

# Application of a net smelter return model within a polymetallic base metal processing plant

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## ABSTRACT

Rosebery Mine is an underground polymetallic base metal mine which has been in continual operation since 1936. Whilst Rosebery owes much of its success to the diversity of payable metals produced in four products, this complexity in itself creates challenges when trying to maximise throughput, recovery or value.

This challenge is not new to the mining industry and has been managed during the exploration, evaluation and production phases of mining through the application of a net smelter return (NSR) model. NSR is defined as the revenue from the sale of products after deducting non payables, treatment charges, refining charges, penalties, freight and royalties. In combination with a cut-off grade, the NSR allows the mining team to decide if a block of ore is profitable or not to mine. Unfortunately this is where application of NSR along the value chain often stops.

Operational key performance indicators and budget targets at Rosebery Mine have previously focused on production of zinc metal in the zinc concentrate, with other metals treated as by-products. There was less attention on the value and product the rest of the metals were recovered to. As a result the operational and metallurgical tactics, focused on maximising zinc metal in zinc concentrate, were at times unintentionally redirecting efforts away from cash generating opportunities. Through the awareness of NSR both the operational and metallurgical teams can set priorities which maximise the value from the ore.

This paper will describe how value was maximised for Rosebery through application of the NSR concept. An average increase in NSR of 4.6% or ~\$12.29/t was attributed to application of the described methods. In addition this paper will discuss the benefits and potential pitfalls of alternative approaches to NSR. These include focus on the metal in concentrate with the greatest contribution to site revenue, which is the simplest approach, or zinc equivalent production.