

Ruotevare Iron Ore Deposit Metallurgical Tests Update

Highlights:

- Bench scale metallurgical tests validate the previously confirmed reduction technique process
- Final high grade product of sponge iron containing 90% iron and 1.5% titanium
- Metallurgical test results acceptable to potential international clients
- Tests ongoing to further optimise the process of sponge iron production
- New tests commenced for the possible production of high grade pellet feed

Beowulf (AIM: BEM; Aktietorget: BEO), the AIM and Aktietorget traded mineral exploration company which owns several exploration projects in Sweden, is pleased to announce that the Company has recently received the initial results of ongoing metallurgical tests, at bench scale, of ore grade material from its 100%-owned Ruotevare iron ore deposit in Northern Sweden. The tests were carried out by MINPRO AB's research laboratory at Stråssa, Central Sweden.

Based on large samples (>50 kg) from the outcropping ore, the tests serve to further validate and optimise the previously confirmed process using reduction techniques in a laboratory scale mechanical oven. The process fully extracts the iron, titanium and vanadium from the Ruotevare titanium-magnetite ore.

Working on crushed and milled Ruotevare ore material the tests show that a final product of high grade sponge iron powder containing up to 90% iron (Fe) with 1.5% titanium (Ti) is obtained. The initial grades of Fe 52.1% and TiO₂ 11.4% from the milled ore material studied compare very favourably with the historic study carried out in the 1970s by the Geological Survey of Sweden showing Fe 53% and TiO₂ 12.3%.

Although not analysed on this occasion, but noted in earlier reports, the levels of other metals and of phosphorous and sulphur are low.

The process

The present study of large samples shows that the technique developed is valid, whereby subjecting the milled material to sub-melting temperatures will reduce all of the iron that is not bonded to ilmenite, and by a subsequent magnetic separation technique, yield a sponge iron powder with high iron content and high metallisation level. By using petroleum coke as a reducing agent and adding soda, high metallisation levels have been achieved at 7750 C.

Subsequent reduction tests show that, by adding a chloride (Na-, Ca- and Fe- chloride respectively have been tested) a segregation is obtained with high selectivity towards both ilmenite and vanadium.

The present tests produced a sponge iron powder with a grade of 90% Fe, 1.4% Ti and less than 0.02% Vanadium (V), with a metallisation level of iron up to 96% and the exchange of

iron above 90%. The amount of iron sponge powder obtained is generally above 60% of the initial concentrate by weight.

These metallurgical results on the Ruotevare iron ore are encouraging and in line with accepted figures of comparable contract specifications for sponge iron from potential international clients.

New test programme

Further tests are planned to show that after extraction of Ti and V, the remaining iron can be recycled to the reduction process so that an even higher exchange of iron is obtained. More than 97% of the Ti and V-content of the concentrate occurs together with ilmenite-bonded iron and surplus coke in the non-magnetic product. After recovering the coke, this product is a very suitable source from which to obtain clean TiO₂ from ilmenite by using the chlorination process traditionally used by titanium producers. In addition, the vanadium can be leached from this product by HCl leaching through established processes. The end product will be V₂O₅ (vanadium pentoxide).

By using mainly closed systems, the exchanges for all products will be very high whilst atmospheric emissions and environmental impact will be minimised. For example, a large part of the energy consumed in vaporising the FeCl₃-solution can be obtained by burning the process gas from the mechanical oven.

Beowulf has been informed by MINPRO that ongoing tests applying the reduction/segregation process should further improve the presently obtained data in terms of the product quality of sponge iron powder obtainable from the Ruotevare iron ore deposit.

To meet demands from potential clients the ongoing tests at Minpro have been expanded to include a study for the possibility of producing a high grade pellet feed from the ore.

The results from both of these further studies will provide the basis for a preliminary economic evaluation of the project following which pilot plant studies can then be planned.

Detailed metallurgical testing to obtain a marketable concentrate of the Ruotevare deposit was initially carried out in the 1970s by the Swedish government-owned iron ore mining company LKAB with subsequent work performed by the Finnish steel company Rautaruukki. The present metallurgical work planned at MINPRO is a continuing study aiming to improve these historic results and obtain highly commercial end products.

Clive Sinclair-Poulton, Chairman of Beowulf commented:

"These metallurgical results confirm the potential of the Ruotevare project - we have over 140m tonnes at 39% Fe inferred - and we expect the new studies to further enhance the project's appeal. The tests to date validate the process of using reduction techniques and the resultant sponge iron produced is more than acceptable to potential clients."

Dr Jan Ola Larsson (Fil. Kand, PhD, DIC), has reviewed and approved the technical information contained within this announcement in his capacity as a qualified person, as required under the AIM rules. Dr Larsson is Technical Director of the Company and has over 30 years relevant experience within the natural resources sector.

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