Redefining the battery limits of processing plants – improving Sustainability through the deployment of sensing technologies

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ABSTRACT

The role of separating ore from waste in an open pit mine is typically the realm of the production geologist who applies grade control to delineate ore from waste. The resolution of the grade control pattern is much coarser than the mining equipment used to recover and transport blasted ore to the mill or waste dump. This residual heterogeneity presents a unique prospect to initiate separation at the excavation front by means of real-time grade estimation for each shovel scoop. By doing so, shovel scoops or trucks below economic cut-off grade can be diverted to waste-dumps and similarly ore grade material can be directed from waste to the mill.

Once ore is introduced into the process, other sensing systems such as belt scanners are also useful tools in feed-forward control to the process plant. Presently, these innovations in on-line measurement are yet to become a standard piece of processing equipment, unlike their on-stream analyser counterparts which have gained widespread adoption.

At Red Chris, an XRF based ShovelSense® system has been successfully trialled and integrated into the fleet management system to take minerals processing to the mine face. In addition to the shovel mounted sensor, a PGNAA based belt scanner has also been installed post crushing to measure additional ore properties ahead of the mill. This sensor allows the realisation of real-time geometallurgical model outcomes in the form of estimated ore hardness as well as forecasting tailing neutralisation potential.