

Native American Resource Partners/Kainai Energy



**An Emerging Unconventional Hybrid Light Tight Oil Play within the
Southern Alberta Bakken-Exshaw Petroleum System:
*A Comparison of the Stratigraphy between the
Williston and Southern Alberta Basins*
*“ Not all Petroleum Systems are Created Equal”***

Brian A. Zaitlin

With contributions from the Kainai Energy Technical Team

Scott Lovett, Christine Robertson, Garry McCarroll, Karen Brawley-Rodgers, Grazina Palmer, Tim Bird, Odette Abaco, Elin Holvik

Native American Resource Partners

A private development firm focused on partnering and providing capital and expertise to First Nations in Canada and Tribal Nations in the United States

Key Land Positions on the Blood FN (SAB), Kawacatoose (Sask WB) and Fort Peck (Montana WB)

- Native American Resource Partners, LLC (“NARP”), a private development firm, is focused on partnering and providing capital and expertise to First Nations in Canada and Tribal Nations in the United States (“Aboriginal Communities”) for the purpose of developing energy and resource opportunities
- As a platform company of Quantum Energy Partners (a private equity firm, specializing in resource development with more than \$6.7 billion in assets under management) NARP has access to and a long-term commitment to capital
- NARP invests directly with Aboriginal Communities and incubates and manages these investments (with its Aboriginal partner) utilizing its fully staffed technical, financial and legal team through a variety of investment vehicles including
 - Creating co-partnered Tribal Energy Companies
 - Providing capital in partnership to fund participation rights negotiated between an Aboriginal Community and industry
 - Creating investment vehicles designed to allow Aboriginal Communities to participate alongside industry in their Traditional Territory
- Targeted equity investment size of \$25-\$300 million
- Investment scope involves non-renewable, renewable, and the service sector



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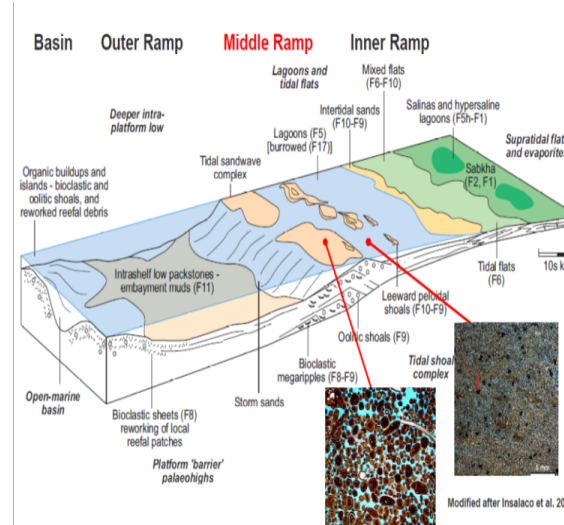
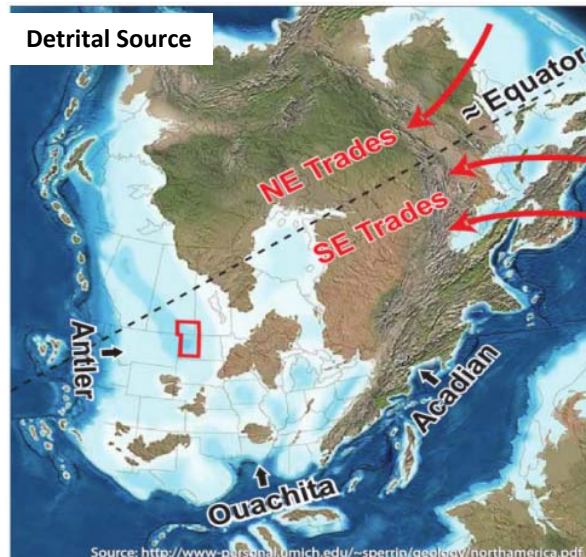
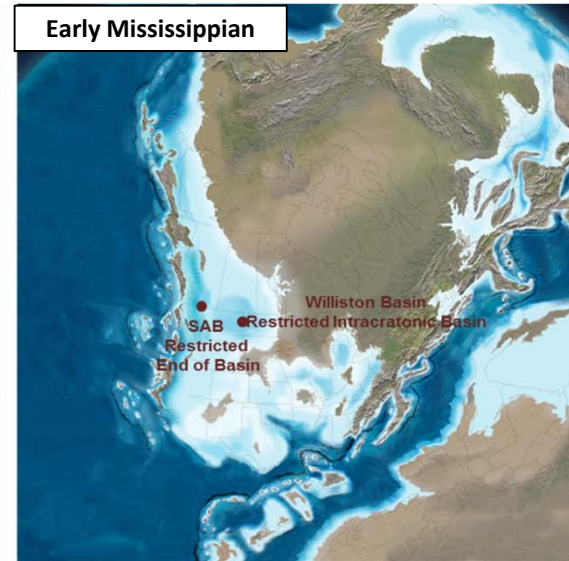
(Required slide - Please read at your leisure or)

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Outline

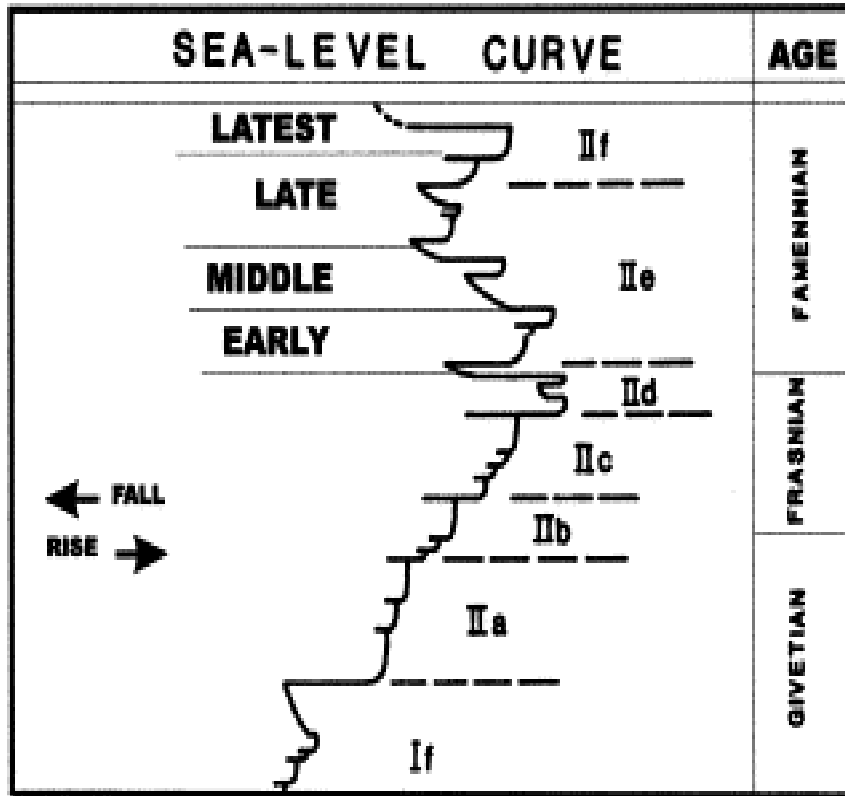
- Controlling Parameters (Basin Setting, Paleogeography, Accommodation, Sea-Level Control and Climate)
- Williston Basin Stratigraphy
- Alberta Bakken Petroleum System (ABPS) Fairway
 - Source
 - Pressure
 - Structure
 - Stratigraphy/Sedimentology
 - Relationship between ABPS – WB Stratigraphy
- Summary and Conclusion

Controlling Parameters on Devonian – Mississippian Deposits: Basin Setting and Paleogeography

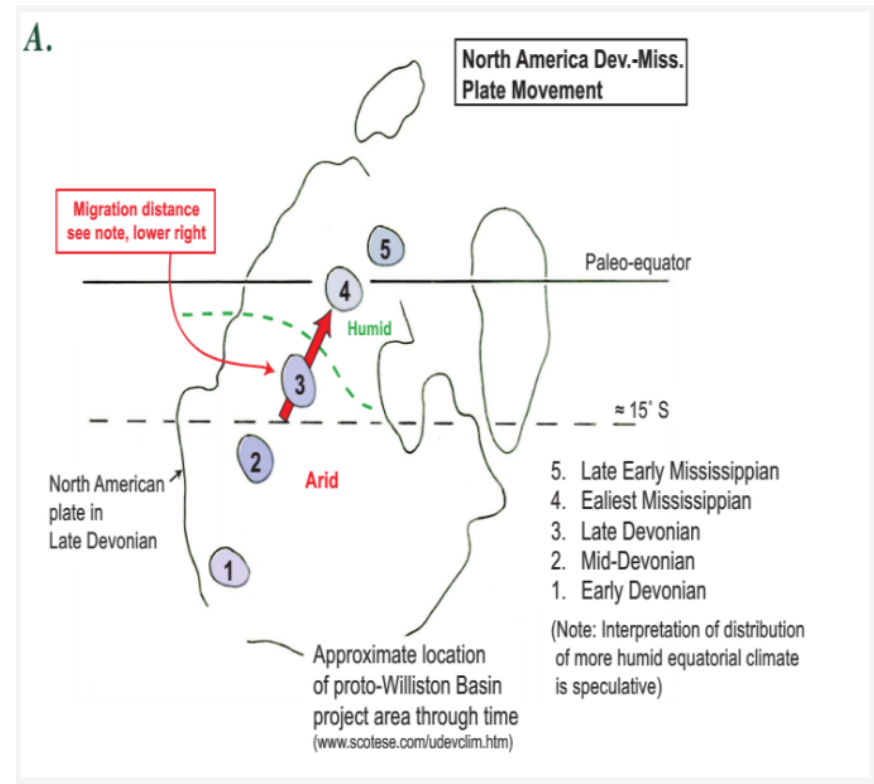


Source: After Blakey (2011)

Controlling Parameters on Devonian – Mississippian Deposits: Sea-Level Control and Climate



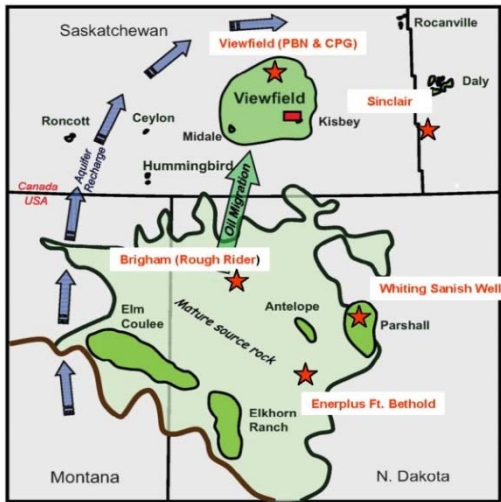
Source: After Google Image



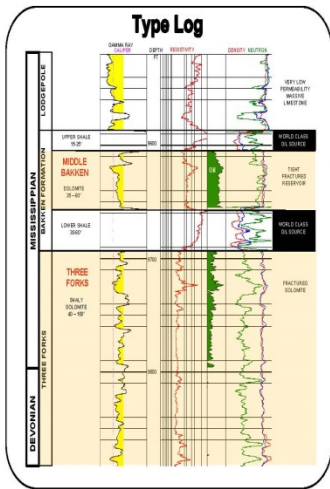
Source: Canadian Discovery

Type Well Stratigraphy Williston Basin

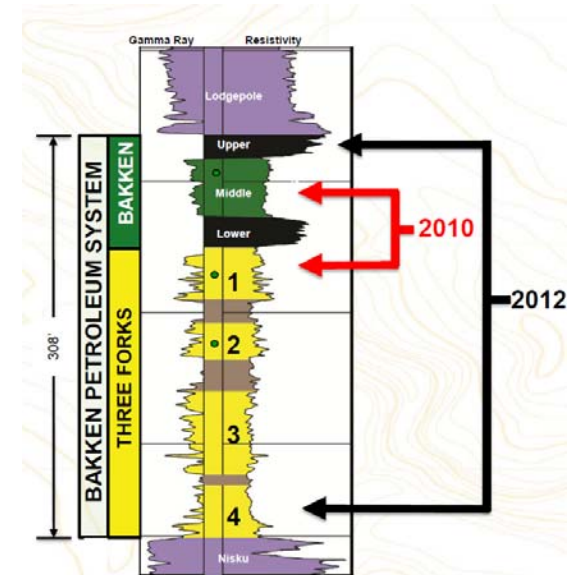
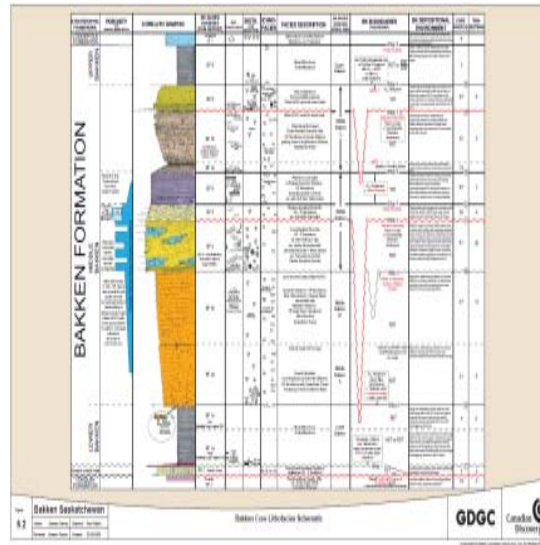
Emerging Focus on the Three Forks



- pervasive petroleum saturation
- over-pressure
- lack of downdip water
- updip water saturation
- low permeability/low matrix porosity reservoir
- self-sourcing within a mature source rock fairway
- deliverability enhanced by fracturing



- World Class Oil Shales Sourced Both Bakken and Three Forks Formations
- Bakken Lite Estimated Average Oil-in-Place 7.0MM Barrels/Section
- Three Forks Estimated Average Oil-in-Place 6.5MM Barrels/Section

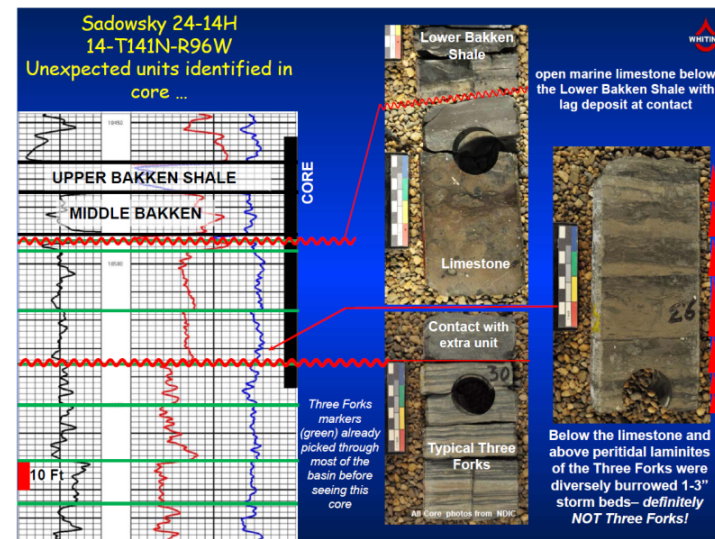
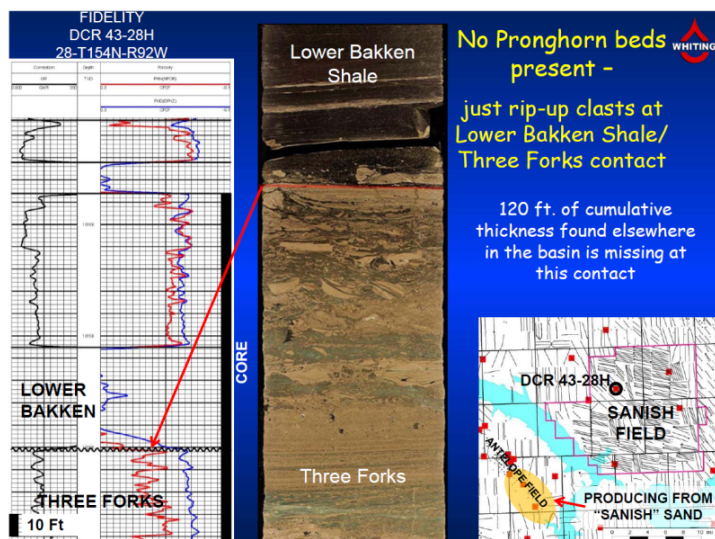
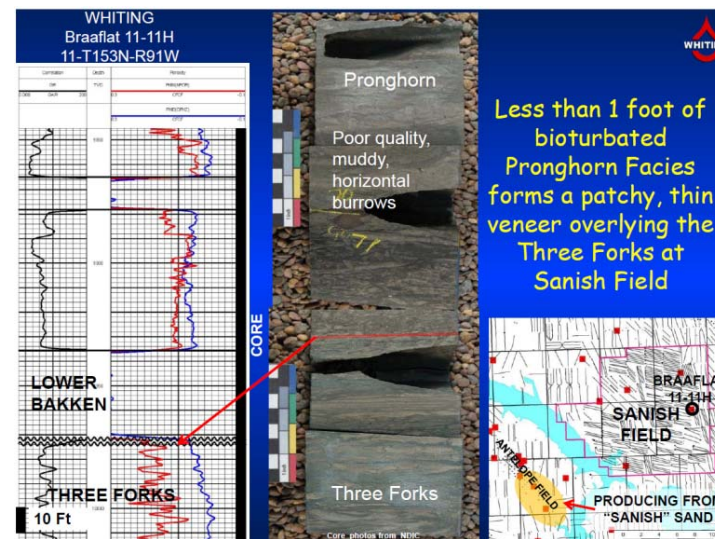
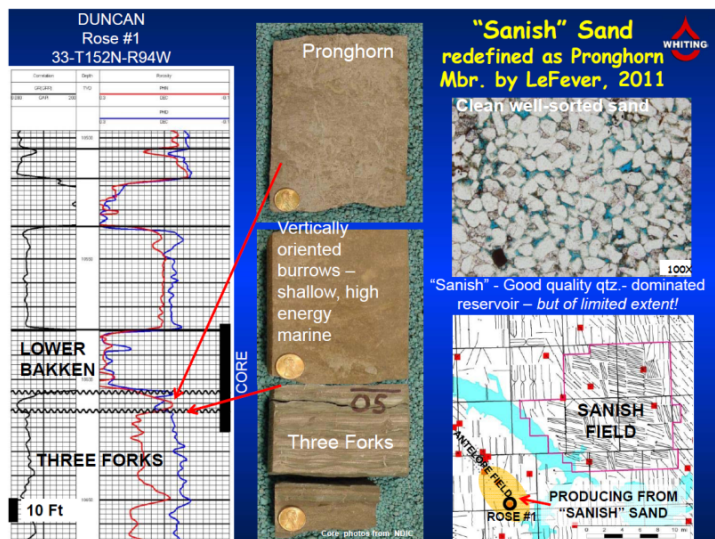


CLR Investor Presentation 2013

Source: EOG Investor Day Presentation, 2010

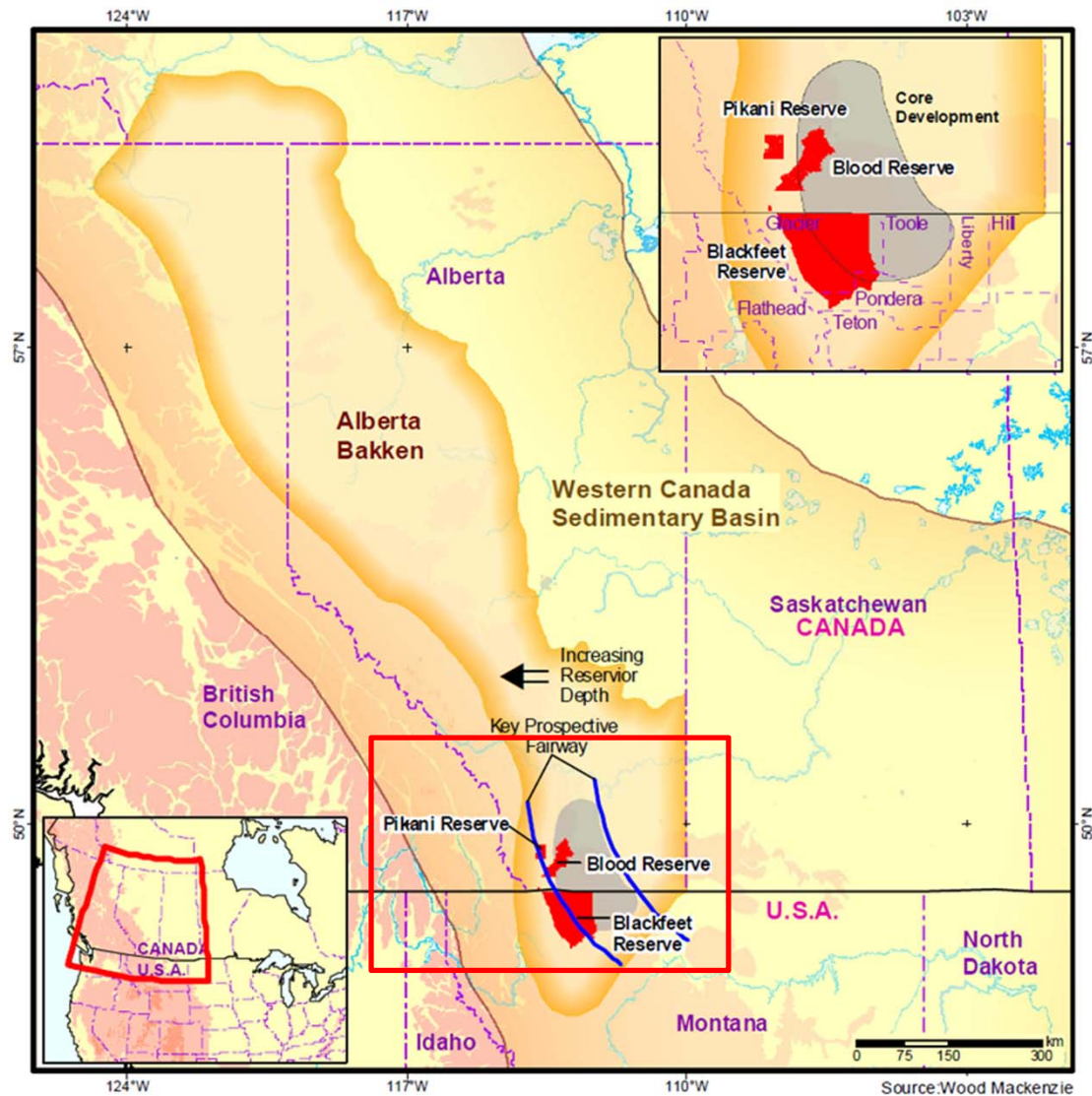
Bakken is an Established Play – Focus now on Sanish/Pronghorn/Three Forks

Sanish/Pronghorn to Three Forks Reservoir Facies



Skinner, Canter, Sonnenfeld and Williams, 2012

Alberta Bakken Petroleum System (ABPS) Fairway



Source Wood Mackenzie

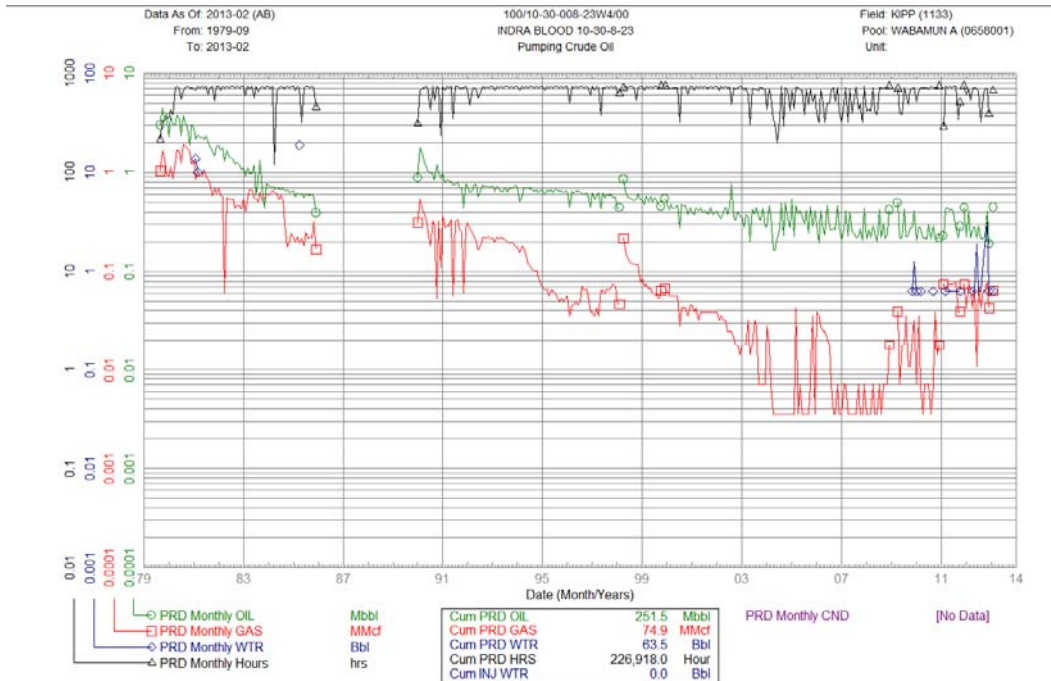
Main Reservoir Units

- **Banff**
- Upper/Lower Exshaw Shales
- **Middle Exshaw** (updip normal pressured only)
- **Big Valley/Stettler**

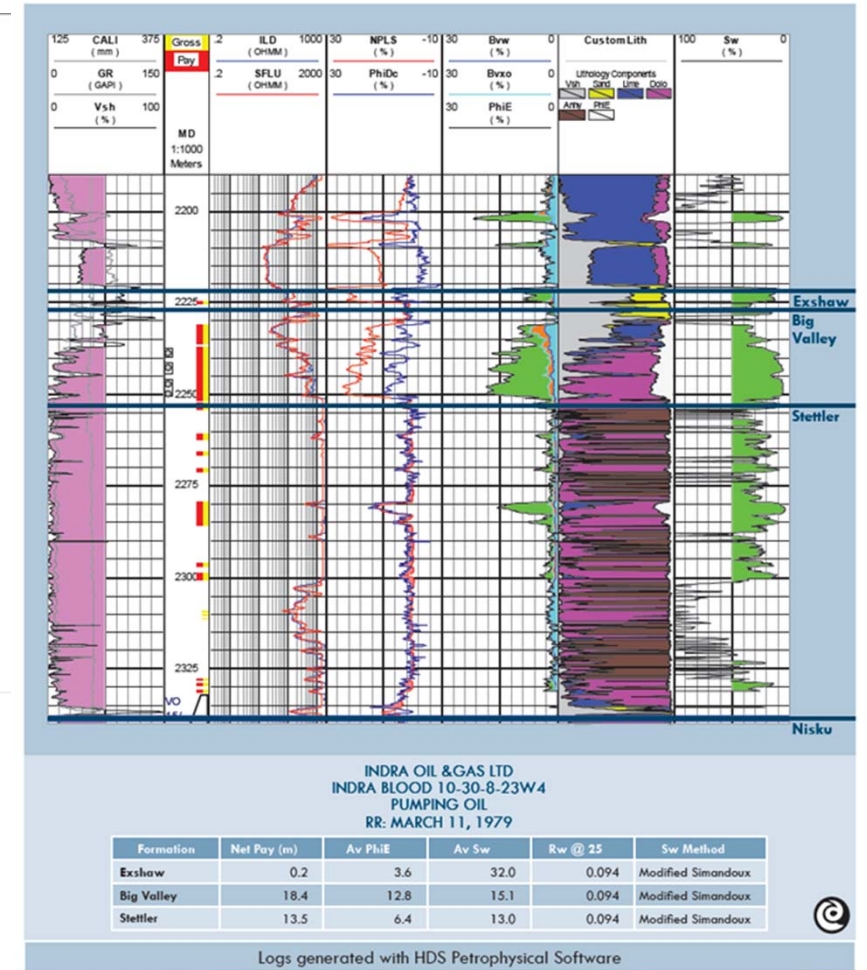
Key Criteria demonstrated for the Big Valley/Three Forks:

- pervasive petroleum saturation
- over-pressure
- lack of downdip water
- updip water saturation
- low permeability/low matrix porosity reservoir
- self-sourcing within a mature source rock fairway
- deliverability enhanced by fracturing

Key Vertical Well 10-30-8-23W3 (Big Valley/Stettler)



Big Valley Pay = 15m
Big Valley Ø = 12%
PGrad = 0.66psi/ft
Cum Prod Oil = 251.5Mbbl
Cum Prod Gas = 74.9MMcf
Cum Prod Water = 63.5 Bbl
On Production = 1979-09 (226918hrs)

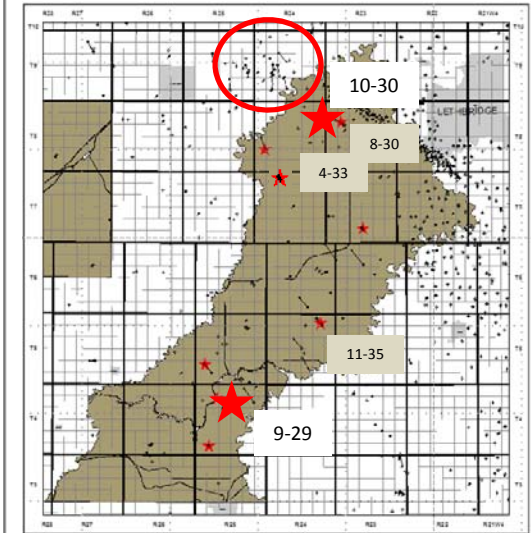
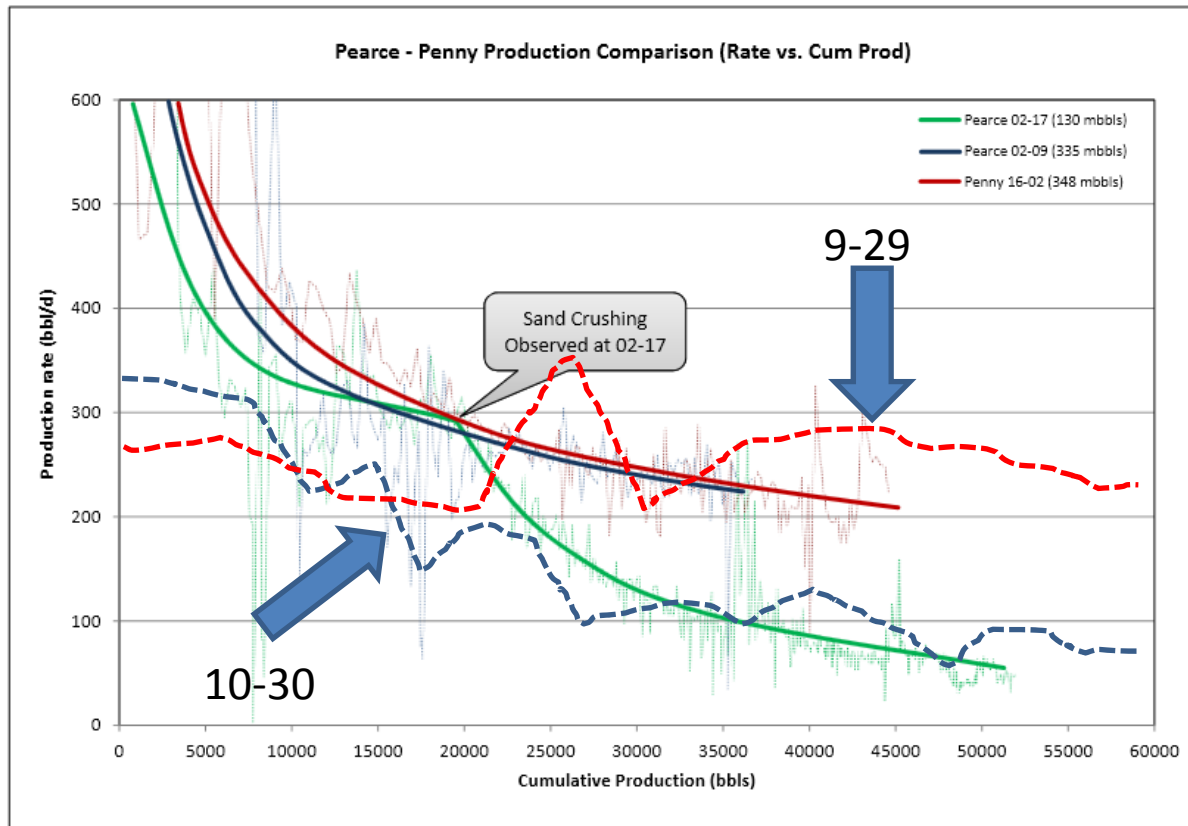


Source: Canadian Discovery Digest, V. 4, 2011

Early Results from the 5 Best Producing SAB Wells

Monarch: Recent Well Performance

- 2-9 and 16-2 have followed a significantly different decline profile relative to the initial 2-17 discovery well



Continued production data will confirm production profile

Modified after Torc Corporate Presentation, 2013 and Geoscout Data

ABPS Source Rock

Exshaw Type section

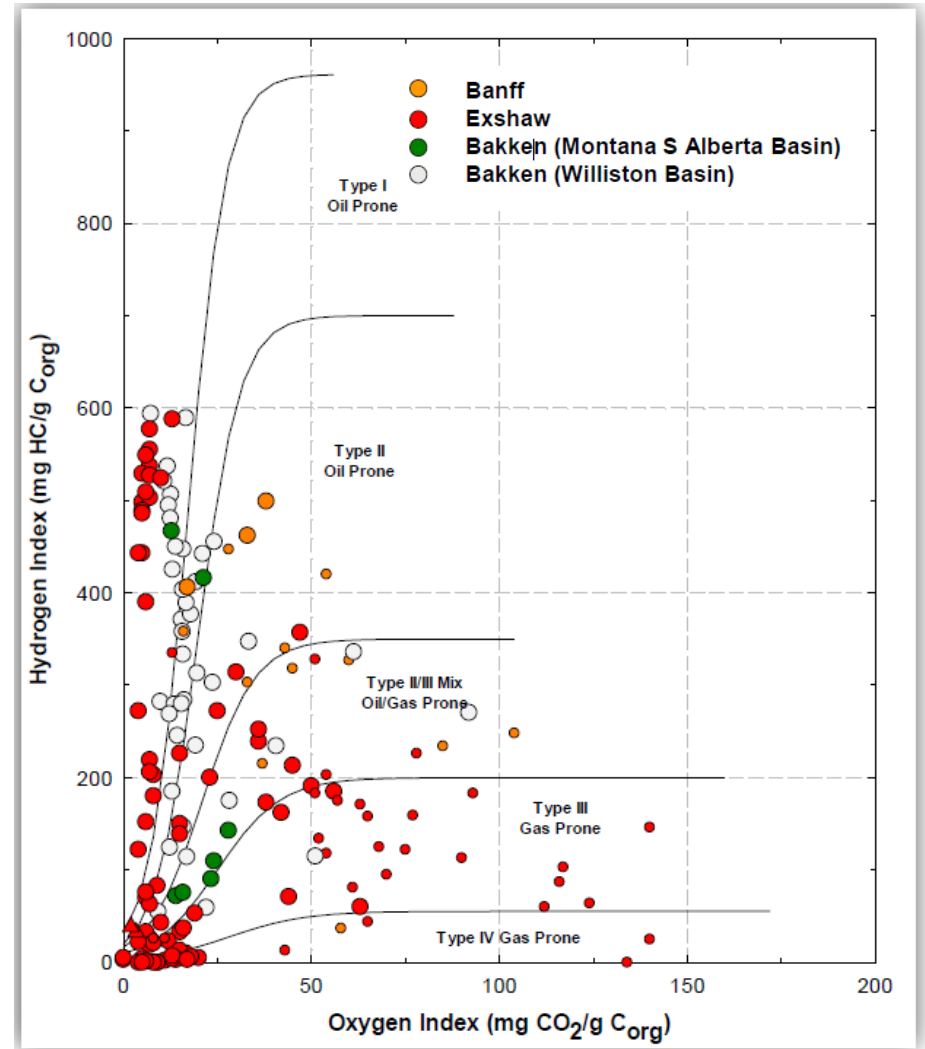
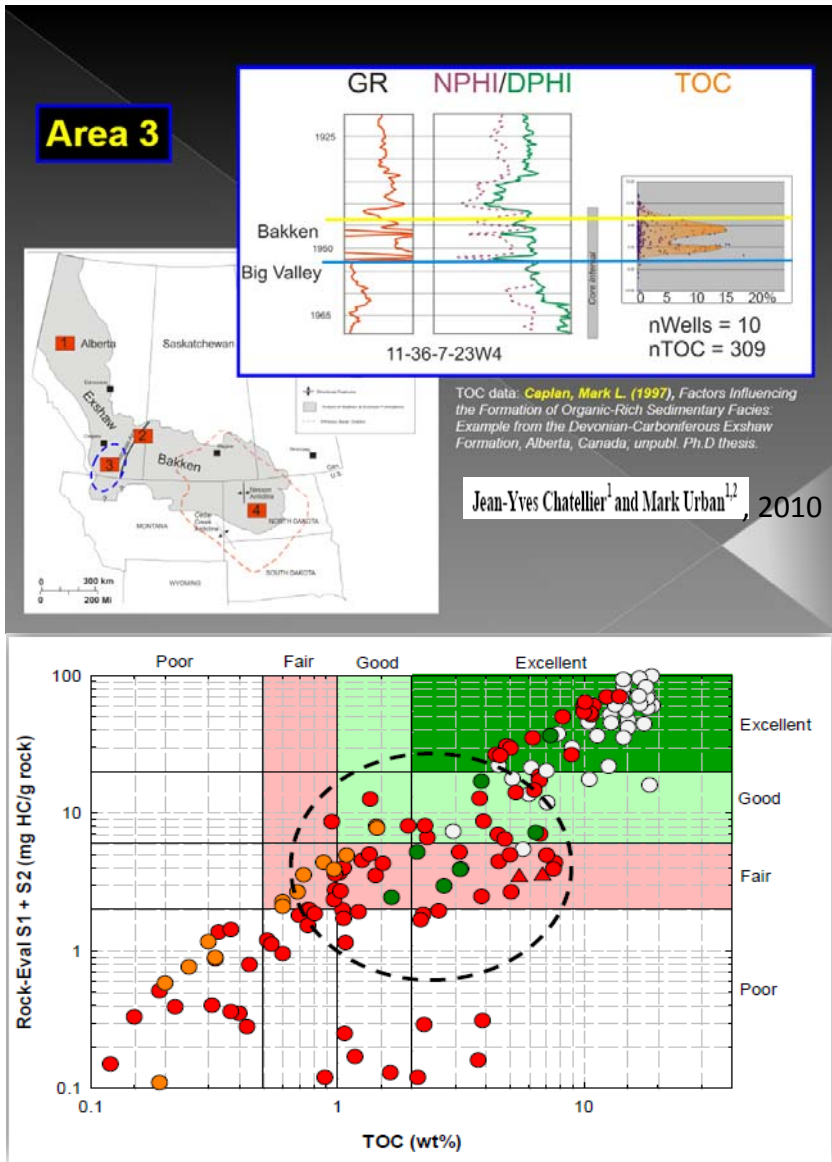
Jura Creek, Alberta



Chatellier 2010



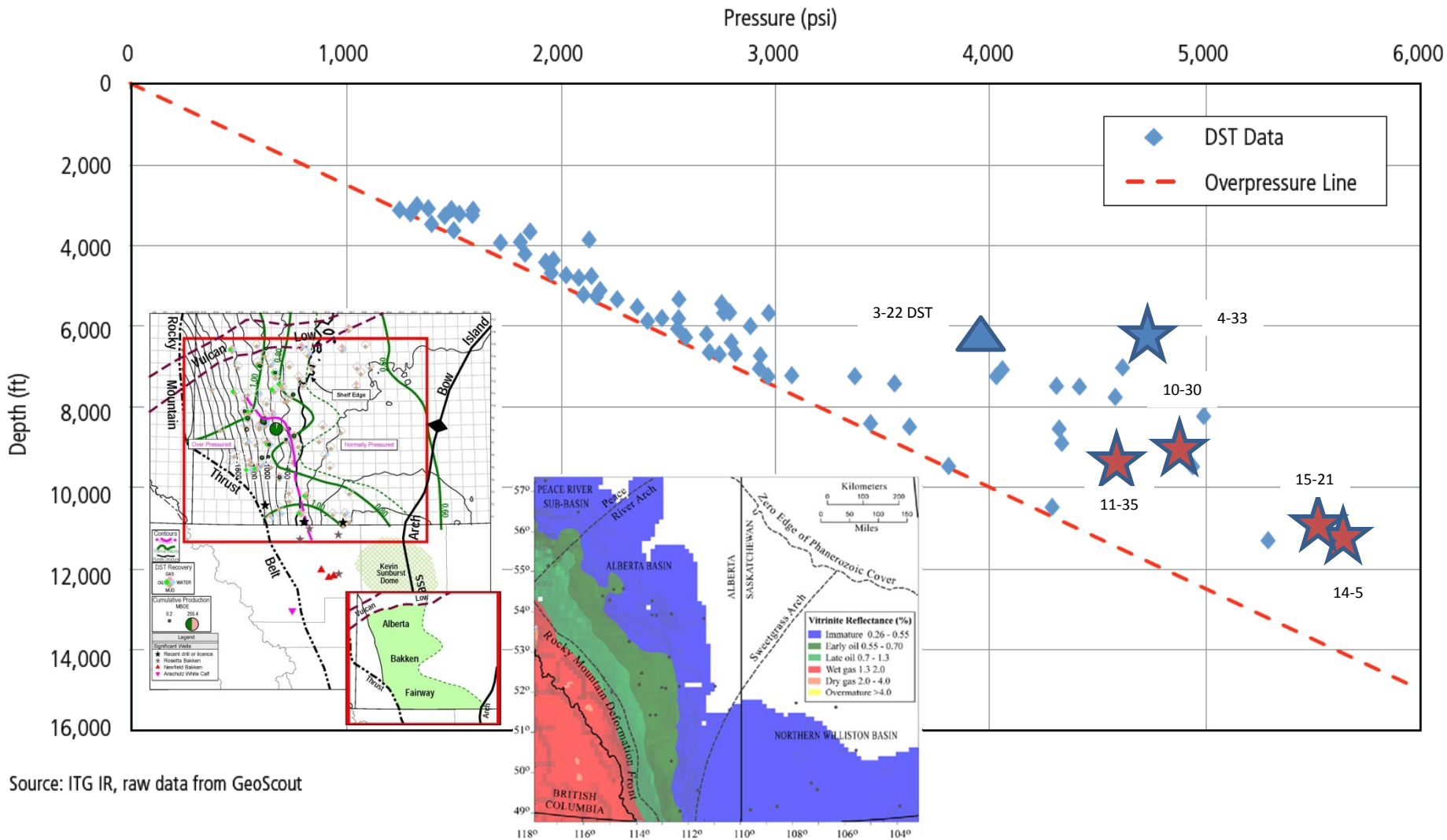
Bakken Exshaw - TOC Distribution – S. Alberta



Murphy, 2012

Pressure vs. Depth Plot for ABPS

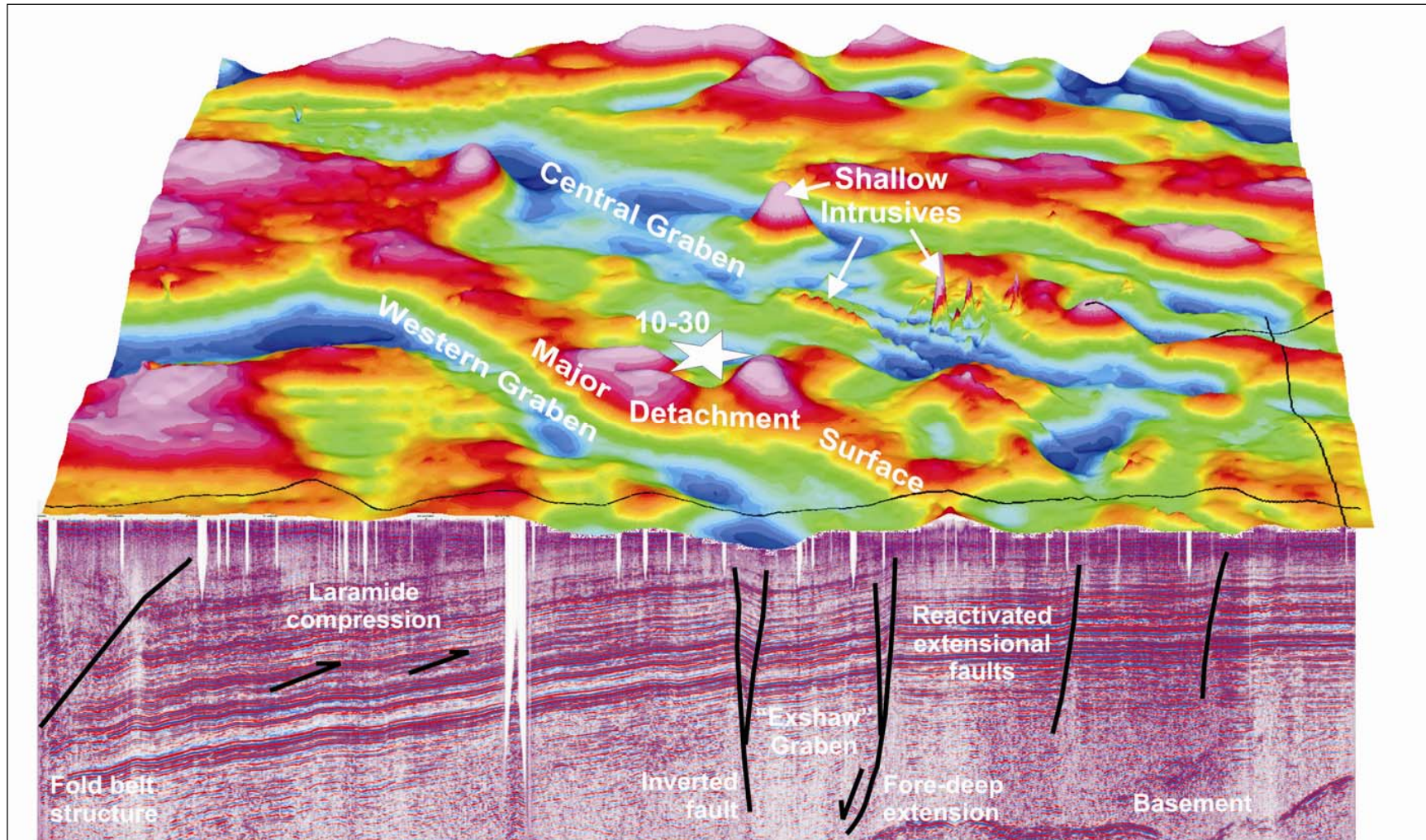
PRESSURE GRADIENT



Source: ITG IR, raw data from GeoScout

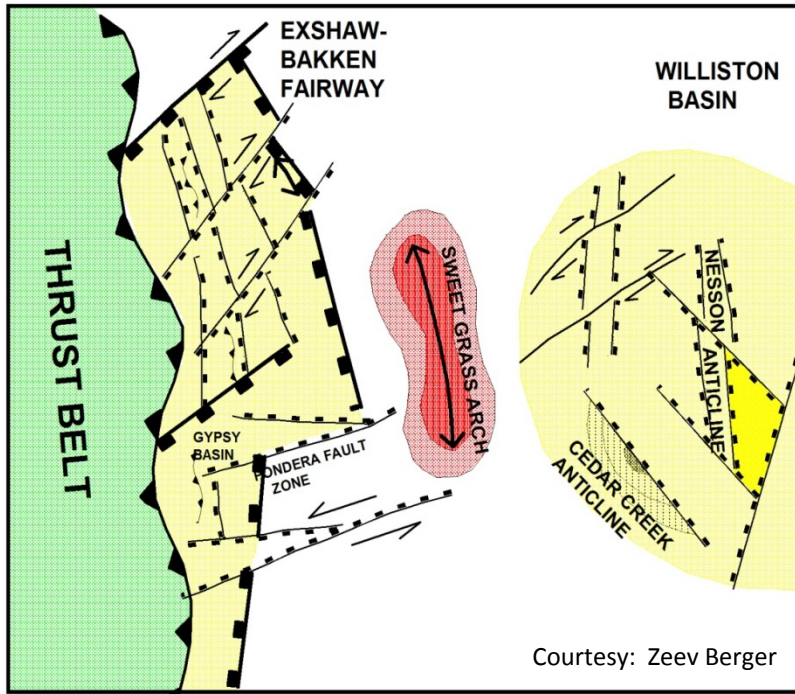
Source: Higley and Lewan, 2009,

Relationships Between Structures Identified with Regional Seismic and GSC HRAM Data

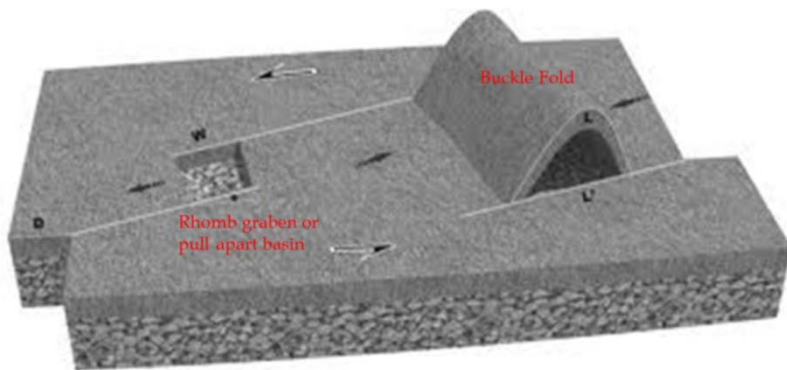
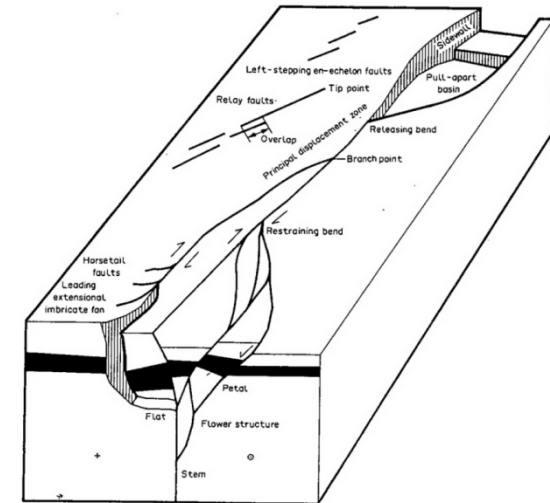


Source: BMO Capital Markets, Iltech Inc., Lemieux, 1999

Structural Models – Williston Basin and SAB



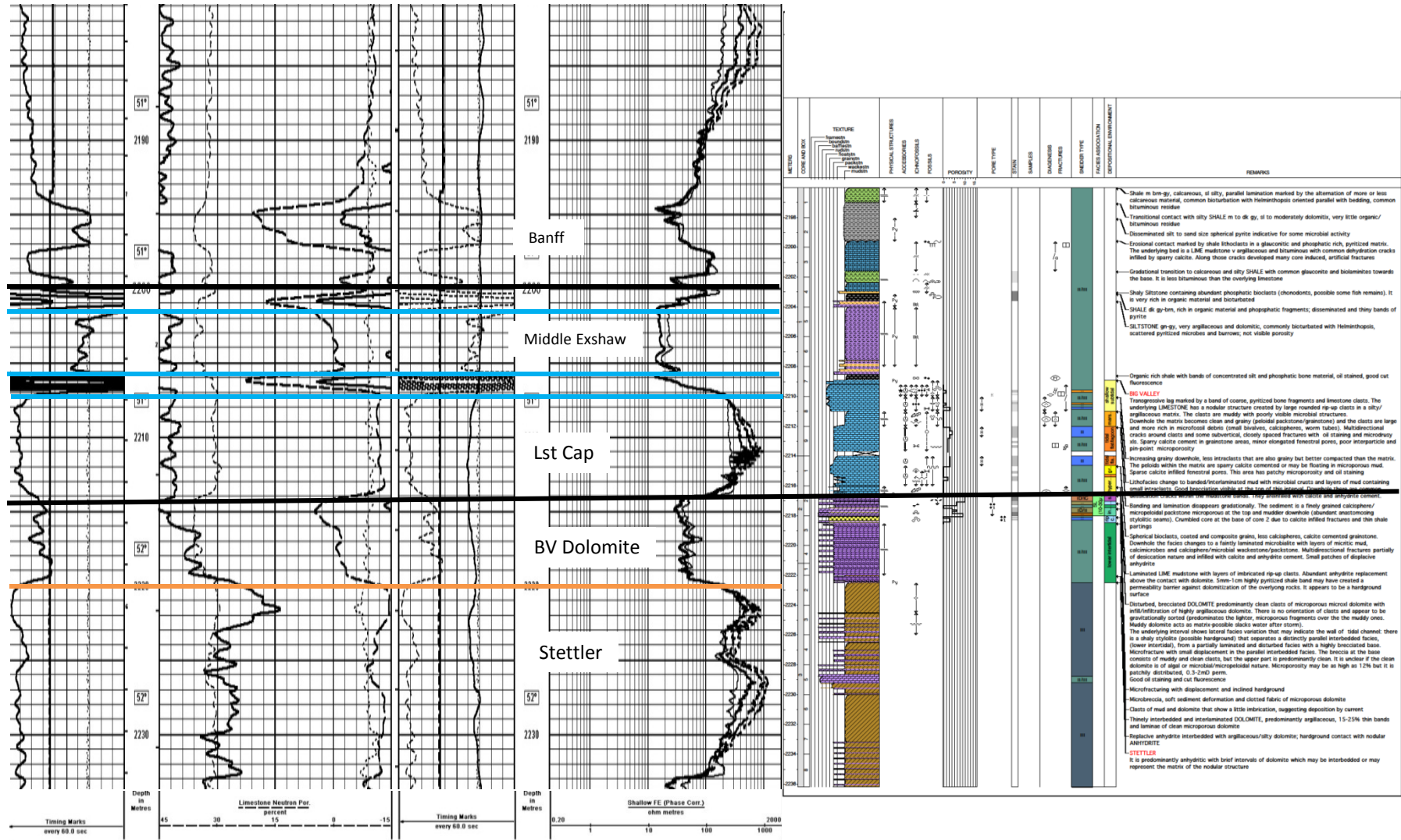
- Fracture Enhancement
- Differential Stress
- Accommodation Controls



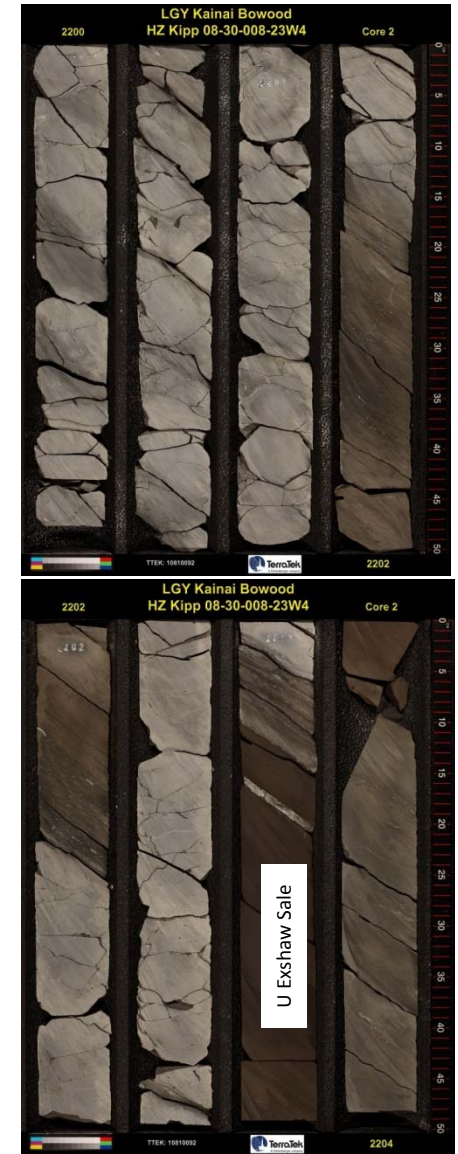
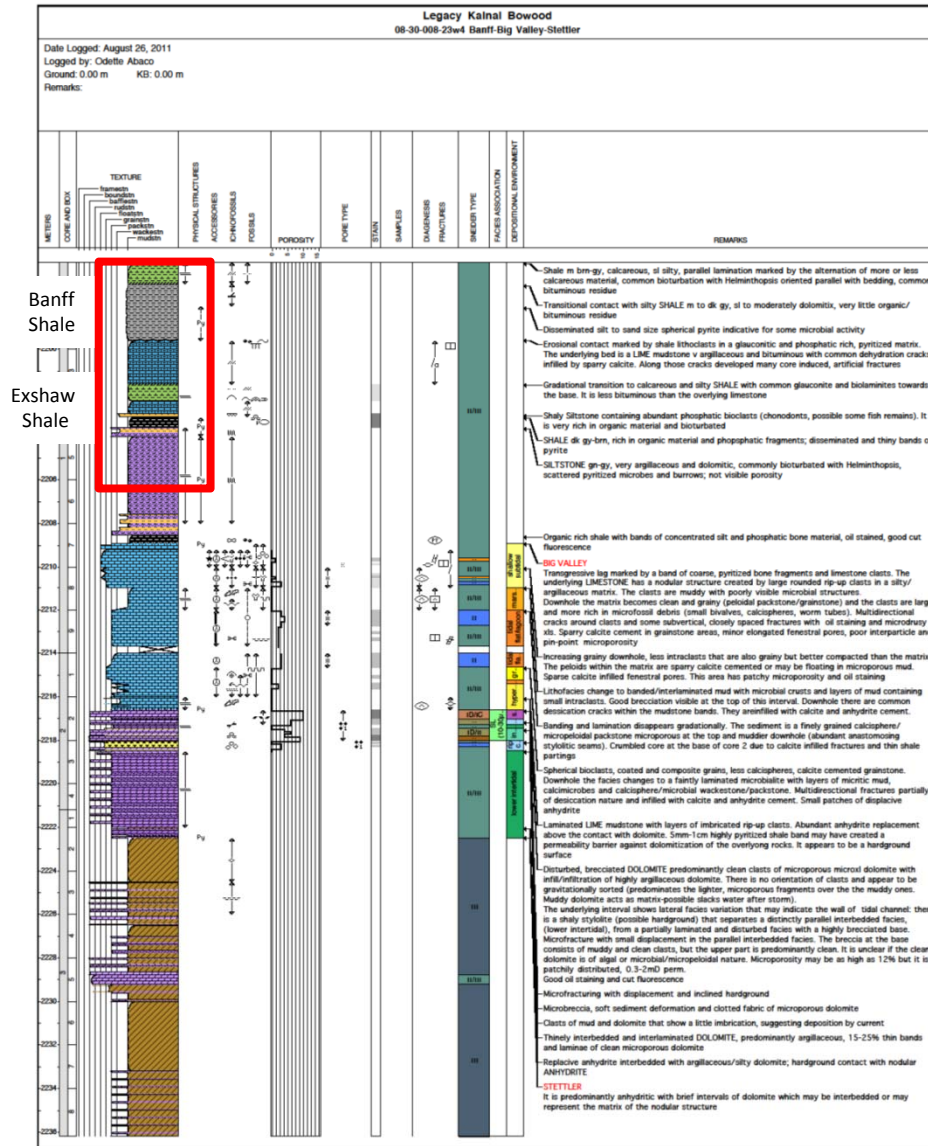
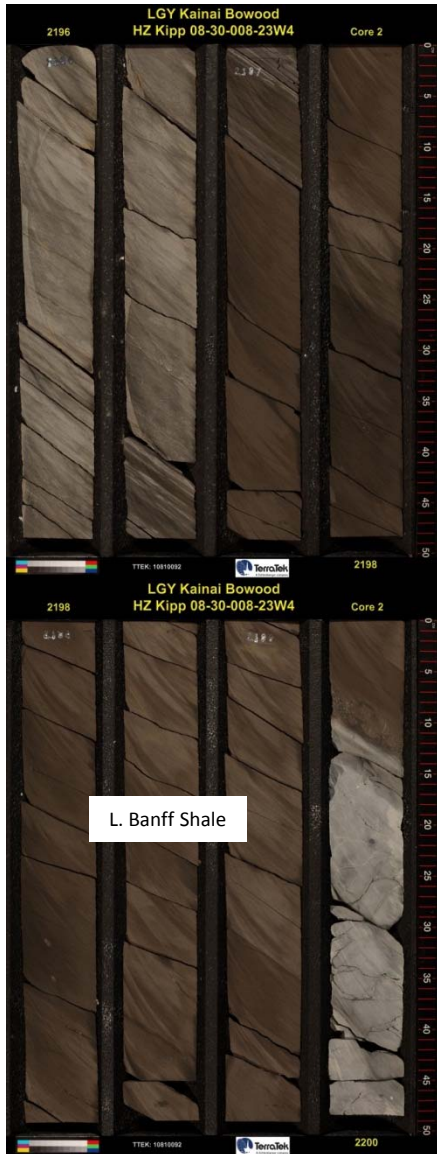
Legacy Kainai Bowood-Band Ranch 8-30-8-23W4 (15-20 SL)

Measured depth log

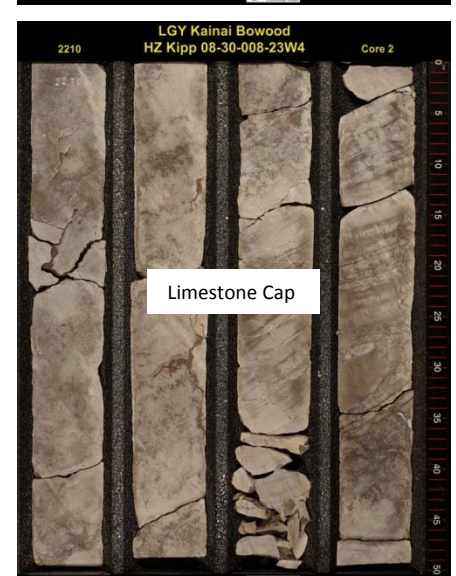
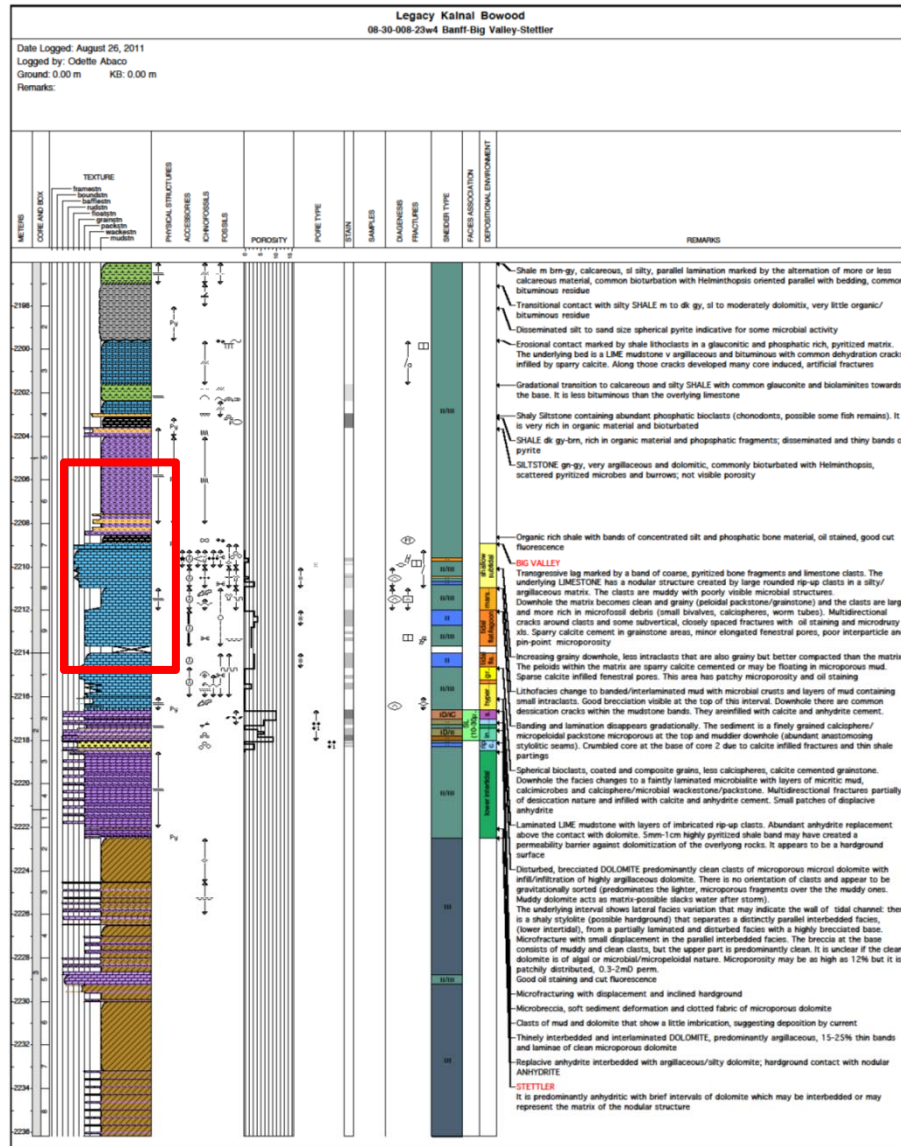
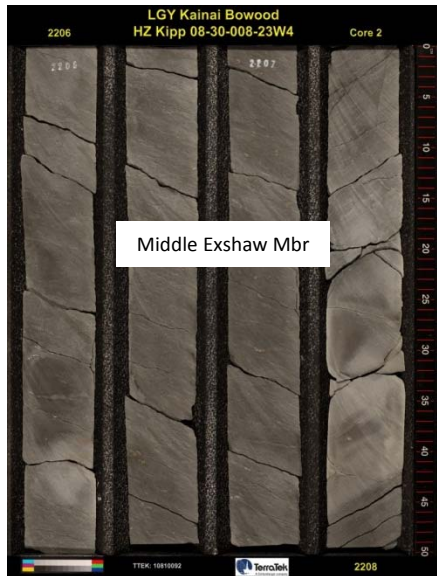
BV = 13m; Pay(conv) = 2.5m



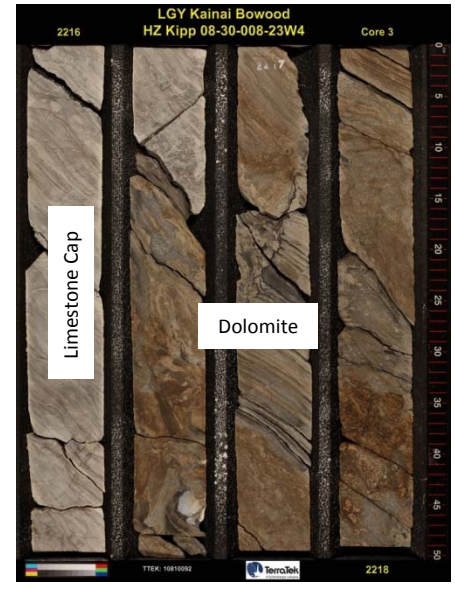
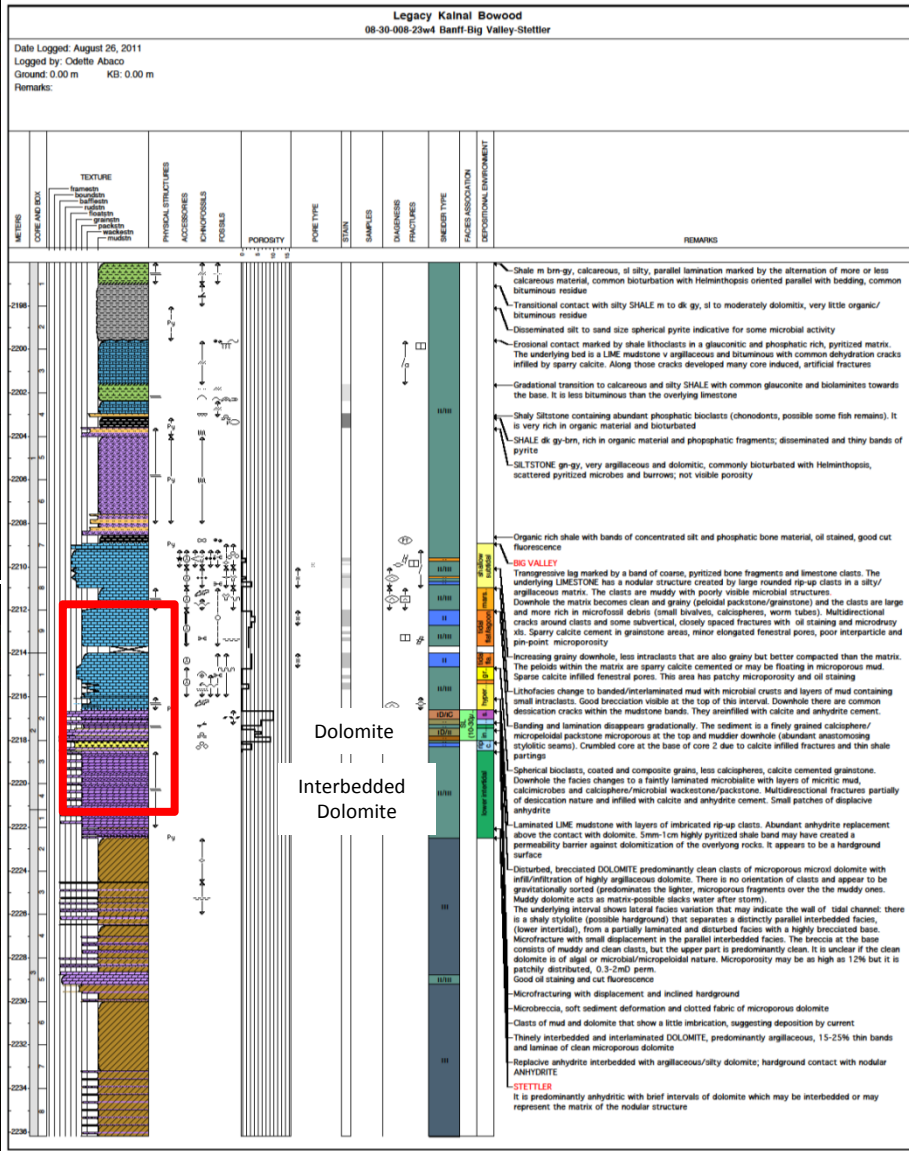
8-30-8-23W4 (15-20 SL)



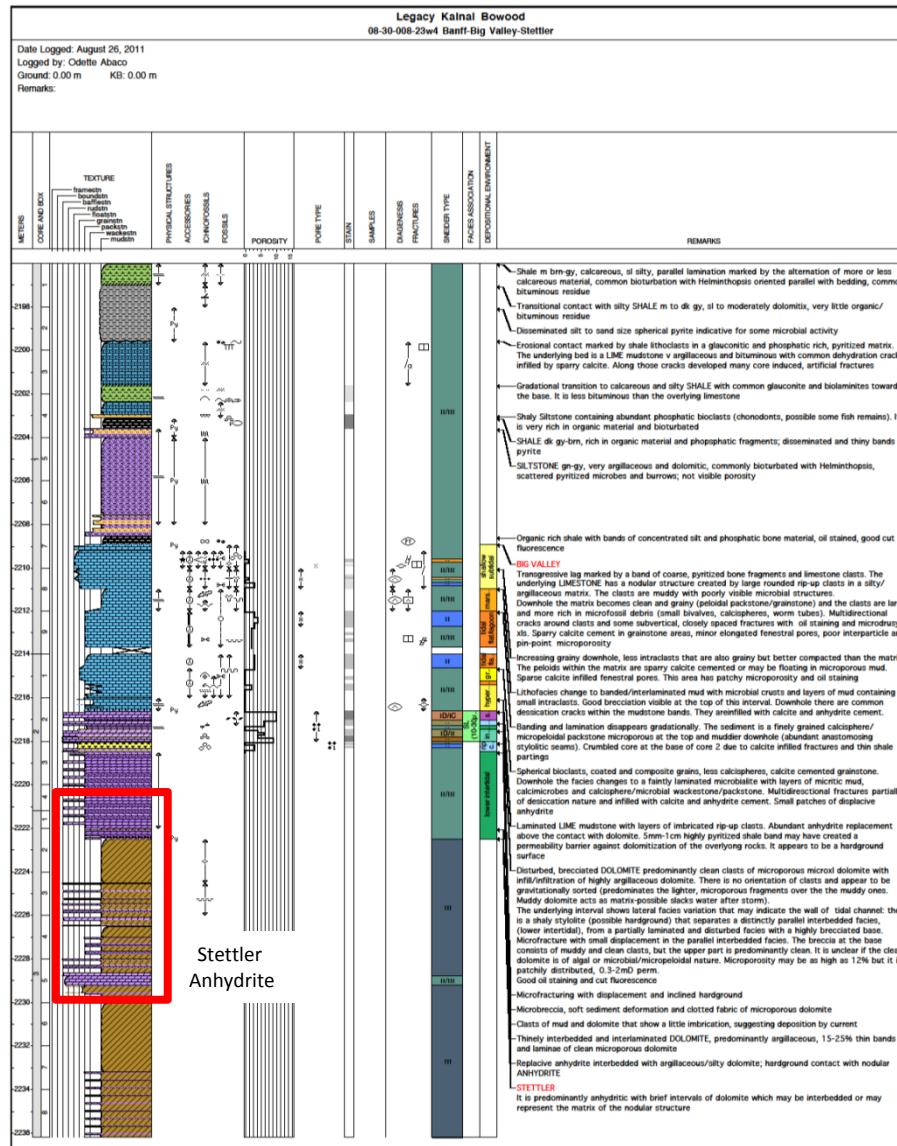
8-30-8-23W4 (15-20 SL)



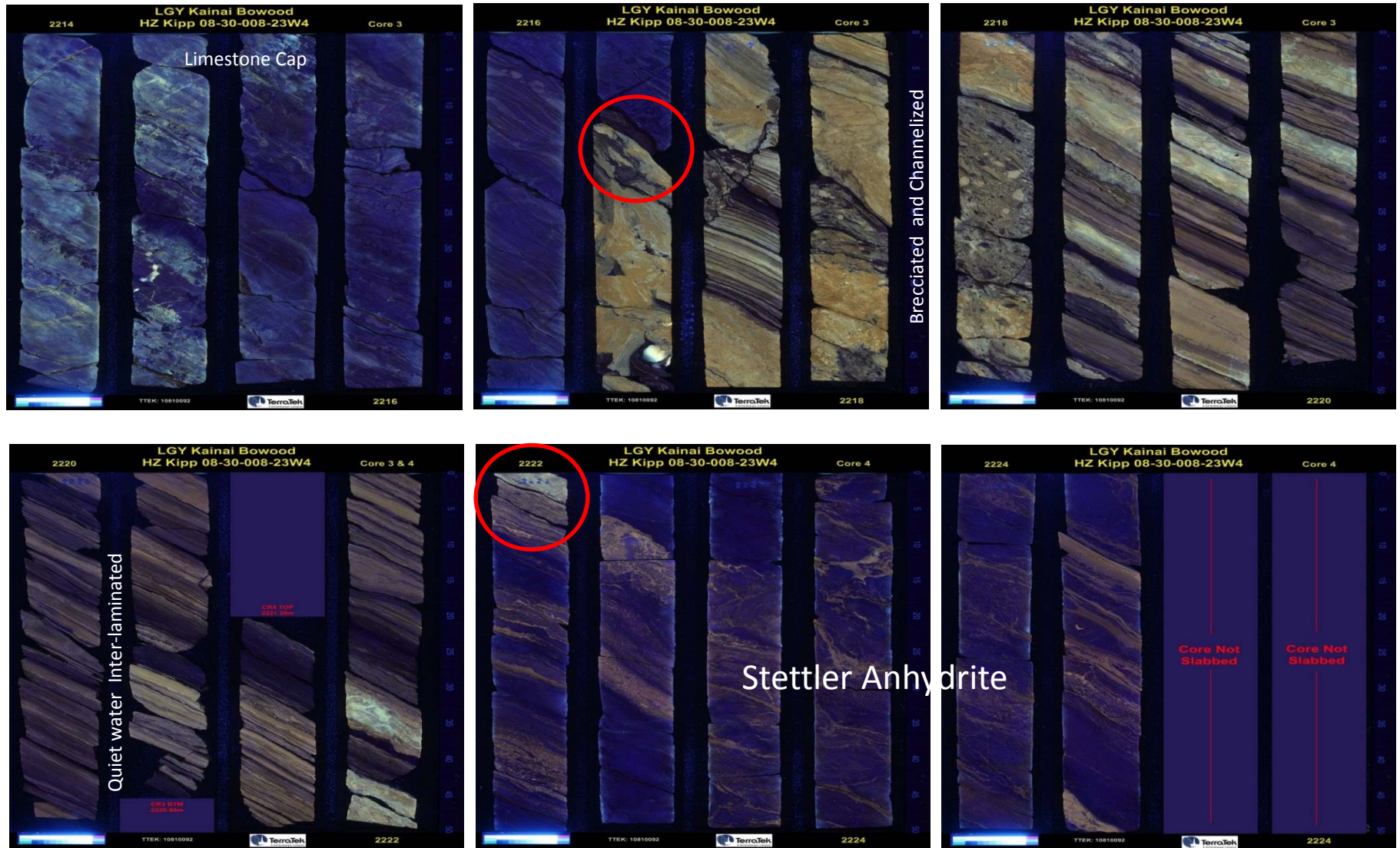
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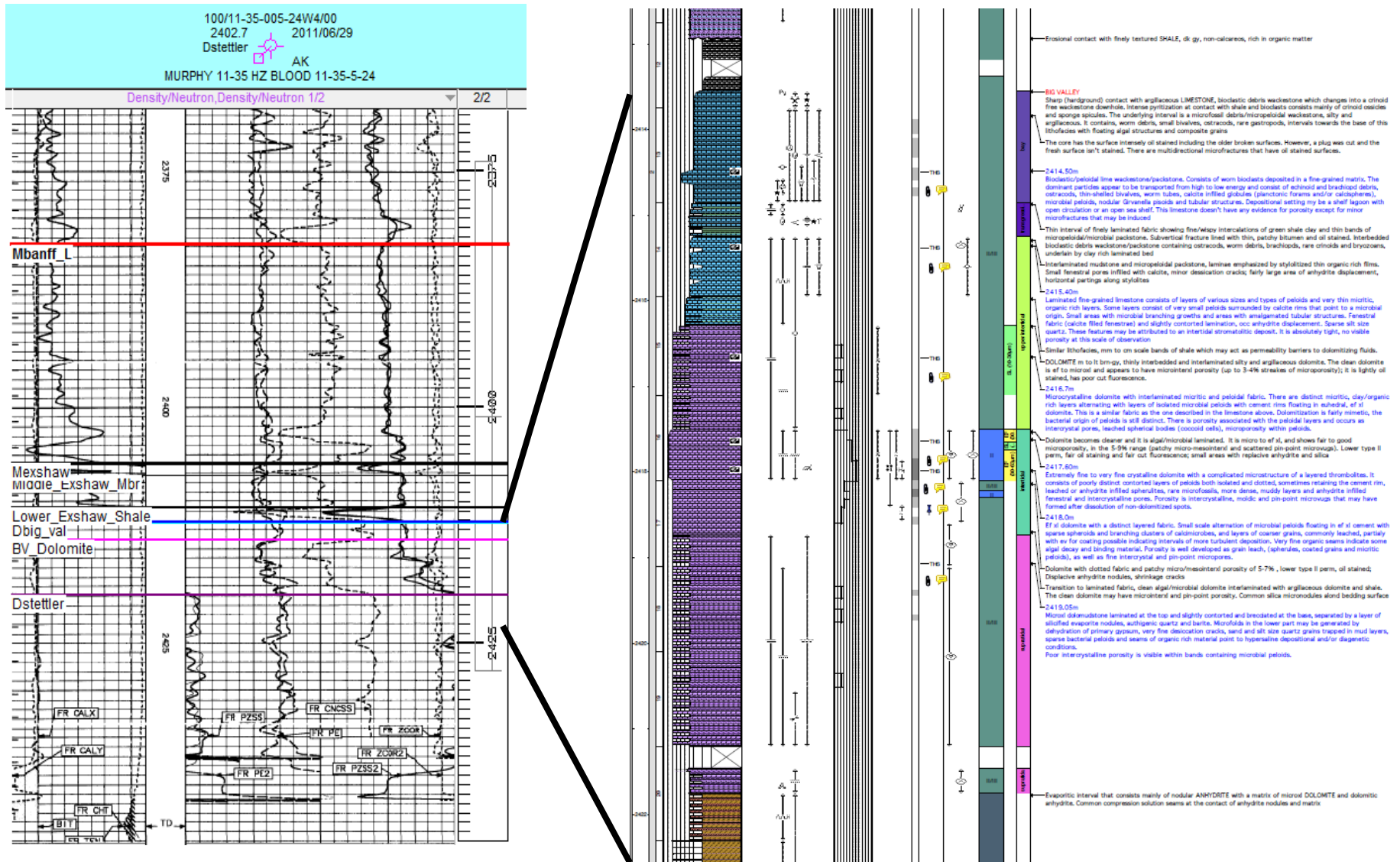
8-30-8-23W4 (15-20 SL)



Legacy Kainai Bowood-Band Ranch 8-30-8-23W4 (15-20 SL)



MURPHY 11-35 HZ BLOOD 11-35-5-24W4



MURPHY 11-35 HZ BLOOD 11-35-5-24W4

2418-2422.22 Stettler – Big Valley Contact

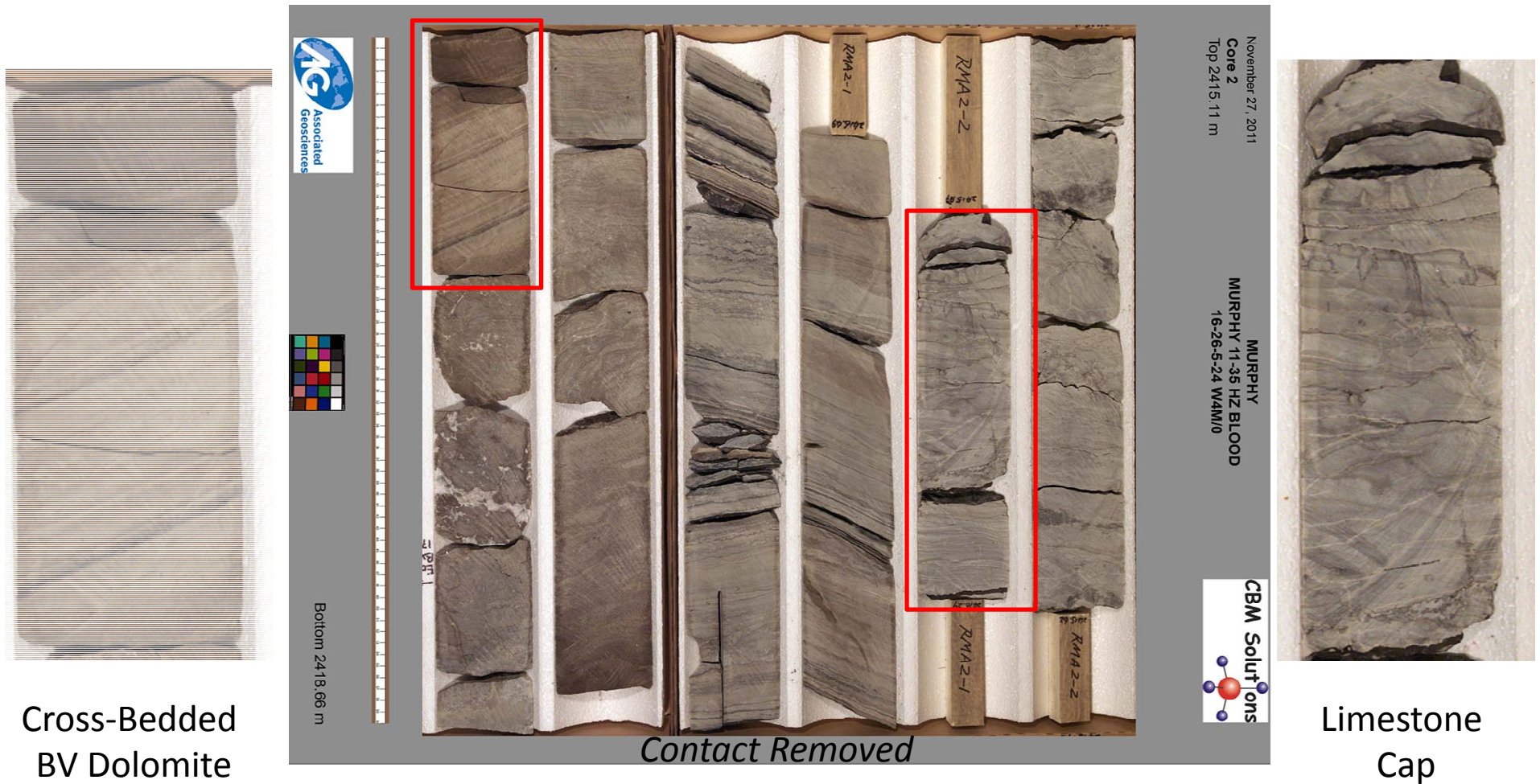


Stettler – Big Valley
Contact



MURPHY 11-35 HZ BLOOD 11-35-5-24W4

2418-2422.22m Big Valley Dolomite - Limestone Cap Contact



MURPHY 11-35 HZ BLOOD 11-35-5-24W4

2418-2422.22 Limestone Cap – Exshaw Shale contact

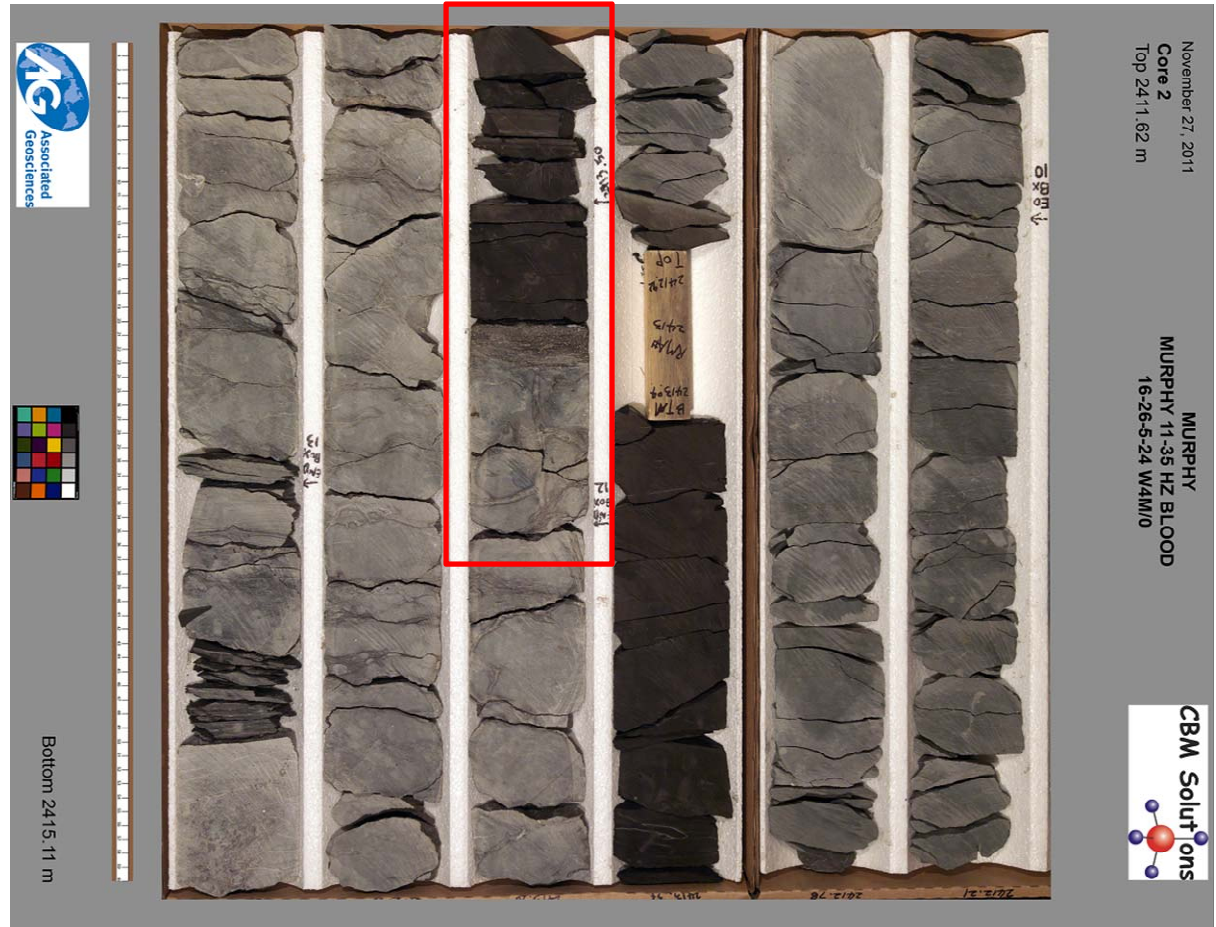


Lower
Exshaw Shale

Flooding Surface

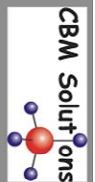
Transgressive
Surface

Brecciated
Limestone Cap



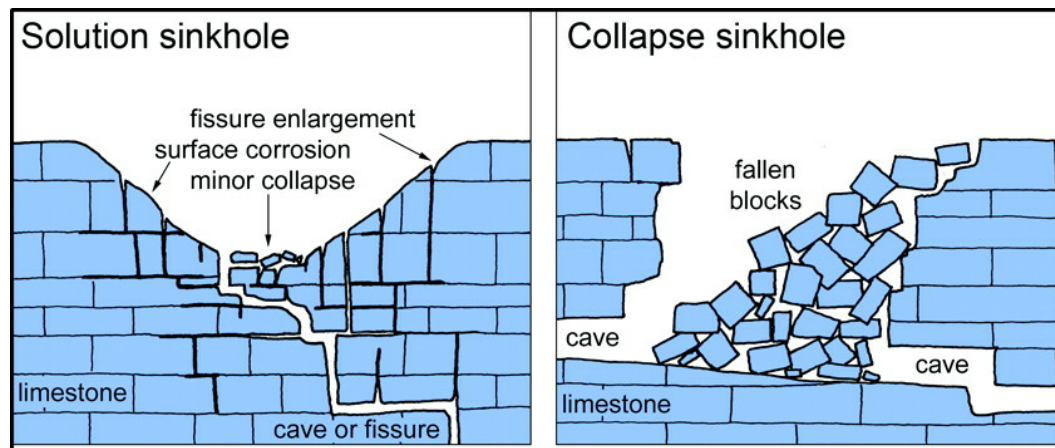
November 27, 2011
Core 2
Top 2411.62 m

MURPHY
MURPHY 11-35 HZ BLOOD
16-26-5-24 W4M10



“Collapse”: Sinkhole or Paleo-Cave

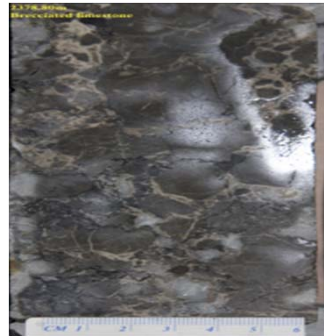
- No dominant trend
- Proximal to faults (extensional, strike-slip and compressional)
- Likely an exposed surface
- More evidence of fracturing in and around area
- Two styles:
 - A) Major collapse and thin Big Valley
 - B) Brecciated and thick Big Valley and extremely fractured “Halo” around sink-hole



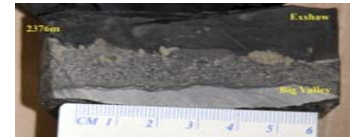
4-33-7-24W4



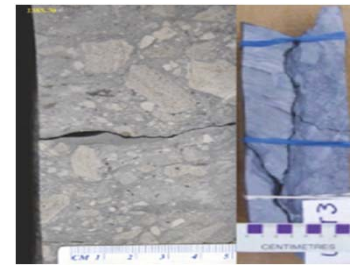
Limestone Cap



Packstone
Wackestone



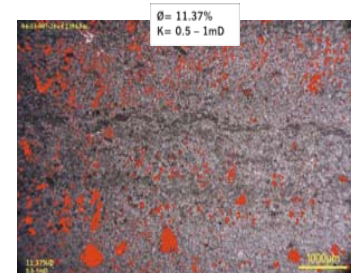
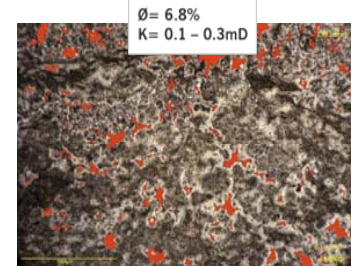
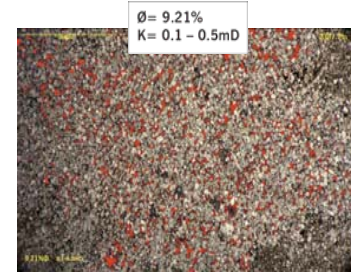
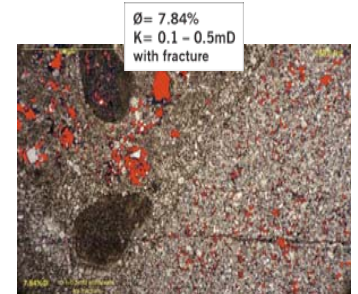
Lst Cap – L Exshaw
Shale contact



Breccia

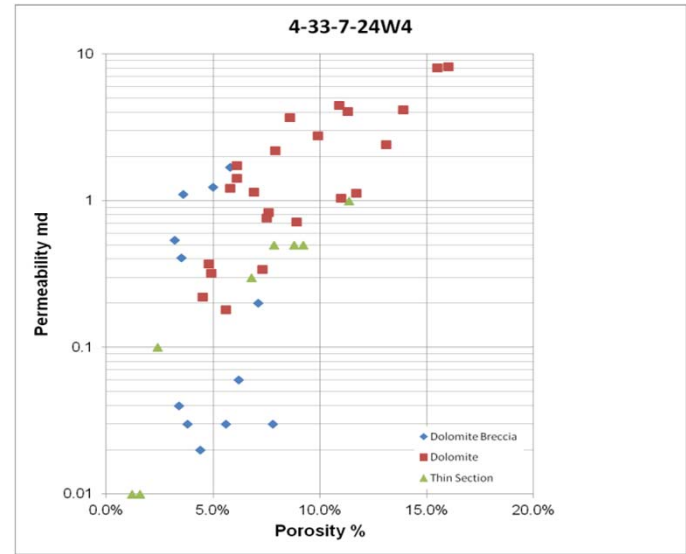
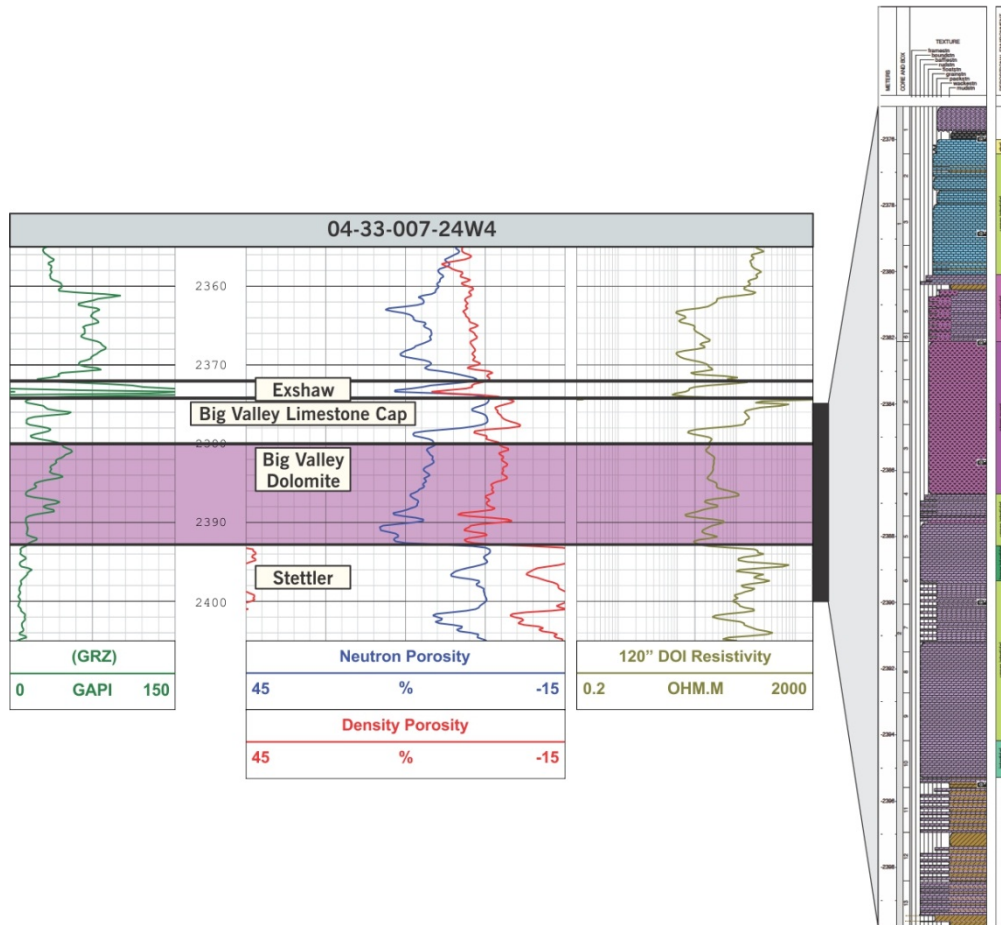


Big Valley – Stettler
Contact

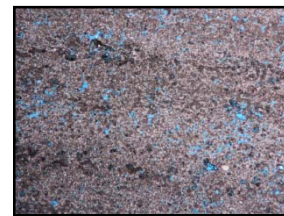


4-33-7-24W4

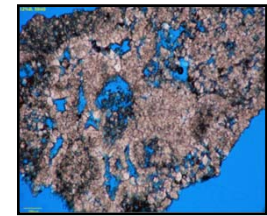
04-33-07-24W4 Big Valley Core and Thin Section Analysis



Big Valley Porosity Styles

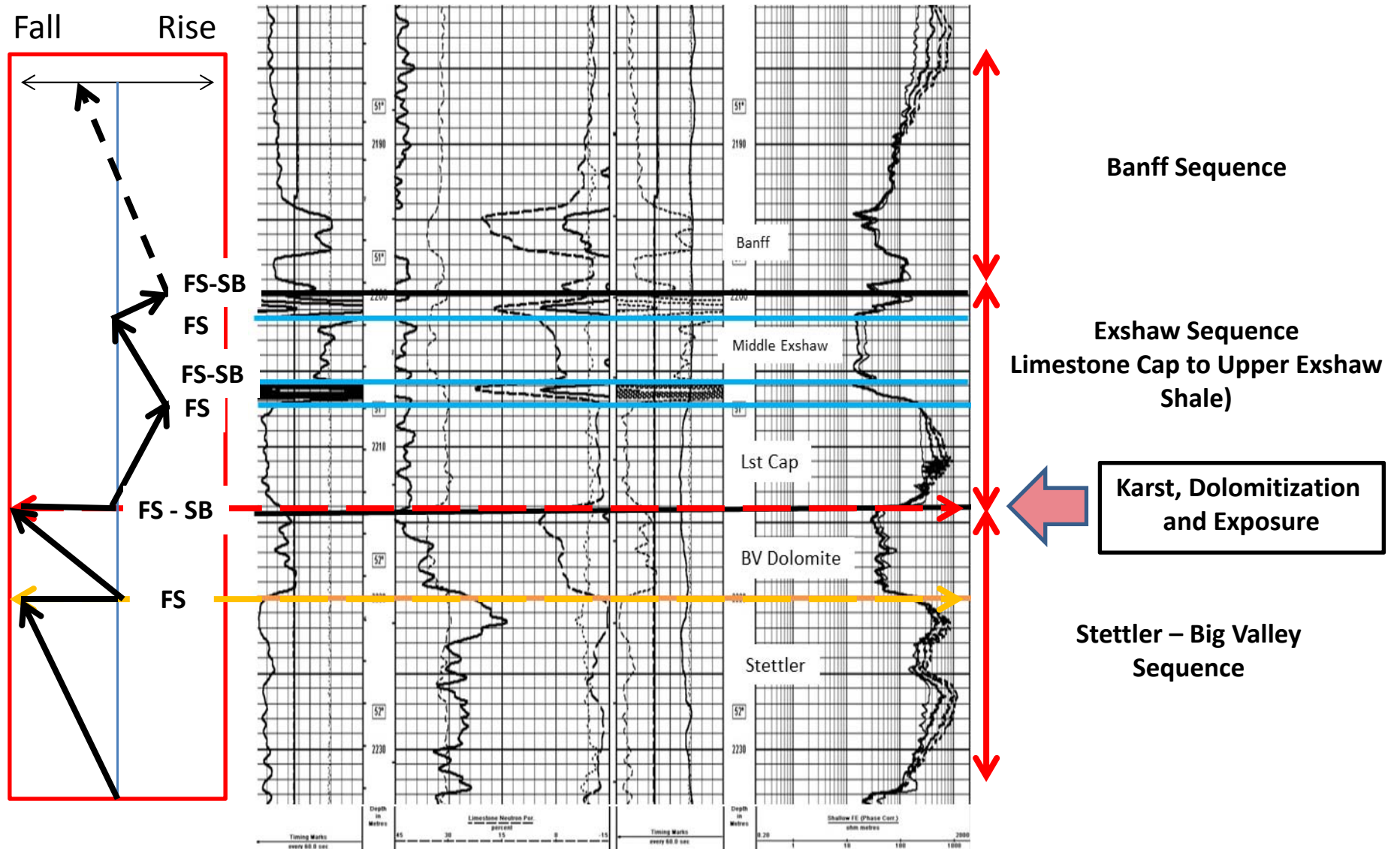


Big Valley dolomite matrix
10 to 14% Ø, 1-3 mD

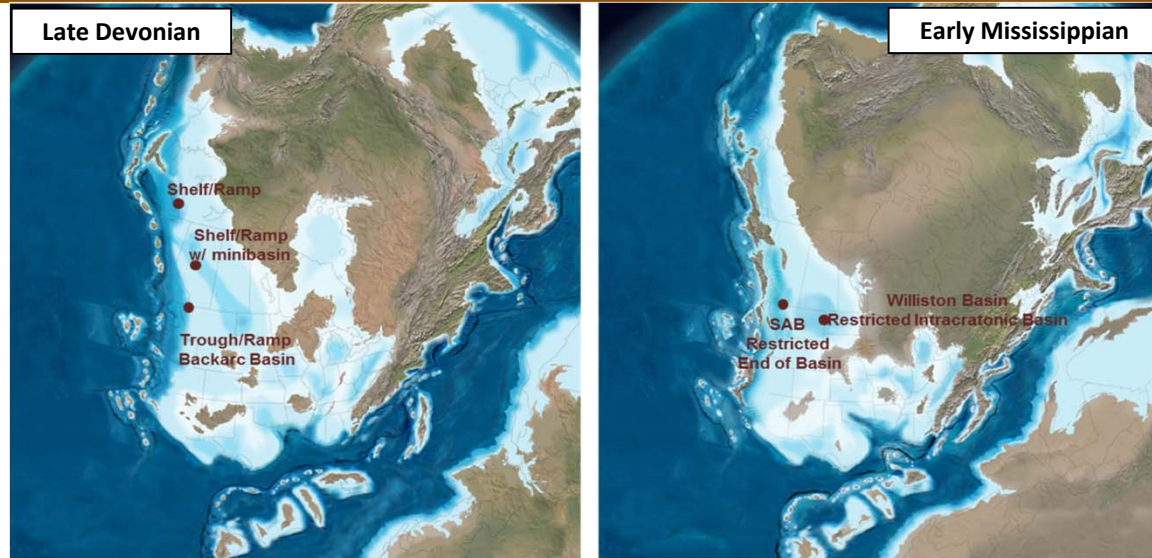


Leached dolomitic porosity
12% Ø, 30mD

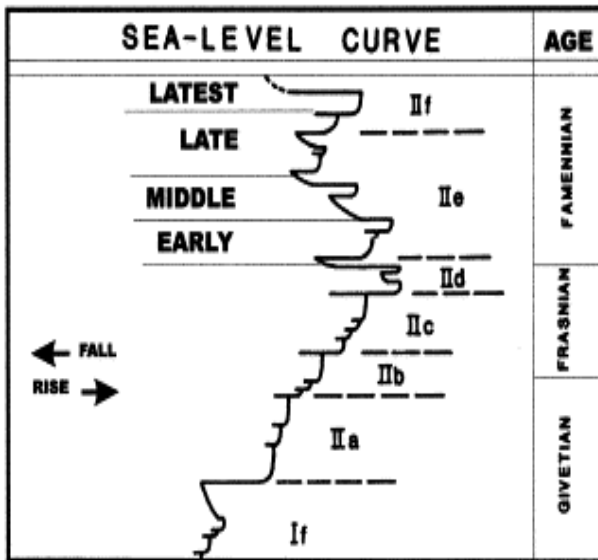
Stettler – Big Valley – Exshaw – Banff Sequences and RSL



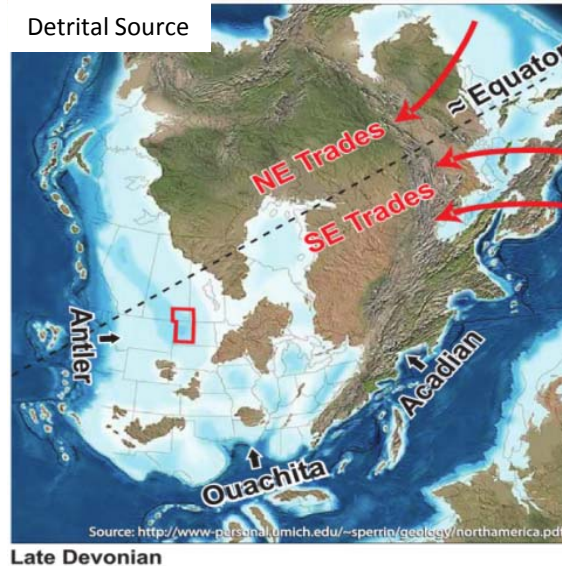
Controlling Parameters on Devonian – Mississippian Deposits: Basin Setting, Paleogeography, Accommodation, Sea-Level Control and Climate



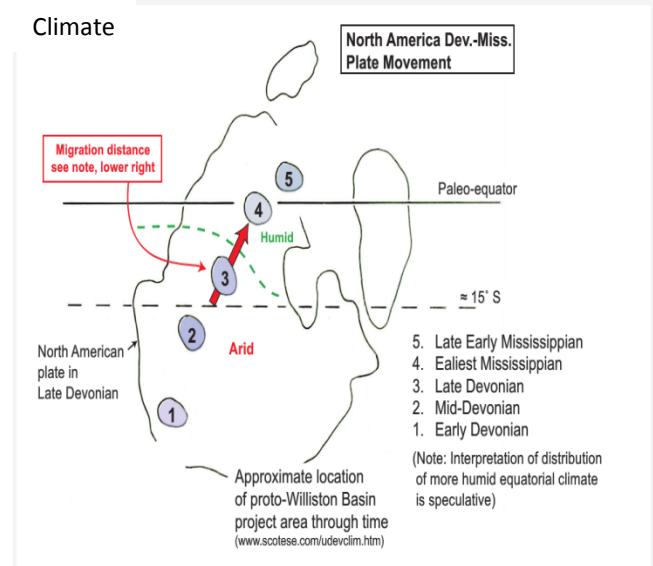
Source: After Blakey (2011)



Source: After Google Image

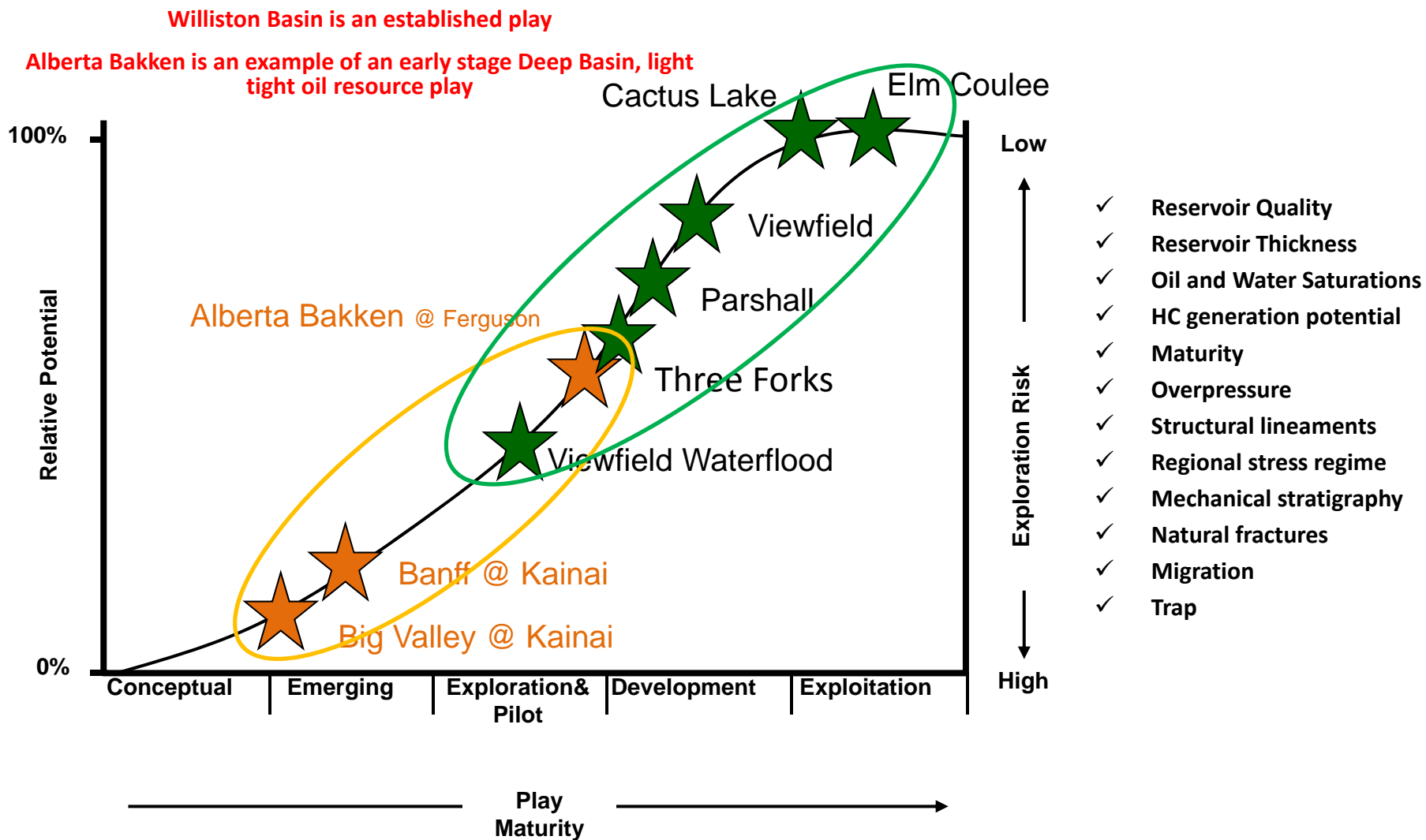


Source: After Blakey (2011)



Source: Canadian Discovery

Play Maturity Between the SAB and Williston Basin



Source: BMO Capital Markets

Acknowledgements

Blood First Nation-NARP/Kainai

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Christine Robertson

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Karen Brawley-Rodgers

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