

Minco plans Maritime manganese mine

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VANCOUVER — Dublin-registered **Minco PLC** (LSE: MIO) is planning to produce high-grade manganese from its Woodstock project in New Brunswick for 25% below the industry's average cost, and supply the North American and European steel markets that rely on increasingly fragmented Chinese and South African output for the popular ingredient.

According to an independent preliminary economic assessment (PEA), for \$864 million Minco could turn Woodstock into an open-pit mine churning through 3,000 tonnes of ore per day to produce 80,000 tonnes of electrolytic manganese metal (EMM) per year over a 40-year mine life.

The investment would give Minco an operation with a \$461-million after-tax net present value and a 14.4% after-tax internal rate of return, helping the project repay its capital costs in seven years. Those estimates use a US\$1.38 per lb. manganese price and an 8% discount rate.

The Woodstock mine could pro-

duce a pound of EMM for US68¢ over its 40-year mine life. By contrast, the reported average cost of production in China, which accounts for 98% of the world's EMM output, is US91¢ per lb.

The Woodstock project is located 5 km west of the town of Woodstock and the junction of the Trans-Canada and U.S. I95 highways in west-central New Brunswick, and 10 km from the U.S. border.

Woodstock offers several advantages. First, the deposit is amenable to open-pit mining and offers a 1.34 strip ratio. This translates to a mining cost of US4¢ per lb. EMM. In China, where grades are declining and ore increasingly comes from underground mines, mining costs average US27¢ per lb. EMM.

Second, electricity rates in New Brunswick are relatively low and stable, which means power adds US17¢ to the cost of producing each pound of EMM. In China, power adds an average of US30¢ to the

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per-pound cost.

There are two types of mineralization at Woodstock: red and grey. Both types of rock comprise rhodochrosite, a manganese carbonate mineral, within an iron-rich matrix.

The presence of manganese as rhodochrosite is an advantage. The carbonate mineral is readily soluble in acid. Many other manganese deposits host oxide forms of the metal, which are not acid soluble and can only be recovered through roasting and reduction.

The red-versus-grey difference is because the iron at Woodstock comes in two forms. The red mineralization contains iron that is mostly oxide. The iron in the grey rock is primarily in carbonate form. This matters because the carbonate iron is more readily leachable and consumes more sul-

phuric acid, boosting operating costs.

The open-pit resource considered in the PEA stands at 41.4 million tonnes grading 9.9% manganese. Of that 60% is red mineralization, with grey rock making up the rest.

The Woodstock PEA describes a 40-year mine life, with open-pit mining for the first 13 years. During open-pit mining the highest-grade ore would be sent for processing, bearing an average grade of 11.7% manganese. The rest of the ore would be stockpiled to help feed the processing plant for the next 27 years, during which time the head grade would be 9.9% manganese.

There are several steps involved in producing EMM. First the ore is pre-concentrated: magnetic separation pulls out iron, which has the bonus of upgrading the mill feed

to an average grade of 15.65% manganese and generating iron concentrate as a co-product. In fact, the mine would also produce 23,200 tonnes of 62% iron-ore fines annually.

The manganese ore is then leached with sulphuric acid at a controlled temperature, which optimizes acid consumption. Trace heavy metals are removed and the manganese sulphate solution is subjected to electrolysis to produce EMM grading better than 99.7% manganese.

The process requires a steady supply of sulphuric acid as well as lime. To meet demand the PEA envisions a sulphuric acid plant and a lime kiln on-site.

On news of the Woodstock PEA Minco's share price gained slightly more than a pence to close at £0.031. The company has 478 million shares outstanding.