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BENEFICIATION PILOTING SUCCESSFULLY COMPLETED

HIGHLIGHTS

- **Beneficiation continuous pilot plant testing has successfully validated the simple and effective flowsheet of Yangibana flotation process**
- **The pilot operation confirmed 70% TREO recovery at a final concentrate grade of 23% TREO.**
- **Ongoing improvement through optimised flotation circuit chemistry to further improve recovery to >80% at a higher TREO grade.**
- **Clear indication of progress from bench scale to commercial production.**
- **Successfully generated bulk samples for downstream engineering equipment design testwork**
- **Generated concentrate for next stage Hydrometallurgy pilot plant operation scheduled in March**

Hastings Technology Metals Limited ("**Hastings**" or "**the Company**") has successfully completed the crucial continuous beneficiation pilot plant for the Yangibana Nd-Pr Rare Earth project.

The Yangibana Nd-Pr Rare Earth project is located in the Gascoyne region of Western Australia. The Company plans to construct a processing plant to produce a Mixed RE Carbonate product, through the process of mining, beneficiation and hydrometallurgy. This beneficiation continuous pilot plant is the first step in pilot testing of the Yangibana Nd-Pr process flowsheet.

Pilot Plant Summary

The simple and effective flowsheet developed in the laboratory testwork program has been translated into a 150kg/hr pilot processing circuit, operating 24 hours per day continuously over 8 days (5 days plus 3 days after a weekend shutdown) at ALS Metallurgy in Perth. The flowsheet consisted of milling, rougher flotation, regrind and cleaner flotation stages.

The flotation circuit selectively concentrates the rare earths-bearing mineral monazite into a final product that is less than 5% of the initial mass. The upgrade of TREO content from the run of mine (ROM) ore to final product is 18 to 20 times. Once fully commissioned, the pilot plant circuit confirmed laboratory performance at 70%TREO recovery to a 23% TREO concentrate grade (9.8%Nd_2O_3+Pr_6O_{11}). Average concentrate grade produced during the full pilot operation was 25% TREO.

The flotation circuit uses commercially and readily available flotation cell equipment and chemical reagents.

Figure 1 Flotation Pilot Plant Operation at ALS Metallurgy, Perth

Figure 2: Close-up of Monazite Flotation

Figure 3: Final flotation concentrate

Specialist equipment vendors also attended the pilot operation to test the thickening and filtration performance of the concentrate and tailings and assess applicability to the engineering design. Work is continuing with other process equipment vendors. Data collected from this work will be incorporated into the detailed engineering study.

As well as gaining operational insight from the 24-hour per day continuous operation the following samples were collected:

- Full circuit metallurgical survey samples for validation of scale-up from laboratory results
- Bulk samples for engineering design testwork, e.g. regrind mill sizing, thickener sizing, product filter sizing, tailing storage facility design and materials handling characterisation.
- Final flotation concentrate, which will be used as feed for the upcoming hydrometallurgical pilot plant.

The results will feed into the current engineering study and detailed design phase of the project.

The concentrate produced from the beneficiation pilot plant will be further processed, on a continuous basis, in the hydrometallurgical pilot plant, in March and April 2017.

Ongoing improvement testwork

Further improvement testwork for the beneficiation circuit has been progressing in parallel to the pilot plant operation. Results indicate that, with minor modifications to the flotation circuit chemistry, compared to conditions that were used in the pilot plant, recovery can be further improved and concentrate grade increased.

Table 1 Beneficiation testwork program results

Project Stage	Feed Grade	Mass Recovery	TREO Recovery	Concentrate Grade	Upgrade
Lab test prior to pilot plant	1.2% TREO	3%	70%	24% TREO	20
Pilot Plant survey	1.2% TREO	4%	70%	23% TREO	18

TERMINOLOGY USED IN THIS REPORT

Total Rare Earths Oxides, TREO, is the sum of the oxides of the light rare earth elements lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), and samarium (Sm) and the heavy rare earth elements europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), lutetium (Lu), and yttrium (Y).

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About Hastings Technology Metals

- Hastings Technology Metals is a leading Australian rare earths company, with two rare earths projects hosting JORC-compliant resources in Western Australia.
- The Yangibana Project hosts JORC Resources totalling 13.41 million tonnes at 1.18% TREO (comprising Measured Resources of 2.16 million tonnes at 1.01% TREO, Indicated Resources of 5.45 million tonnes at 1.30% TREO and Inferred Resources of 5.81 million tonnes at 1.12% TREO), including 0.39% Nd_2O_3+Pr_6O_{11}.
- The Brockman deposit contains JORC Indicated and Inferred Resources totalling 41.4 million tonnes (comprising 32.3mt Indicated Resources and 9.1mt Inferred Resources) at 0.21% TREO, including 0.18% HREO, plus 0.36% Nb_2O_5 and 0.90% ZrO_2.
- Rare earths are critical to a wide variety of current and new technologies, including smart phones, hybrid cars, wind turbines and energy efficient light bulbs.
- The Company aims to capitalise on the strong demand for critical rare earths created by expanding new technologies.