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SUCCESSFUL GREEN PIG IRON PRODUCTION

Highlights:

Magnum Mining and Exploration Limited has completed its first biochar pig iron test using 100% biochar. The SGS test result shows that our green pig iron is a premium feed for Electric Arc Furnace (EAF) steel making.

As announced on 28 September 2021, Magnum Mining and Exploration Limited ("Magnum" or the "Company") (ASX:MGU) has undertaken an extensive test work program over the past few months.

The Company is pleased to confirm:

- that it is on track to become a leading producer of green pig iron products for sales to US and export markets at premium prices.
- extensive test work was completed by Beijing Shougang International Engineering Technology Company (BSIET) (see here - bisect.com) at its pilot plant in China and included:
  - production of a dry iron ore concentrate at 63%Fe (SGS tested);
  - reduction in the rotary kiln using 100% Biochar to produce Direct Reduction Iron (DRI) and
  - melting the DRI in an Electric Furnace to produce the end product, green pig iron (SGS tested).
- SGS China tested and has confirmed the quality of the iron ore concentrate and green pig iron produced.
- that Magnum green pig iron with low silica & high carbon offers premium value in use for EAF steel makers.
- the process of dry concentration with minimal water consumption compared to a 'wet' concentrate and the utilisation of Biomass/Biochar in a 'carbon neutral' process are also significant contributions to a healthier environment when compared to other steel making processes.
- this success is an important step in the Company's strategy of moving up the value chain to green pig iron with a significant Carbon Credit premium.
- Magnum with its wholly owned low-cost iron ore resource is now well positioned to take advantage of the rapidly increasing demand in high value green pig iron. There is a US$400 per ton value difference between iron ore & pig iron, with iron ore prices currently around US$100/t delivered China and pig iron delivered into the US is around US$550/t.
- the US steel industry is rapidly expanding with over 80% using EAFs. Relevantly, the Company advises that a global shortage of quality steel scrap and pig iron supply is forecasted and considers that Magnum is well placed to supply quality pig iron both domestically and internationally.

TEST WORK RESULTS

1. Dry Concentrate Results:

The iron ore sample from the Buena Vista Project was crushed and sized before undergoing a dry magnetic separation process. As announced on 28 September 2021, the Company has decided to use a ‘dry concentrate’ process to produce the iron ore that is required as feed to the rotary kiln at the Buena Vista Project. The planned dry magnetic beneficiation plant is a cost-effective and efficient setup that provides added savings in water consumption in what is an increasingly arid region. This will further strengthen the Company’s vision of being a green pig iron producer.

SGS has confirmed the test work was successful with a concentrate product grade of 63%Fe.

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Lab Reference No.:MNT214561QD
SGS Report No.:MSRQD2100712-01A
Testing Report Page: 1 / 2

TESTING REPORT

Principal Name:	QINGDAO DONGKUANG ENVIROMENTAL PROTECHTION CO., LTD.
Principal Address:	Room 205, No.21 Donghaixi RD, Shinan District, Qingdao Shangong Province, China.
Declared Sample Name:	Nevada iron concentrate
Sample Received Date:	2021-10-12
Sample Testing Period:	2021-10-12 ~ 2021-10-18
Sample Condition on Receipt:	Powder, In plastic bag, One submitted sample(1kg)
Declared Sample Number:	/

In accordance with instructions received from applicant, we prepared and carried out required test on the sample. The analysis results reported as refer to the next page(s)

SGS-CSTC Standards Technical Services(Qingdao) Co.,Ltd

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MNT214561QD

Authorised Signatory
2021-10-18

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Figure 1 SGS Iron Ore Concentrate Quality Report - Page 1

Lab Reference No.:MNT214561QD
SGS Report No.:MSRQD2100712-01A
Testing Report Page: 2 / 2

Test Items	Unit	Result	Standard No.
		/	
TFe	%	63.00	GB/T 6730.5-2007
FeO	%	21.82	GB/T 6730.8-2016
Si	%	3.02	GB/T 6730.62-2005
Al	%	0.69	GB/T 6730.62-2005
P	%	0.016	GB/T 6730.62-2005
S	%	0.0680	GB/T 6730.17-2014
Volume average particle size	μm	43.21	GB/T 19077-2016

Remark : 1.Upon Client's request, the report has been issued in both Chinese and English. Only the Chinese version has legal effect. In case of any discrepancy between the Chinese and English versions, the Chinese version shall prevail.
2.The test result of Volume average particle size was performed by SGS internal other laboratory.

******The end******

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BSIET have proposed a ‘plug & play’ off the shelf Dry Magnetic Beneficiation Plant with an annual output of 1 million tonnes of 63%Fe concentrate using a feed grade of 15-20%Fe ROM. This feed grade optimizes the resource tonnes available for mining as well as allowing a lower strip ratio and hence reduces the overall mining costs.

The outcome from this work will feed into the detailed engineering design and estimates of the capital and operating costs of the dry concentrator.



Figure 2 Proposed Dry Magnetic Beneficiation Plant

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2. Biochar Direct Reduction Iron

Iron ore concentrate & Biochar: Prior to the rotary kiln test, the concentrate was mixed with biochar and pelletized. The use of Biochar will significantly reduce our Carbon footprint.

Rotary Kiln and DRI: The pellets were then fed into the rotary kiln where the temperature in the kiln was 1200 Celsius. As the pellets moved along the kiln, the reduction process took place and DRI produced.



Figure 3 Rotary Kiln



Figure 4 Reduction at 1200C



Figure 5 DRI

3. Pig Iron: The DRI was melted in an electric furnace to produce high quality pig iron



Figure 6 DRI melting



Figure 7 GREEN pig iron

SGS has confirmed the pig iron quality as follows:

Lab Reference No.:MNT215097QD
SGS Report No.:MSRQD2100795-01A
Testing Report Page: 1 / 2

TESTING REPORT

Principal Name:	QINGDAO DONGKUANG ENVIROMENTAL PROTECHTION CO., LTD.
Principal Address:	Room 205, No.21 Donghaixi RD, Shinan District, Qingdao Shangong Province, China.
Declared Sample Name:	Nevada iron
Sample Received Date:	2021-11-19
Sample Testing Period:	2021-11-19 ~ 2021-11-23
Sample Condition on Receipt:	Lump, In plastic bag, One submitted sample(1kg)
Declared Sample Number:	/

In accordance with instructions received from applicant, we prepared and carried out required test on the sample. The analysis results reported as refer to the next page(s)

SGS-CSTC Standards Technical Services(Qingdao) Co.,Ltd

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MNT215097QD

Authorised Signatory
2021-11-24

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Figure 8 SGS GREEN Pig Iron Quality Report - page 1

Lab Reference No.:MNT215097QD
SGS Report No.:MSRQD2100795-01A
Testing Report Page: 2 / 2

Test Items	Unit	Result	Standard No.
		/	
Fe	%	94.46	GB/T 223.7-2002
Si	%	0.086	GB/T 223.60-1997
C	%	4.63	GB/T 223.86-2009
P	%	0.129	GB/T 223.59-2008
S	%	0.0270	GB/T 223.68-1997

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Figure 8 SGS GREEN Pig Iron Quality Report - page 2

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4. Surge of Demand for Pig Iron

Due to tighter greenhouse gas emission restrictions, globally there is a huge shift to the use of EAF to produce steel. In the USA alone, over 80% of steel production is from EAF with another 30 million tons of additional capacity being added.

These furnaces require high grade scrap/pig iron/DRI and worldwide competition for the supply of steel scrap and pig iron is underway. Relevantly;

- the European Union ("EU") is already putting in bans to prevent the sale of scrap outside the EU.
- Ukraine has put a 200% tariff on exporting scrap,
- Russia has imposed a EU100 per ton duty on scrap export, and;
- Brazil has started shipping more pig iron to China than the USA for the first time this year

The result has been a dramatic and consistent increase in the price for these products and is a trend that is expected to continue well into the next decade.

The targeted markets for Buena Vista Project iron products are US West and East coast steel producers and the sophisticated Japanese market which will pay a premium for green pig iron for its EAF. Given the Investment and Jobs Act (US infrastructure bill) recently passed in the US Senate and steel-related antidumping duties, the US steel market is expected to grow rapidly together with the need for premium pig iron.

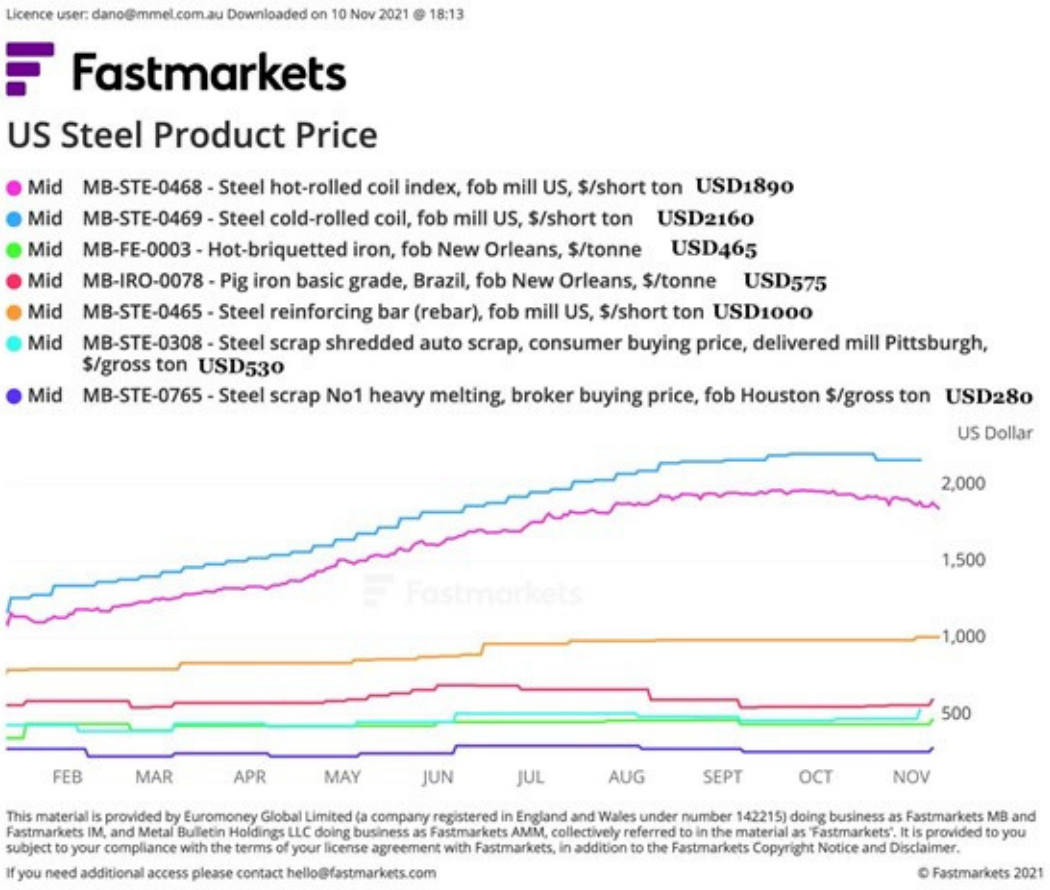


Figure 9 US Steel Price 2021

Next Steps

Following the completion of the highly successful test work program, the Company intends to move forward as follows by:

- Securing a long term biochar supply;
- Initiating marketing discussions with targeted US based EAF customers;
- Undertaking a detailed review of the estimated plant operating and capital costs commencing in Q1 2022 including:
  - Mine Development (SRK designed and permitted);
  - Dry Concentrator (design in progress and permit update required);
  - HBI production (design and permit required);
  - Confirming the power and natural gas supply (identified) and water supply (identified and permitted)
  - Selecting logistics hubs;
  - Undertaking a financial model for both iron ore and pig iron.

The release of this announcement has been authorised by the Company Secretary.

For further information, please contact:

John Dinan, Company Secretary
Magnum Mining and Exploration Limited
Ph: +61 02 8316 3989



John Dinan
Company Secretary

1 December 2021

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