

Gold grade estimation using alteration based indicator kriging at Gwalia Mine, Western Australia

F.J. Maturana¹, C. Browne²

Note: Presenting author's name should be underlined.

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Resource Geology Superintendent, St Barbara Limited, Leonora 6438. Email:
Francisco.maturana@stbarbara.com.au

2.

Senior Resource Geologist, Sandfire Resources NL, Perth 6000. Email:
Callum.Browne@sandfire.com.au

ABSTRACT

Gwalia Gold Mine is located 3km south of Leonora in the north-eastern goldfields of Western Australia. Historically, gold grade Gwalia has been estimated using ordinary kriging. This approach requires the definition of hard-boundaries to properly constrain mineralisation zones to ensure a practical degree of stationarity. The process is highly subjective and imposes continuity on mineralisation that is not supported by geological evidence and consequently leads to poor local reconciliation and problematic short term mine planning. Throughout the Gwalia orebody, there is a well-established direct relationship between alteration type, veining and gold. Indicator kriging appeared as an attractive alternative for this style of mineralisation. Consequently, Indicator kriging was applied to the South West Branch lode based on the detailed logging of alteration and veining types. Results from this process are highly consistent with geological observations and have resulted in improved reconciliation. The main advantage of this approach is the elimination of internal hard-boundaries imposing an artificial continuity of mineralisation. Indicator kriging does not rely on arbitrary interpretations (straight lines over several meters), but uses probabilities based on an underlying geology model highlighting the critical importance of soundly based observations by Mine Geologists.