

# Metallurgical improvements at Northparkes Concentrator through the application of high chrome grinding media

*C J Greet<sup>1</sup>, J Davis<sup>2</sup>, G Small<sup>3</sup> and X du Toit<sup>4</sup>*

1.FAusIMM(CP), Manager Minerals Processing Research, Magotteaux Australia Pty Ltd, Mansfield Park SA 5012, Australia. Email: Christopher.greet@magotteaux.com

2.Senior Metallurgist, Northparkes Mines, Parkes NSW 2870, Australia. Email: jim.davis@northparkes.com

3.MAusIMM, Manager Metallurgy - Development, Magotteaux Australia Pty Ltd, Mansfield Park SA 5012, Australia. Email: grant.small@magotteaux.com

4.Sales Engineer, Magotteaux Australia Pty Ltd, West Perth, WA 6005, Australia. Email: Xavier.dutoit@magotteaux.com

## ABSTRACT

Laboratory test work completed on samples of Northparkes ore indicated that shifting from forged steel to more inert high chrome grinding media produced a more oxidising pulp potential and reduced the EDTA extractable iron due to the improved corrosion resistance. These changes in pulp chemistry were responsible for a significant increase in copper and gold recovery.

Based on these results a plant trial was completed. Pulp chemistry surveys of the plant before and after purging the mill of forged steel again showed that the transition to high chrome grinding media resulted in the pulp potentials becoming more oxidising and the EDTA extractable iron reducing. A statistical analysis of the copper and gold recoveries showed that this change in grinding chemistry saw increases of at least 1.0 and 1.3 percent, respectively. It was also noted that the final copper concentrate grade improved by at least 0.7 percent.

Examination of monthly composite data on a recovery-by-size basis showed that the improvement in copper recovery when using high chrome grinding media occurred in the intermediate (-90+10 micron) size fractions. The main losses from the circuit occurred in the coarse (+90 micron) and fine (-10 micron) size fractions for both grinding media types. The liberation data indicated that the higher recoveries for high chrome appear to be related to increased recoveries of coarse composite particles, while the improved copper concentrate grade can be attributed to better selectivity against pyrite.

This paper describes both the laboratory and plant trial methodologies employed at Northparkes and relates the improvements to the changes on a recovery-by-size and liberation-by-size as well as on a mineral class basis.