



Taganito HPAL Plant Project



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ABSTRACT

This paper will present Commissioning and Operation Status of Taganito HPAL Plant Project in the Philippines. The Project will produce 30,000 Ni-tons and 2600 Co-tons per year as Mixed (Ni/Co) Sulfide for export to Sumitomo Metal Mining Co., Ltd. (SMM) Nickel Refinery in Japan as its raw material. The plant is designed taking into consideration the improvements, technical data and operation know-how gained from the successful operation of Coral Bay Nickel Corporation (CBNC) in the Philippines, the sister company of Taganito HPAL Nickel Corporation (THPAL). The Plant Commissioning was completed in June 2014 and reached monthly production corresponding to its nameplate capacity in August 2014. After that, the operation has been stable. This paper will also discuss nickel leaching and removal performance of iron and aluminum in the autoclave at elevated temperatures for more efficient HPAL operation.

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1. Introduction

The objective of Taganito HPAL Project is to produce 30,000 MT of nickel and 2600 MT of cobalt as sulfide with treatment of nickel laterite ore in the Philippines and to export to SMM Nickel Refinery in Japan as raw material for 30-years. In other words, 1.15 wt% of nickel content in ore is finally upgraded up to 99.99 wt% in electrolytic nickel. THPAL was founded in August 2008 and became a joint venture of three (3) companies namely, Mitsui Corporation, Nickel Asia Corporation (NAC) and SMM with a controlling stake of 62.5%. Aside from its capital share, Taganito Mining Corporation (TMC), under the control of Nickel Asia Corporation supplies the ore for the HPAL Plant located in Taganito, Claver, Mindanao, Philippines (Fig. 1). The product of this plant, Mixed (Ni/Co) Sulfide is shipped to the SMM's Nickel Refinery in Japan. SMM provides HPAL technology and manpower for management of THPAL operation. Fig. 2 below illustrates this relationship.

2. THPAL Project

2.1. Project history

In year 2007, SMM started the bankable feasibility study for this project. In August 2008, THPAL was incorporated and the Engineering, Procurement and Construction (EPC) contract was awarded to

a Joint Venture consisting of JGC Corporation (JGC) and Chiyoda Corporation in 2009, then construction of the HPAL Plant was started in November 2010. Mechanical Completion was achieved and plant commissioning was started in June 2013 although construction was suspended for some period due to deterioration of public security in the project area. The plant was inaugurated in September 4, 2013. Finally, after maintaining more than 80% of operation load for two consecutive months, Completion of Work (COW) was declared in June 2014.

In terms of plant design, 2-train system is applied for HPAL circuit with consideration on reliability of the process, facility. Generally the technical data, operation know-how and improvements gained in the successful operation of CBNC were reflected in THPAL Plant design. As for the H₂S Plant, more economical design was considered, different from CBNC. Furthermore, the continuous HPAL pilot test and large scale test with 40,000 WMT of ore were conducted in 2008 and 2010 respectively to reconfirm the reliability of the process and the equipment design.

To help ensure the success of this project, commissioning team was organized. Some cadet engineers and operators were sent to CBNC to study actual HPAL operations to develop necessary skills and knowledge to commission the plant. CBNC also provided manpower support to lead the THPAL commissioning and operation.

2.2. THPAL Process flow sheet

The mined ores of TMC are delivered by trucks to THPAL Plant site and then are processed to produce Mixed (Ni/Co) Sulfides

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Fig. 1. THPAL Project location.

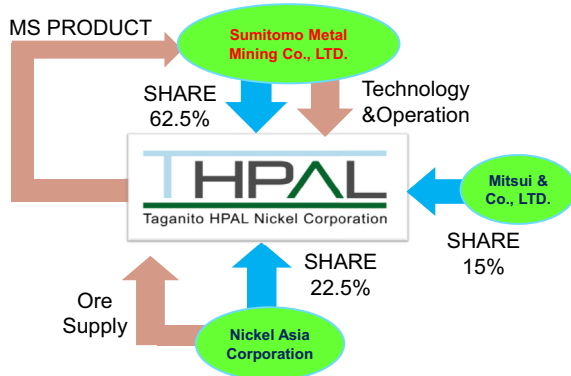


Fig. 2. THPAL shareholders profile.

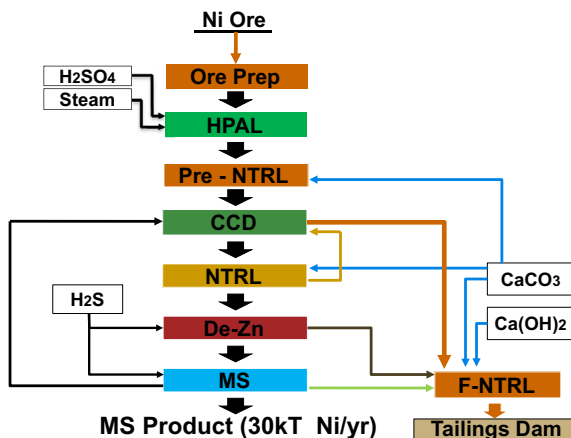


Fig. 3. Taganito HPAL Plant Process flow sheet.

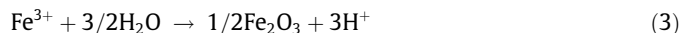
and sent to Nickel Refinery in Japan. Fig. 3 shows the Flow Sheet of the THPAL Process. Each major process circuit is briefly explained below:

2.2.1. Ore preparation circuit

Laterite ores are wet-screened in this circuit and transferred to thickener to thicken ore to around 40 wt% solids as slurry.

2.2.2. High pressure acid leach

The Ore slurry is pre-heated up to 200 °C before pumping to the autoclave. Using 98 wt% H₂SO₄, the leaching reactions represented below are carried out at 240–250 °C.



The exiting leach slurry is de-pressurized by a series of 3 flash tanks and sent to Pre-Neutralization Circuit. The recovered steam from the flash tanks is recycled back to the pre-heaters to heat the ore slurry prior to injection to the autoclave.

2.2.3. Pre-neutralization

The Leach slurry of about 50 gpl free acid concentration is neutralized at pH 2–3 by using limestone slurry, and then sent to Counter Current Decantation circuit for residue washing.

2.2.4. Counter Current Decantation (CCD)

Thickeners are used in this circuit to wash the leached slurry with Barren Liquor containing low nickel concentration from Sul-fidization Circuit. The resulting Pregnant Liquor overflow is sent to Neutralization circuit. The thickened solids of about 50 wt% solids are sent to Final Neutralization circuit for treatment prior to disposal to Tailings Dam.

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