Downhole Assays in the Pilbara

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ABSTRACT

Pulsed neutron wireline tools were introduced to the Australian iron ore industry in 2012 to deliver "downhole assays" and since then, the technology has developed into a reliable and efficient means of supplementing and even replacing traditional assay analysis. Not only are there safety benefits through reduced site exposure, but the technology allows for better sample resolution and near-real-time results. The cost savings can be significant, with some companies stating that downhole assays are currently saving them ten million dollars a year compared to conventional methods.

Not only can the technology be used to grade iron ore at the site, but it can also measure percentages of minor elements such as silicon, aluminium, copper, nickel, titanium, manganese, magnesium, calcium, phosphorus, sulphur and sodium, as well as hydrogen, oxygen, chlorine, and carbon. They can also measure proxies for LOI. The sampling resolution is generally 10-20 cm - considerably higher than the typical 2 metre sampling used in conventional assay in the Pilbara, allowing for less assumptions about minor element distribution. The depth of investigation approximately 30-50 cm which also gives a more representative sample.

This presentation will begin with a description of pulsed fast and thermal neutron activation technology as implemented in the downhole assay environment, paying attention to the calibration methods. Then, a case study will be presented in detail, discussing the data acquisition and calibration programme. The results of the downhole assay compared to traditional assay will be discussed, considering the pros and cons of each method. Operation experiences will be related, pointing toward future improvements and optimisation.