# TEST WORK CONFIRMS +68% Fe HIGH GRADE IRON ORE

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### HIGHLIGHTS

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- Metallurgical test work confirms a +68% Fe product can be produced

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- Minimal changes necessary to previously designed plant to achieve high grade product

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- Ore hardness test indicates lower power requirement than peers

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- Test work will feed into the currently scheduled Scoping Study to update historic CAPEX and OPEX estimates as a prelude to embarking on a Prefeasibility Study

- Ore type classification is recognised as a value adding parameter

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Magnum Mining & Exploration (ASX: MGU, "Magnum" or "the Company") recently completed metallurgical test work on ore from its Buena Vista Green Pig Iron Project mine site in Nevada, USA (Figure 1).

Two ore types were tested: medium grade and low grade ores.  Grind size recovery tests showed that medium grade ores could deliver a 68.4% Fe product with a 48% weight recovery at an industry standard 45µm grind size. Low grade ores had a weight recovery of 20%.

Crucially, the study concluded that the current beneficiation plant design needs very little change from that proposed in the 2011 Feasibility Study. Considerable costs will be saved by not repeating past design work.

In addition to the recovery test work, ore hardness, through the Crushing Work and Bond Work Indices, were measured.  This shows that the CWi is about a third of that measured from Banded Iron Formation sourced magnetite for medium grades and about half for low grade Buena Vista ores.  This relates directly to how much power is required to crush and grind the ore,
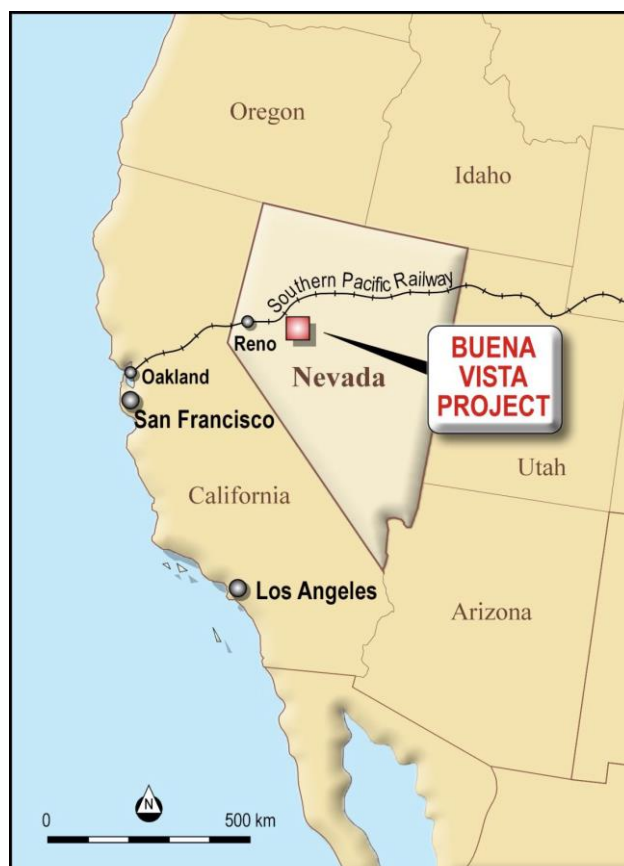


Figure 1  Buena Vista Green Pig Iron Project Location, Nevada, USA

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making the Buena Vista ore highly competitive compared to bif related ores.

The test work was designed to check the work done for the project's 2011 Feasibility Study (ASX: RHM 9 May, 2011) to inform the Company's in progress Scoping Study.   Specialist metallurgical consultants Mineralconsult Pty Ltd managed the test work at ALS' laboratory in Perth and undertook the interpretation of the results.

## ORE CLASSIFICATION WILL VALUE ADD

The Buena Vista iron resource consists of **232Mt @ 22.6% DTR** (ASX: MGU 23 March 2021) with an additional **450 to 540Mt @ 15 to 22% Fe**[1] in Exploration Target Estimate (ASX: MGU 13 January, 2023).  The ore consists of disseminated to massive magnetite that ranges in grade from less than 10% Fe, the cut-off used in the resource estimation, to over 60% Fe.  The study proposed that processing of these ores can be further enhanced by undertaking material type classification by pursuing a pre-beneficiation blend that will optimise recovery.

## NEXT STEPS

The Scoping Study is now underway and will incorporate these results.

An ore classification study is being initiated.  The outcomes from the study will assists in identifying the ore's physical parameters that can optimise the flowsheet for efficient material throughput while maximising product quality.
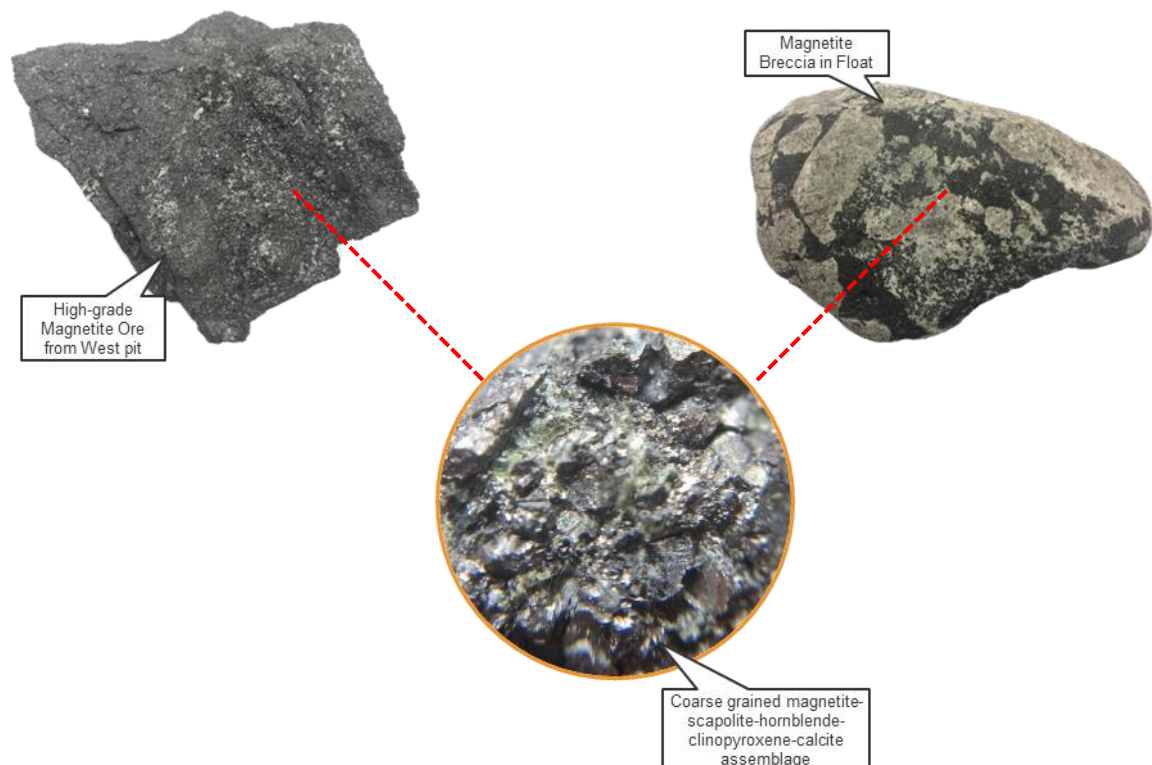


[1] The potential quantity and grade of the Exploration Target is conceptual in nature, there has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource.

## THE BUENA VISTA IRON DEPOSIT

Buena Vista Iron Deposit is located approximately 160km east-north-east of Reno in the mining friendly state of Nevada, United States. It was discovered in the late 1890's and in the late 1950's to early 1960's around 900,000 tonnes of direct shipping magnetite ore with an estimated grade of 58% Fe was mined.

In the 1960's, US Steel Corporation acquired the Buena Vista Project and carried out an extensive exploration program including 230 diamond drill holes and considerable metallurgical test work. Richmond Mining Limited, an ASX listed company, acquired Buena Vista in 2009 and commenced a detailed exploration program culminating in a definitive feasibility study in 2013. A key component of these studies was extensive investigation of the optimal logistics plan for the deposit's development. This included the negotiation of in-principle agreements with existing rail and port operators and the securing of all major mining permits. Detailed costings were completed on the trucking or slurry pipeline options to deliver the concentrate to the rail head located some 50 kilometres from mine site. A significant decline in iron ore prices to less than US$50/ tonne caused the then proposed development of Buena Vista to be deferred.

### Geology

The Buena Vista Project magnetite deposits are the product of late-stage alteration of a localised intrusive local gabbro that resulted in intensely scapolitised lithologies and the deposition of magnetite. The most well-known example of this type of magnetite mineralisation is the Kiruna magnetite deposit in Sweden, which has been in production since the early 1900's.

The distribution and nature of the magnetite mineralisation at Buena Vista is a function of ground preparation by faulting and fracturing, forming a series of open fractures and breccia zones. These ground conditions produce variations in mineralisation types from massive pods grading +60% magnetite to lighter disseminations grading 10-20% magnetite.

Metasomatic magnetite deposits such as those at Buena Vista have important positive beneficiation characteristics over the other main type of magnetite deposit which is a banded iron hosted magnetite, also known as a taconite.

The Buena Vista ore is of magmatic origin and as a consequence is coarser grained and softer than banded iron hosted ores. Industry standard crushing, grinding and magnetic separation produces a concentrate grade of +67.5% Fe with very low levels of impurities.

### Resource

The Mineral Resource Estimate (JORC(2012)) at Buena Vista (ASX:MGU 23 March 2021) is:

| Category | Million Tonnes | Fe % | DTR % |
|---|---|---|---|
| Indicated Resource | 151 | 19 | 23.2 |
| Inferred Resource | 81 | 18 | 22 |
| Total Resource | 232 | 18.6 | 22.6 |

*The company confirms that all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed.*

In addition, an Exploration Target Estimate has been completed  (ASX:MGU this announcement):

| Category | Million Tonnes | Fe % |
|---|---|---|
| Exploration Target | 407 to 540 | 15 to 22 |

*The potential quantity and grade of the Exploration Target is conceptual in nature, there has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource.*

### Development

Mining permits are in place to develop the Buena Vista Iron Mine. The Company has re-aligned the project from a simple mining, concentration and exporting model to a green pig iron producer. Using cutting edge technology in tandem with biochar sources, the Company is capitalising on a first-mover advantage to supply green pig iron to the USA steel industry.

## CAUTIONARY STATEMENTS

In accordance with ASX Listing Rule 5.3.2, the Company advises that no mining development or production activities were conducted during the March 2023 Quarter.

**1** The potential quantity and grade of the Exploration target is conceptual in nature, there has been insufficient exploration to estimate a Mineral Resource over the entire area of the Exploration Target, and it is uncertain if further exploration will result in the estimation of an increased Mineral Resource.

**2** The Company confirms that it is not aware of any new information or data that materially affects the information included in this announcement and that all material assumptions and technical parameters underpinning the estimates in the announcement of the 'Maiden JORC Resources for the Buena Vista Magnetite Project' dated 23 March 2021 continue to apply and have not materially changed.

The company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified.

## COMPETENT PERSONS STATEMENT – RESOURCE ESTIMATION

The information in this report that relates to Mineral Resources is based on information compiled by Mr Jonathon Abbott, a Competent Person who is a Member of the Australian Institute of Geoscientists and a full time employee of MPR Geological Consultants Pty Ltd. Mr Abbott has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the "Australasian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves". Mr Abbott consents to the inclusion of the matters outlined in Appendix A in the form and context in which it appears.

The company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified.

## COMPETENT PERSONS STATEMENT – EXPLORATION TARGET ESTIMATION

The information in this report that relates to an Exploration Target is based on information compiled by Mr Marcus Flis, a Competent Person who is a Fellow of the Australasian Institute of Mining and Metallurgy and a full time employee of Rountree Pty Ltd. Mr Flis has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the "Australasian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves". Mr Flis consents to the inclusion of the matters outlined in Appendix A in the form and context in which it appears.

## BY ORDER OF THE BOARD

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Table 1 - (JORC Code, 2012 Edition)

## Section 1 Sampling Techniques and Data

| CRITERIA | COMMENTARY |
|---|---|
| Sampling techniques | • Bulk sampling of ore stockpiles. |
| Drilling techniques | • Drilling is not being reported |
| Drill sample recovery | • Drilling is not being reported |
| Logging | • Drilling is not being reported |
| Sub- sampling techniques and sample preparation | • Sampling is not being reported |
| Quality of assay data and laboratory tests | • Metallurgical test work was undertaken by ALS laboratories in Perth under an independent consultant's direction. |
| Verification of sampling and assaying | • All data is checked on a daily basis by field staff and consultants. |
| Location of data points | • Sample locations were recorded by handheld GPS. |
| Data spacing and distribution | • Single point samples. |
| Orientation of data in relation to geological structure | • N/A |
| Sample security | • Samples were controlled by independent consultants to industry standard |
| Audits or reviews | • None. |

## Section 2 Reporting of Exploration Results

Criteria listed in the preceding section also apply to this section

| CRITERIA | COMMENTARY |
|---|---|
| Mineral tenement and land tenure status | • The project contains mineral rights over 234 separate claims covering an area of 2,457Ha (6,071 acres). Of these 45 are patented mining claims with the balance being either former railroad fee title land or unpatented claims<br>• The 45 patented mining claims covering 777 acres are all secured through lease agreements and have overriding royalties.<br>• The project has surface rights to the Section 5 patented land claim (528 acres). These rights provide for the housing of Buena Vista's proposed production facilities, plant, workshops stockpiles and waste dumps.<br>• All tenements are in good standing.<br>• Relevant tenements to this announcement are T24NR34E Section 4, Section 5, Section 7, Section 8, Section 17, Rover 1832, Albatross 1832, Wyoming 1832, Cactus 1832, NVFe2,3,4,5,6,7,8, Iron Mountain 2MS14880,3MS14880, 6MS14880, 7MS14880, 10MS14880, 12MS14880, 13 MS14880, 14MS14880, 15MS14880 |
| Exploration done by other parties | • The database compiled for resource modelling comprises 218 holes for 36,084 m of drilling. Diamond drilling by Columbia Iron Mines in 1960 |

| | | |
|---|---|---|
| | | provides around 50% of the combined drilling (112 holes for 18,215 m), with 2010 Richmond Mining Pty Ltd diamond drilling contributing 4% (8 holes, 1,415 m), and 2012 Nevada Iron Limited RC and diamond drilling contributing 10% and 36% respectively (19 holes, 3,431 m and 50 holes, 13,024m). |
| Geology | • | Buena Vista magnetite iron mineralisation occurs within scapolite-hornblende-clinopyroxene-calcite-magnetite altered gabbro. Magnetite mineralisation varies from fine disseminations to massive pods up to tens of metres in dimensions, reflecting variable ground preparation of the gabbro. The mineralisation generally dips moderately to the north, striking approximately east-southeast (~098 to 120) for most of the property area, and trending southwest-northeast in the East Deposit area (~070). |
| | • | The magnetite mineralisation is cross cut by late-stage steep, generally east-west trending dykes ranging in thickness from less than 1m to rarely ~60 m. |
| | • | The mineralisation generally outcrops, but in the west of the project, including the Section 5 Deposit and western portions of the West Deposit it is overlain by around 3 to rarely 25m of un-mineralised surficial alluvial gravels. |
| | • | The mineralisation shows no significant oxidation, with fresh material occurring at shallow depths |
| Drill hole information | • | N/A. |
| Data aggregation methods | • | N/A. |
| Relation between mineralisation widths and intercept lengths | • | The mineralisation dips to the north or northeast at around 35°, approx perpendicular to the generally 45° to 60° south to south-easterly inclined drill holes giving true thicknesses of mineralised intersections generally approximating 87% to 97% of intercept down-hole lengths. |
| Diagrams | • | See diagrams included in this announcement. |
| Balanced reporting | • | Summary report includes all results. |
| Other substantive exploration data | • | The large number of Davis Tube Recovery tests available for Columbia's drill hole samples and more comprehensive test-work by Nevada Iron demonstrate the mineralisation is amenable to concentration by simple magnetic processes. |
| | • | Ground magnetic and gravity surveys exist over the area. |
| Further work | • | Ore classification will be undertake. |
| | • | Drilling may be recommended to clarify ore structure |

## Section 3 Estimation and Reporting of Mineral Resources

Criteria listed in the preceding sections also apply to this section

Mineral Resources are not being reported in this announcement.

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