

# Bluejay Mining\*

JAY LN

BUY

Target 37p

## Valuation upgrade

### Stock Data

Ticker	JAY LN
Share Price:	25 pence
Market Cap:	£200m

Bluejay are planning the construction of the Dundas (formerly Pituffik) ilmenite mineral sands project in Greenland. The project is advancing through Feasibility Study work towards final financing with Site works due to start in Q2 2018 and construction scheduled for later next summer. BlueJay's market capitalisation now means the company is included in the MSCI World Micro Cap Index as of today.

**We upgrade our target price to 37p from 24p on our revised cash flow analysis**

### Price Chart



- BlueJay are making good progress towards the start of production next year.
- **Valuation:** we are raising our NPV valuation to 37p/s today in response to the high grade and purity levels of BlueJay's ilmenite concentrate product.
- **Production:** While BlueJay plans to start production next year we assume sales start in 2020. We escalate the mining rate from 1mtpa in 2020 to 2mt in 2021, 3mt in 2022. We then see a further jump in production to 5.5mtpa from 2026.
- **Capex:** we assume a \$60m capital cost to start followed by a further \$100m for the second phase expansion. We assume a 10% discount rate by way of standardisation. The project gives a 43% IRR on these metrics.
- **Pricing:** We assume BlueJay could receive \$200/t for its product, up from \$180/t previously though management reckon they will get higher price levels.
- **Upgrading:** we have also assumed the upgrading of material at the first sieve to 18.5%. This has the double benefit of raising the input feedstock grade reducing costs and improving throughput rates.
- **Feasibility Study:** A number of consultants are working on more detailed plans for the process plant and related infrastructure.
- **Costs:** we assume relatively high mining, processing and loading costs for a dredging operation given its location in the north of Greenland. These costs should come down as the operation proves itself. We assume \$3.25/t for mining, \$5.0/t for processing and \$4.5/t for loading. The loading cost is particularly high given that it should simply require a longish conveyor belt to reach a ship parked in the Fjord, though it should cover the use of a tug boat to manage passing ice bergs.
- **Offtake:** management are in Hong Kong presenting at the 'TZMI' Titanium and Zircon Congress for mineral sands producers. We expect discussions to continue on offtake with Chinese producers and assume 60% of BlueJay's Ilmenite concentrate may be sold in China with the rest to be sold in the West.

**Conclusion:** BlueJay is fortunate to have discovered the World's largest, known, high-grade, ilmenite mineral resource. The sheer scale and consistency of the high-grade mineralisation is extraordinary and while the location in Greenland presents some challenges these appear relatively easy to overcome from an engineering and production perspective.

*\*SP Angel act as nomad and broker to BlueJay Mining*

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- **Extraordinary high grade:** BlueJay Mining has an extraordinary high grade ilmenite project in the north of Greenland. The geological team have largely proven the extent, consistency and grade of the project with the focus now on details of how best to mine and process the mineral sands.
- **Engineering solutions:** The very high grade and the coastal location are a potent combination when it comes to mining and processing. Dry mining is an option but dredging in the near shore environment looks better with bulldozers to be used to push ilmenite material towards the dredge. Screened/sieved ilmenite will then be piped to a centralised process plant and storage facilities.
- **Dewatering** should occur naturally with much of the water in the ilmenite coming out under the sheer weight of the mineral sand in storage. Any further dewatering could be achieved simply with filters.
- **Ship loading** should be via conveyor onto ships waiting in the Fjord. Ships are able to come close to shore due to the natural gradient of the Fjord making construction of ship loading facilities relatively simple.
- **Drilling:** BlueJay used a newly acquired Sonic-drill rig through the past field season as recommended by SRK Consultants is working well and shows mineral sands to a depth of over 30m in some areas exceeding the length of available drill rods and casing. The Sonic rig is reported to be working well and to be drilling off five to six holes per day depending on depth. We witnessed the first test drill hole on the recent site visit to Moriusaq Bay, Greenland.
- **Resource:** This has dramatically exceeded our expectations at 23.6mt grading 34.5% total heavy mineral sands and 8.8% ilmenite in-situ in the inferred resource.
- **High-grade zone:** includes 7.9mt grading 14.2% ilmenite at Moriusaq. The feasibility study is focussed on this part of the resource. We expect this high-grade resource to expand in scale to >100mt as further work expands our knowledge of the deposit in the shallow marine and near-shore environment.
- **Interlak Delta:** the Interlak delta looks like a truly exceptional ilmenite deposit. We expect Interlak may contain a much larger, high-grade resource to substantially add to the high-grade portion of the mine. This could host >1bnt of high-grade ilmenite material and justify a second, separate operation.
- **Consistency:** drilling now shows remarkable consistency in the density and grade of the mineral sands deposited by nature. The ilmenite rich sands appear to be equally well distributed at depth with no or very few apparent layers of rocks, aggregates or other minerals seen in preliminary drilling. We now expect to see this extended as the high-grade ilmenite is so much heavier than any other mineral causing other minerals to be washed away by waves and storms through the deposition process.
- **Bulk sample:** BlueJay shipped some 500-600t of sieved concentrate material for storage and for further processing for consumer testing.
- **Purity:** the amazing thing about Pituffik is the apparent purity of the ilmenite mineral sands and the near total lack of any other material, particularly clay which bungs up processing at many other mineral sands operations.
- **Nature** has done an amazing job in sorting out the heavy mineral sands from the lighter material and this can be very clearly seen from the air where rivers show plumes of natural sand being washed down the shoreline to other beaches leaving a mass of ilmenite sand on Bluejay's licenses at Pituffik. We note, other beach sands in the region do not appear to have similar areas of ilmenite concentration.

- **Microscopy** indicates good purity levels with the ilmenite grains liberated by erosion. The very heavy levels of erosion seen in general in Greenland appear to have served to liberate the ilmenite in a way that may not be seen in less active environments.
- **Sonic Drilling:** we believe the sonic drill rig will show high-grade ilmenite in a mass of heavy mineral sands largely free of any other mineralisation till the base rock.



- **Bucket test:** We completed our proprietary SP Angel bucket test on the BlueJay license. The test involved borrowing a five litre bucket from the kitchen, filling it with mineral sands off random locations on the beach, weighing said bucket with some recently purchased luggage scales. Our test showed high levels of heavy mineral sands from all areas and particularly near the shore line where we weighed 13.4kg for approximately 5kg of mineral sands with no sieving.



- **Beaches and Terraces:** The very high level of erosion caused by glacial and freeze/thaw erosion combined with the unusually high level of ilmenite rich dyke swarms has created an exceptional environment for the sorting of heavy mineral sands over millions of years enabling the natural enrichment and deposition into the active beaches which have then been uplifted to form deep terraces of ilmenite mineral sands. Drilling is reported to show ilmenite to >30m of depth in this

environment. This fits with a theoretical beach model when considering the scale of the beach terraces and surrounding geology in our view.



- **Shipping:** the Fjords of Greenland provide deep shipping lanes with depths of >800m seen by us on the sonar during our travels. Deep water is present very close to shore at Pituffik and it should be relatively inexpensive and simple to rig up a short 10-20m pier and conveyor for the loading of Handymax or Panamax ships through the summer months. Ice breaking could extend the shipping season though we suspect this will not be necessary if the carriers can load in time. The bathymetry survey should be completed in the next few weeks and should show the best location for the pier, though nature has provided much of the infrastructure to be needed.
- **Moriusaq Bay:** The Moriusaq Bay area provides a natural harbour to protect against passing icebergs and heavy weather. The bay, active beaches and raised beaches appear to contain significant concentrations of potentially uniform ilmenite.
- **Ilerlak Delta:** The Ilerlak Delta and raised beaches appears to host exceptionally high-grade ilmenite as seen in the very heavy and black nature of the mineral sands. The delta is solid to walk across due to its concentration of heavy mineral sands. People tend to sink into normal sand in such wet environments but the density of the heavy minerals in the sand at Ilerlak makes it quite unlike any beach we have ever walked across.

The 'freeboard' or wall of mineral sand demarking the raised beach from the lower delta area at Ilerlak gives a view as to the probable depth of ilmenite in the raised beach, though we do not yet know the depth of ilmenite in the more active delta environment.





- **Environmental:** a local group, Orbicon Arctic are working on a baseline sampling program for the EIA though we saw nothing to cause any particular concern on the beaches or at the shore line.
- **Moriusaq camp:** The abandoned settlement at Moriusaq provides a camp of reasonable quality saving BlueJay a small fortune in camp costs. The former supermarket provides a useful mess room and canteen and the recent installed washrooms are a significant addition for the team working at site.



- **Kitchen:** an army marches on its stomach and miners in the field are just the same. We are pleased to report that the Pituffik kitchens are well appointed with an unusually creative Danish chef and enough grub to keep the team going through this season and beyond, though the coffee could take some getting used to.
- **Feasibility study:** the team now look set to deliver a feasibility study on the project in the second half which will likely show very low unit operating costs and strong

economic potential for the project. Our own preliminary evaluation of the project economics shows significant value and considerable upside from here.

- **Processing:** The mineral sands at Pituffik appear to require very little in the way of mineral processing. Simple screening and sieving produces concentrate for testing while the use of spirals should produce a viable concentrate for sale. A further stage of processing using permanent 'neodymium' magnets may produce concentrate which is suitable for 'Chloride' producers commanding higher prices for this purer material. This fetches the higher end of market prices at around \$180-220/t.
- **Ilmenite market:** we expect the environmental crackdown in China to further restrict the processing of titano-magnetite ores and concentrates. This should restrict the availability of titanium from this source and drive demand for ilmenite 'titanium' rich concentrates from mineral sands.
- **Ilmenite pricing:** the market for ilmenite continues to improve with China raising demand while stifling feedstock production. We expect prices for basic quality material to rise from \$180/t to >\$200/t with BlueJay concentrates potentially selling for >\$235/t going forward.
- **Feedstock issues:** China's recent drive to reduce pollution has cut out the processing of low-grade titanium bearing iron ores causing consumers to look for new, less polluting, sources of feedstock material. BlueJay's concentrate material should prove popular in this environment.



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