Does a Good Outcrop Just Stand Out?

Pooling their resources, this team’s objective is to answer questions related to basinal tight reservoir facies abundant in Alberta and which hold potentially large oil & gas resources.

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Why Does This Matter?

Direct Data Analysis can put Prospect in Higher Confidence & Lower Risk Severity Quadrant

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Risk Analysis of Exploration Prospects

- **Risk Severity**
  - High
  - Moderate
  - Low

- **Confidence Level**
  - High
  - Moderate
  - Low

- **Data Quality**
  - Good
  - Lots
  - Poorest
  - Sparse

- **Data Quantity**
  - Poor
  - Sparse

- **Conclusions Interpreted from Data**
  - Bad News
  - Good News

Figure 19: Chance adequacy matrix.

Peter R. Rose, Risk Analysis and Management of Petroleum Ventures
Jurassic source rocks have been prolific in other parts of the world (Arabian/Iranian basin, Australian Northwest shelf, GOM, northern North Sea, Norwegian shelf, Papua basin, West Siberia, Yemen rift province and more).

WCSB Jurassic is recognized as an oil and gas source rock.

Why is there a paucity of known Jurassic sourced oil production?

Where is all the expected oil sitting?

Was oil expulsion inhibited by vertical and lateral barriers?

Can it be “entombed” in restricted basinal generative fairways?

Finding an appropriate outcrop now becomes much more relevant.
A Representative Outcrop?

Generic Basinal Jurassic Log Signature

A
B
C
Outcrop Data Gather and Analysis

- Provincial surface sampling permit acquired
- Outcrop Horizons A & C sampled at 75cm (approx.) spacing
- Middle Horizon B sampled at 30cm (approx.) spacing
- Calgary Rock & Materials made cuttings from portion of all outcrop samples
- Geo-Libre, Pro Geo, Calgary Rock & Materials teamed up & pooled expertise:
  - Outcrop analog concept & samples – Geo-Libre Inc.
  - Thin sections & XRD – Calgary Rock & Materials
  - Xrf profiling of outcrop powders – Pro Geo Lab & Analytics
  - Leco TOC & Rock-Eval outsourcing – Pro Geo Consultants
- Joint review – Are results adequate to support a Go-Forward Study?
Outcrop Data Compared to Basin Well Logs

Hot Shale GR > 175

Typically High TOC (4 -12%) In Upper C & Lower A Horizons

Lower GR & TOC across B Horizon

Low calculated SW
Outcrop Thin Sections

Generic Basinal Jurassic Log Signature

C
B
A

C
B
A
Outcrop Thin Sections - Horizon C

Horizon C - Organic Rich
Quartz 75% Dolomite 9%
Horizon B - Brittle Conduit
Dolomite 60% Quartz 23%
Outcrop Xrf

Sampling rate:
18 across C horizon (75cm approx.)
5 across B horizon A (30cm approx.)
22 across A horizon (75cm approx.)
• Tmax values (Rock Eval) suggest the outcrop has Metasomatic overprint

Metasomatic replacement occurs when a mineralizing solution encounters minerals unstable in its presence. The original mineral is dissolved and almost simultaneously exchanged for another along conduits through which hydrothermal solutions flowed

• Enrichment in Quartz across both Horizons A, B and C support hydrothermal alteration associated with Tmax values recorded

• TOC readings and sedimentary fabric signatures were preserved
Results Support Further Team Effort

- Geo-Libre, Pro Geo and Calgary Rock & Materials working on more in-depth outcrop samples analysis
- Outcrop analysis results significant in better understanding Jurassic source rocks
- Team intends to tie it back to specific oil-prone play fairway
- Results planned to be offered as client based report

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Thank You!

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