

On Relationship between Spatial Continuity and the Average Grade in Ore post Ore-Waste Discrimination

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Abstract

The Joslyn North Mine Project is located approximately 65 kilometers north of Fort McMurray on the Joslyn Lease. The project is currently in the pre-development stage and covers an area of more than 221 square kilometers.

The oil sands bitumen resources of the North Joslyn Mine Project are deposited in the Lower Cretaceous McMurray Formation of the Mannville Group. This formation consists of clastic sediments and is informally split into Lower, Middle, and Upper Units. Bitumen saturated facies within each unit generally comprises clean porous sands. In particular, the Lower McMurray unit consist of basal coarse to medium-grained fluvial channel sand deposits. The Middle McMurray unit includes a combination of thick tidal or estuarine channel sands and tidal flat deposits. The channel sands tend to fine to medium-grained. The Upper McMurray unit comprises very fine-grained sands which oftentimes are inter-bedded with clays. The two main reservoir units are Middle and Lower McMurray.

To describe the North Joslyn Mine bitumen oil sands resource, its composition and the bitumen in place there is significant amount of data available. This data comes from close to 800 cored wells with information on facies, bitumen grade, particle size distribution (psd), methylene blue index, etc. The well spacing ranges from 100 to 400 meters. The data on facies and bitumen grade are very densely sampled with average core sample size of meters. Despite of the dense well information and there is still a significant local uncertainty. Moreover, there exists an important relationship in-between spatial/geological continuity (characterized by variogram structure) and the average grade in ore post ore-waste discrimination. In this talk, we summarize this relationship and make recommendations on establishing low/base/high grade cases for mining engineering studies.

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