

Conventional Interpretation in an Unconventional Environment

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Summary

This paper will guide the listener through some of the interpretation processes and workflows used to identify the hydrocarbon potential of zones other than the target unconventional reservoir on a property in Central Alberta. As the technical geoscientist, your first job is to evaluate its hydrocarbon potential in the target unconventional horizon where numerous horizontal wells will hopefully be drilled. Your second job is to identify any drill hazards that may be encountered as part of the horizontal well program. But what about the other geological horizons that you may encounter on the way down to your target zone that aren't drilling hazards and what about the zones beneath your main target zone?. Integrated geology, geophysics, and engineering data will provide the basis for determining the presence of these conventional reservoirs. With support from the other project team members, these opportunities could be converted into reserves that will increase the profitability of the project area for your company or client and extend the lifetime of the surface assets.

Project Area Workflow:

This Case Study is located in Central Alberta where the main Unconventional zone is the Cardium sand. The typical drilling hazards are the depleted reservoirs of the Basal Belly River sands.

Once the Cardium has been evaluated, and/or between drilling seasons, the geoscience team can then spend some time evaluating the other conventional horizons. This is where the geoscientists, including geologists, geophysicists, and petrophysicists, review the other drilled wells in the project area that may impact the area's prospectivity.

Reviewing the land ownership situation for what rights are held by the employing company is the next critical step. This step includes the zones above and below the Unconventional Zone of Interest herein called the "UnZOI" for ownership, expiry dates, and lease structure.

Existing production is then evaluated in terms of the zone, current rates, pressures, surface facilities, and facility owners.

Reserves are then evaluated in terms of the zone, OOIP, OGIP, produced, and remaining reserves

Statistics are determined for each zone and the prospects are ranked and prioritized for each horizon. The most economic or the ones with the highest risk/reward potential are then recommended to senior management for drilling consideration.

Hopefully, there are some budgetary funds available and some of the prospects are drilled before the land expires.

Why would you go to all this effort? The answer lies in increasing the profitability of your existing assets and extending the life of your company's lands and facilities. This is especially important when new energy ideas using existing surface facilities and wells are coming to life every day.

Conventional Zones

In this project area, one conventional zone, the Basal Belly River was identified with some potential, above the Cardium. Seven other conventional zones, all with prospects of various sizes, were found below the Cardium in the SWS, Upper Mannville, Mid Mannville, Glauconite, Rock Creek/Nordeg, Wabamun, and Nisku.

This paper will provide some details on several of these conventional reservoir prospects that were found in the Project Area and imaged in recent 3D's.

Conventional Horizons

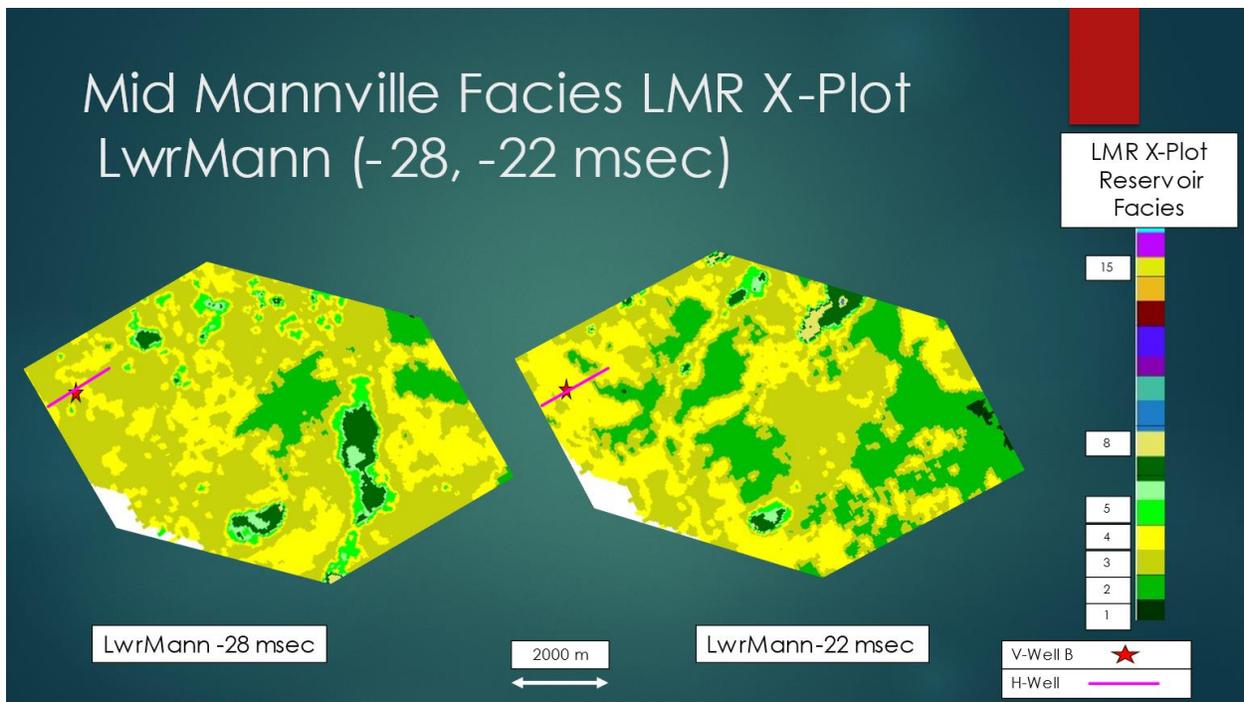


Figure 1. Illustrates the Mid Mannville facies as defined by the LMR Crossplot using well control on the Project Area 3D. A 2000m+ horizontal well passes by a vertical Well B which helps calibrate the reservoir facies for this zone.

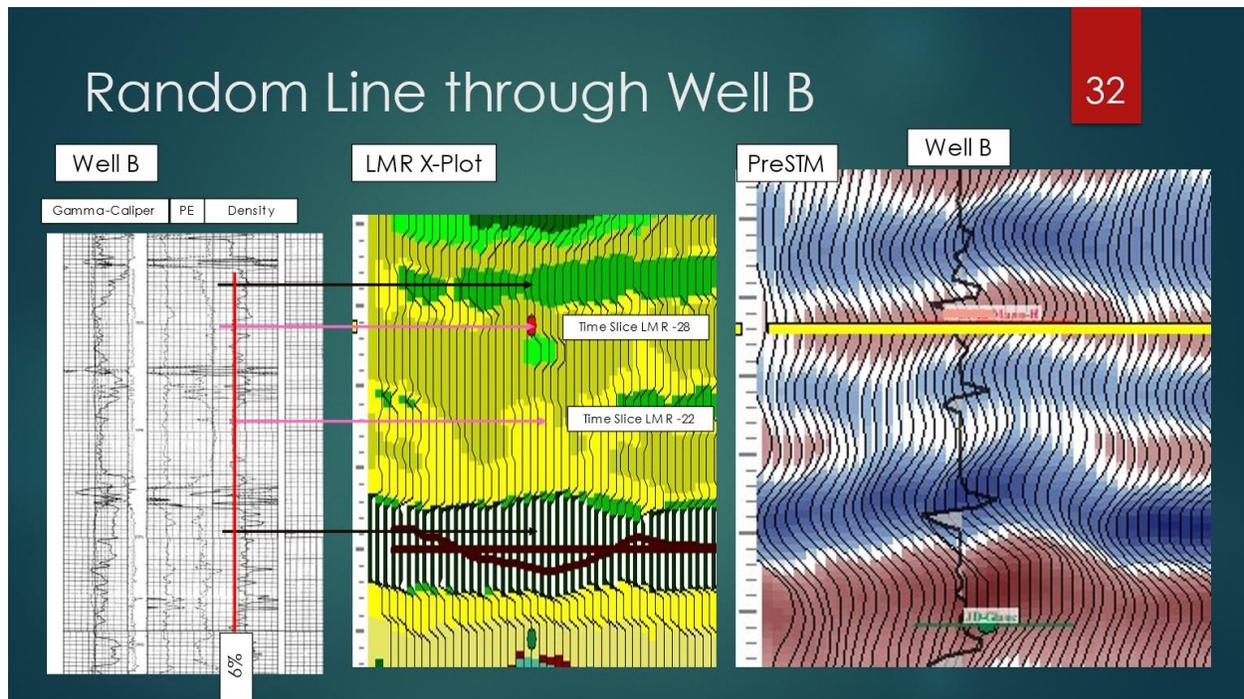


Figure 2. The Mid Mannville section of vertical Well B is shown on the left illustrating two lithic channels. The locations of the two Time Slices are shown in Pink on the LMR X-Plot section in the middle and a PreSTM section for the same random line is shown on the right. The LMR X-Plot section provides much more interpretive detail than the standard migrated time section allowing the geoscientists to make better reservoir facies maps, tied to well control, with confidence.

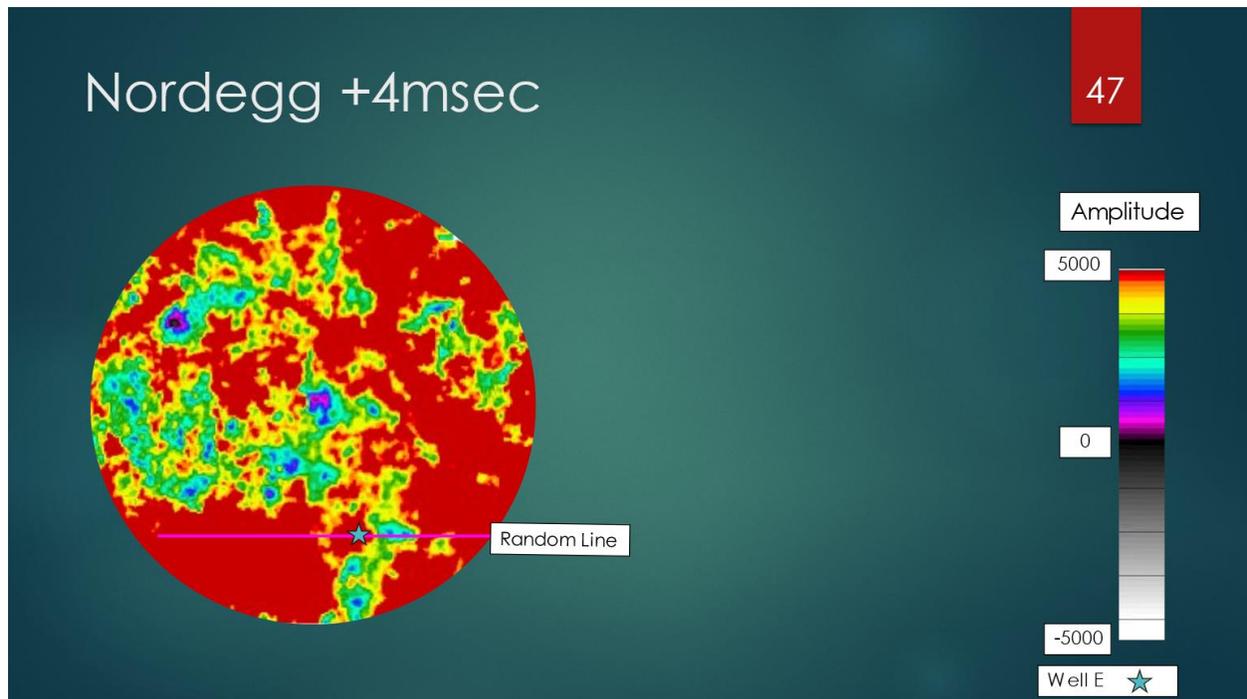


Figure 3. Shows a time slice 4 msec below the Nordegg time horizon and illustrates the facies change within the Nordegg that help define the edges of Nordegg gas pool encountered in Well E which has produced over 3.1 Bcf. Other Nordegg prospects can be found using this and other amplitude time slices.



Random Line through Well E

48

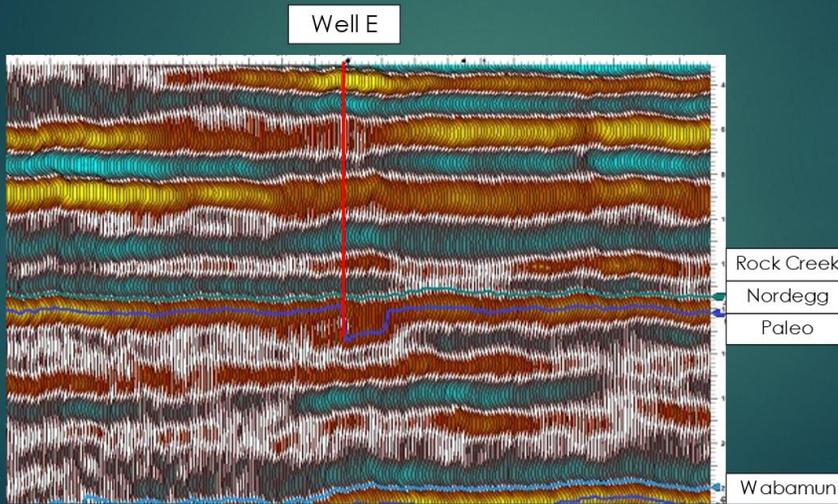


Figure 4. The Random line located in Figure 3 passes through Well E and illustrates the changes in structure and amplitude character at the Nordegg and Paleo levels.

Nisku Reef Anomaly Line 1

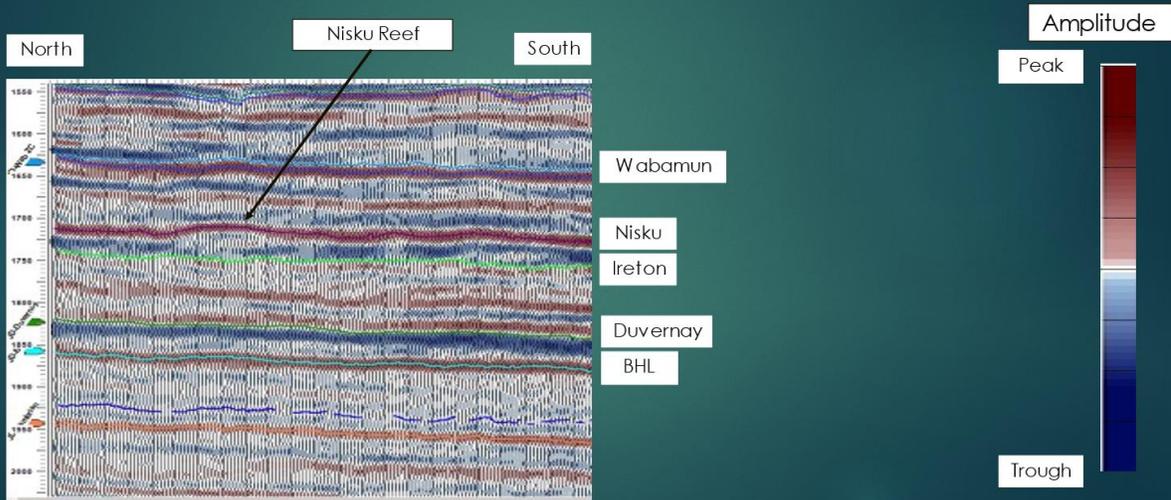


Figure 5. This Nisku reef anomaly was found on the Project Area 3D. It is a conventional exploration target, in Alberta, that has a huge potential for adding reserves but also has many other risks that need to be quantified through additional work before being drilled.

Conclusion

These are just some of the prospects that were found on this Project Area 3D. More will be shown in the presentation.

Evaluating all Conventional horizons on your company's 3D's could lead to significant upside potential under your existing surface facilities leading to extended life-of-field and increased profitability.

Acknowledgments

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