

Best Practices for the Construction of a Reserves Model for the Athabasca Oil Sands, Alberta, Canada

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Summary

Chevron Canada Resources Limited with consultants from Norwest Corporation recently completed a reserves study of the Athabasca Oil Sands Project (AOSP) in Alberta, Canada. As an unconventional surface mining oil sands operation, AOSP required the utilization of new methods and reserves classifications, which integrated into well established Chevron modeling procedures. This has resulted in a significant set of lessons learned for this type of resource modeling and uncertainty characterization.

Best practices from in-situ oilsands properties have similarities to those from mining. These lessons included the *first order importance of representative global property distribution* modeling and quantification of the associated distribution uncertainty. This was dealt with through the application of declustering and spatial bootstrap. *Facies were grouped based on a statistical study of their respective reservoir property distributions.* This maximizes the interpretability and information content of facies for the purpose of building reservoir property models. 3D facies proportions modeling from different sets of information and geostatistical mapping can enhance the integrated bitumen resource assessment efforts through better integration of drill holes and geologic knowledge.

In addition, there was a need to integrate drill holes without facies assignments. Soft data calibration and integration through the indicator formulation allowed for the *utilization of all available data.* Efforts were made to *test the implicit modeling assumptions* in a by-facies geostatistical workflow. Contact profiles were calculated to ensure that the systematic discontinuity in reservoir properties across facies boundaries were in agreement with available data. It was important to test a model feature that may have had a significant impact on the assignment of selective mining blocks (SME). The result was the efficient construction of a defensible geologic model that incorporated all available information and provided reliable resource estimation.