

# GRINDING CIRCUIT EXPANSION AND OPTIMISATION AT THE B2GOLD MASBATE PROJECT, PHILIPPINES

*A. Insalada<sup>1</sup>, K. Bartholomew<sup>2</sup>, A.J. Marcera<sup>3</sup>, E. Occena<sup>4</sup>, M. Anghag<sup>5</sup>, D. Torres<sup>6</sup>, N. Avenido<sup>7</sup>, J. Rajala<sup>8</sup>, R.E. McIvor<sup>9</sup>*

1. Metallurgical Superintendent, Phil. Gold Processing and Refining Corp., Puro, Aroroy, Masbate 5414, Philippines. Email: Aileen.Insalada@pgprc.com.ph
2. Sr. Metallurgist, Metcom Technologies, Inc, Grand Rapids, Minnesota, USA 55744. Email: kyle@metcomtech.com
3. Sr. Metallurgist, Phil. Gold Processing and Refining Corp., Puro, Aroroy, Masbate 5414, Philippines. Email: alexanderjethro.marcera@pgprc.com.ph
4. AVP – Process Plant, Phil. Gold Processing and Refining Corp., Puro, Aroroy, Masbate 5414, Philippines. Email: Eugene.Occena@pgprc.com.ph
5. Mill Operations Superintendent, Phil. Gold Processing and Refining Corp., Puro, Aroroy, Masbate 5414, Philippines. Email: Mario.Anghag@pgprc.com.ph
6. Mill Operations Manager, Phil. Gold Processing and Refining Corp., Puro, Aroroy, Masbate 5414, Philippines. Email: Dennis.Torres@pgprc.com.ph
7. Chief Metallurgist, B2Gold Corporation, Vancouver, British Columbia, Canada V6C 2X8 Email: navenido@b2gold.com
8. VP Metallurgy, B2Gold Corporation, Vancouver, British Columbia, Canada V6C 2X8 Email: jrajala@b2gold.com
9. Chief Metallurgist, Metcom Technologies, Inc., Grand Rapids, Minnesota USA 55744. Email: rob@metcomtech.com

Keywords: Comminution, Functional Performance, Plant Expansion, Optimisation

## ABSTRACT

B2Gold acquired the Masbate Mine, located on Masbate Island, Philippines, through a merger of CGA Mining Limited in January 2013. The deposit is mined by open cut, and current ore processed is a combination of historically stockpiled, low-grade, oxidised material and freshly mined sulphide ore. The comminution circuit consists of a 9.75 m diameter by 3.62 m, 8.5 MW SAG mill followed by 9.6 MW of secondary ball milling. SAG pebble crushing and a three-stage supplementary crushing plant are also used in the grinding circuit. Gold recovery is achieved via a conventional leach/CIP plant. A plant expansion, which included the addition of a third ball mill and crushing circuit upgrades, was commissioned in 2019 to enable an increase from 6.5 Mtpa to 8.0 Mtpa. In 2023 a detailed grinding circuit survey was conducted by the site metallurgical team, with guidance from Metcom Technologies, Inc., to benchmark circuit performance and identify process optimisation opportunities. Bond Work Index analysis was used to benchmark circuit efficiency, and Functional Performance Analysis was used to identify specific performance improvement opportunities in Classification System Efficiency (CSE) and Ball Mill Grinding Efficiency. Drop-weight and rotary mill-based comminution tests were conducted on the 2.4 metric ton SAG feed sample which was

collected as a composite before and after the slurry samples were collected. Optimal grind size targeting was achieved via grind vs. gold recovery laboratory tests on the same SAG feed composite in combination with the results of the grinding survey. This paper describes the detailed, systematic approach utilised in both the plant expansion design process and comminution circuit optimisation.