

Pokrovskiy pressure oxidation (POX) Hub – from laboratory to commercial production

T. Haakana¹, P. Zaytsev² and Y. Shneerson³, M. Klementiev⁴, V. Fedorov⁵, A. Zavaliuev⁶, E. Kudrin⁷, A. Afanasiev⁸, T. Karjalainen⁹, K. Lillkung¹⁰

1.
Technology Manager, Outotec (Finland) Oy, 02230 Espoo. Email: timo.haakana@outotec.com
2.
Head of Sci-Tech Department, SRC Hydrometallurgy, St Petersburg. Email: peter.zaytsev@gidrometall.ru
3.
Managing Director, SRC Hydrometallurgy, St Petersburg. Email: ims@gidrometall.ru
4.
Deputy General Director, SRC Hydrometallurgy, St Petersburg. Email: klement@gidrometall.ru
5.
Head of Research and Development, Petropavlovsk, Moscow. Email: fedorov-v@pokrmine.ru
6.
Production Director of the POX Hub, Petropavlovsk, Pokrovskiy mine. Email: zavaluev-a@pokrmine.ru
7.
Technical Director of the POX Hub, Petropavlovsk, Pokrovskiy mine. Email: kudrin-e@pokrmine.ru
8.
Head of the POX Hub, Petropavlovsk, Pokrovskiy mine. Email: afanasiev-a@pokrmine.ru
9.
Project Manager, Outotec (Finland) Oy, 02230 Espoo. Email: teemu.karjalainen@outotec.com
10.
Technology Manager, Outotec (Finland) Oy, 02230 Espoo. Email: kristian.lillkung@outotec.com

ABSTRACT

Petropavlovsk is one of the largest gold producers in Russia with assets located in Amur region, the Far East. Company has four mines, namely Pokrovskiy, Pioneer, Malomir and Albyn. Today a significant amount of Petropavlovsk's resources and reserves is classified as refractory. Petropavlovsk has been developing the POX Hub at Pokrovskiy mine, which has now reached the end of its operational life.

To support the pressure oxidation project development and to secure a successful project implementation, Petropavlovsk build a state-of-the-art R&D center (SRC Hydrometallurgy) in St Petersburg in 2008 and a continuous POX pilot plant was completed in Blagoveshchensk in 2011. The extensive batch test campaigns were conducted in St Petersburg laboratory to find the optimal process conditions and the pressure oxidation flowsheet for different ore types.

A detailed mathematical model of the pressure oxidation process was developed by SRC Hydrometallurgy to facilitate the optimal pressure oxidation design. Process performance was confirmed, and the model was validated with pilot scale experiments on Blagoveshchensk pilot plant. The data generated by Petropavlovsk formed a solid basis for the scale-up and plant design.

Basic and detail engineering for the Pokrovskiy pressure oxidation circuit and for the Malomir and Pioneer flotation circuits was done by Outotec. Besides the engineering, Outotec supplied all major equipment for Pokrovskiy POX Hub and Malomir concentrator plant. Construction was managed by Petropavlovsk and Outotec provided the installation and commissioning services.

Petropavlovsk has successfully developed the Pokrovskiy pressure oxidation Hub to the commercial production together with a Finnish technology provider Outotec. The selected systematic approach for the research and project development from the laboratory to the commercial operation is described including all the major stages from the early stage technology evaluation to the start-up of the Pokrovskiy POX plant. The predicted versus the actual plant performance is presented and discussed in detail.