

# **Back to basics – a practical approach to troubleshooting plant recovery/grade issues in the Mt Isa Copper Concentrator**

Cathy Evans<sup>1</sup>, Roxanne O'Donnell<sup>2</sup>

1 The University of Queensland, Sustainable Minerals Institute, W.H. Bryan Mining and Geology Research Centre, 40 Isles Road, Indooroopilly, Brisbane, Qld 4068, Australia

2 Copper Concentrator, Mount Isa Mines, Mt Isa, QLD 4825

Email addresses: [c.evans@uq.edu.au](mailto:c.evans@uq.edu.au), [Roxanne.ODonnell@glencore.com.au](mailto:Roxanne.ODonnell@glencore.com.au)

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## **Abstract**

Like many operations, the Mt Isa Copper Concentrator occasionally has operational periods when it is difficult to achieve target grade and/or recovery, often due to feed ore type changes. At times like these it is useful for metallurgists to have a suite of tools that they can use to quickly diagnose the problem or at least eliminate some potential causes. This paper describes an investigation in the Mt Isa Copper concentrator to identify the potential cause of periods where grade or recovery was below target values. The strategy used applied a sequence of steps, starting with fast turnaround analyses that could be done on site and only moving to more intensive analyses with longer turnaround times if these were needed to identify the cause. The analyses used shift samples from the inventory samplers – Head, Final Concentrate and Final Tail - as the basis for the investigation as these were readily available and represented known periods of operational performance. The samples were sized, the size fractions assayed and the elemental compositions converted to mineral content (chalcopyrite, iron sulphides, non-sulphide gangue) using a standard element-to-mineral conversion method. Comparing the mineral recovery by size performance of the plant with baseline data from a previous plant survey identified much higher recovery of fine iron sulphides as the major difference. The assumption that these fine iron sulphides were liberated was confirmed by MLA analysis. The reason for higher recoveries of the fine liberated iron sulphides was identified using a simple laboratory batch flotation test which showed that the problematic ores have a high proportion of naturally-floating iron sulphides which, once recovered in the roughers, are difficult to depress from Final Concentrate. The main steps of the diagnostic approach can be performed on site, providing metallurgists with fast turnaround options to troubleshoot future problems.