Changing Face Mapping Paradigms; A Study of Dales Gorge Shale Bands Across Pilbara Iron Ore Deposits

Lance Karlson[*]

Short Term Geological Modelling, BHP Billiton Iron Ore, PO Box 655, Newman WA 6753

*E-mail, lance.karlson@bhpbilliton.com

Face mapping within BHP Billiton's iron ore deposits adds significant value to geological models; however, the confidence placed in stratigraphic interpretation within these maps has traditionally been low. In the case of the Dales Gorge Member of the Brockman Iron Formation this lack of confidence involves the identification of shale bands that divide the Member into four key units. The prevailing paradigm within the literature is that these shale bands have variable colors, bedding features, and chemistry between pits, and that accurate identification is only possible using downhole gamma logs. This study has shown that in the Newman area this is not the case, and that equivalent shale bands across four separate orebodies present remarkably consistent physical and chemical characteristics. Comprehensive documentation of these characteristics has allowed mine geologists to confidently identify singular shale bands within structurally complex walls and in turn enhance the performance of geological models. In many cases this identification has proven more reliable than downhole gamma logs.

This study involved the identification and photography of individual shale bands within large exposures of the Dales Gorge Member at mine sites across Western Australian Iron Ore. A chemical database of 1,075 RC and diamond drill hole assays was also created using gamma logs to choose samples that corresponded with individual shale bands. Ternary plots of the database revealed potentially diagnostic chemical trends that have since been used to aid the interpretation of shale bands from assay results.

It is suggested that the methods used in this study can be repeated across other deposits and for different stratigraphy, with the knowledge that enhanced face mapping leads to improved geological models, which in turn support more effective mine planning.