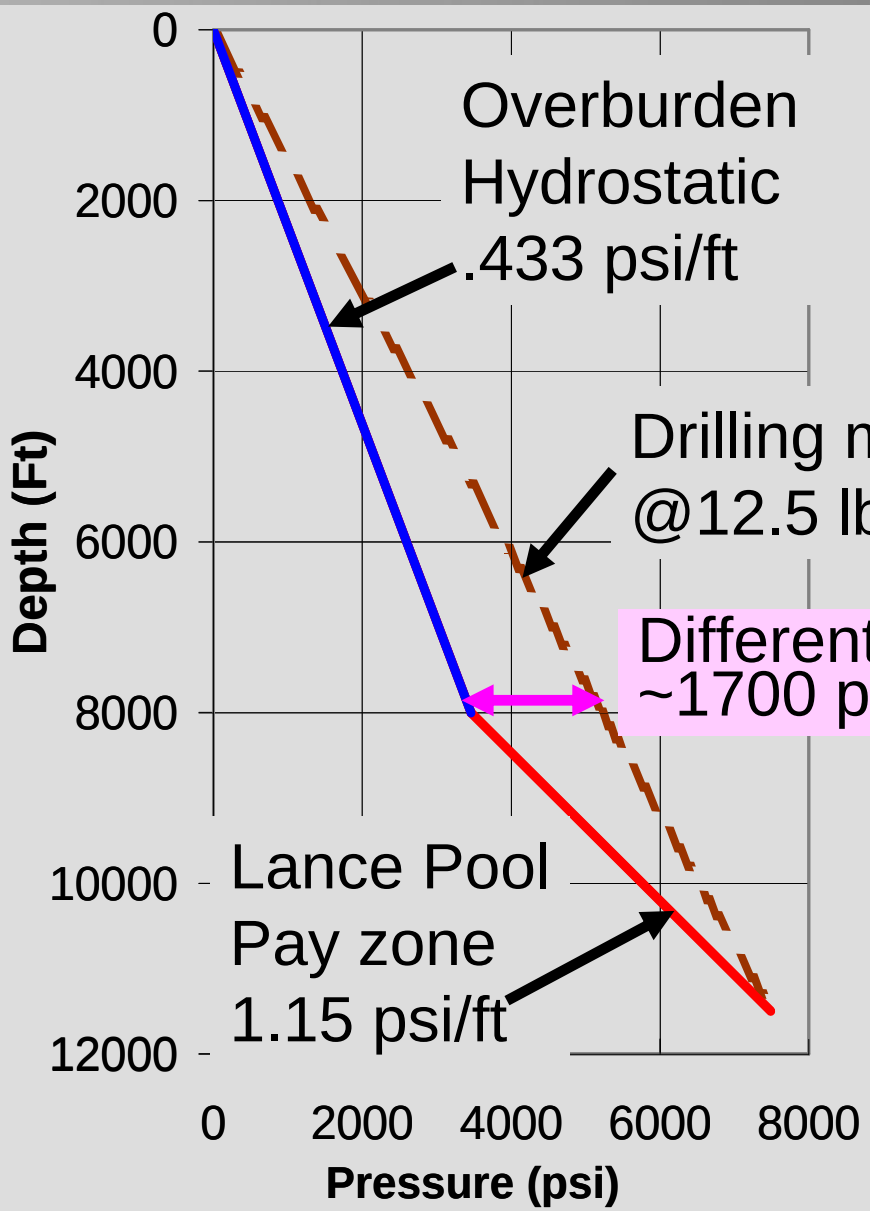


Directional Well - Section View



This configuration increases risk of differential sticking relative to vertical wells

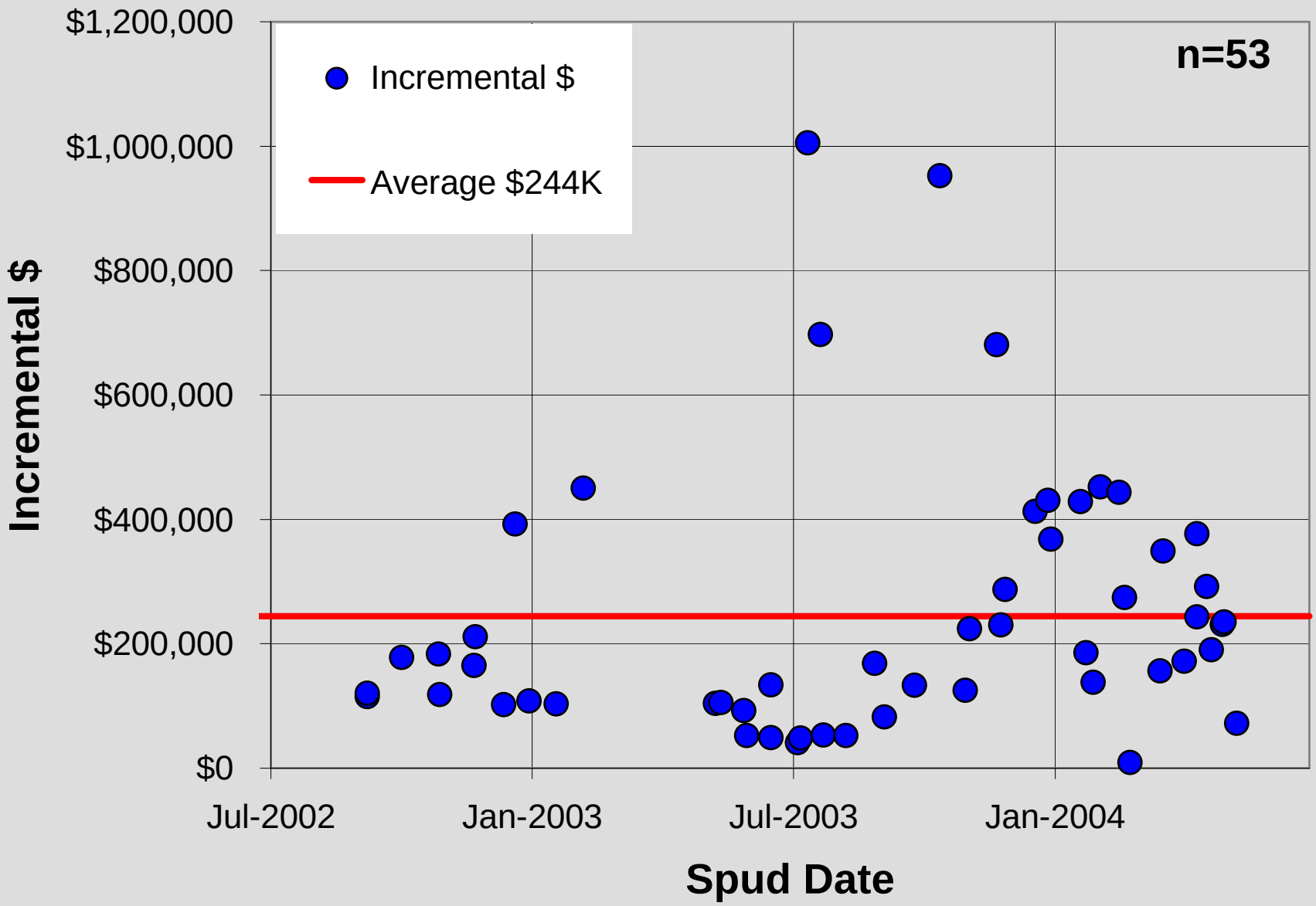
Differential Sticking Potential



1700 psi across a 50 ft thick permeable sandstone with a 1” wide contact with drill pipe generates

1,000,000 lbs force

Directional Drilling Cost



Conclusions

- Overpressure: critical to gas storativity, preserve porosity and perm; economics of ultra-tight reservoir
- Complex of Reservoir & Topseal
- Large porosity thickness, complicated reservoir architecture and low permeability of Lance Fm are key; Well density of at least 1 well/10 acres is required for optimum recovery
- Stimulation technology is essential and will likely continue to evolve with development