QUEENSLAND PACIFIC METALS

Successful Hematite Pellet Testwork Completed with CSIRO

Highlights

- ✓ **CSIRO testwork generates hematite pellet samples with excellent properties suitable for blast furnace iron making.**
- ✓ **Indicative specification of hematite pellets based on testwork are:**
  - **62.84% Fe,**
  - **Reducibility Index 60.3%,**
  - **Low Temperature Reduction Disintegration Index 2.9% and**
  - **Compressive strength 2493N.**
- ✓ **CSIRO testwork provides important technical information for final design of pellet plant in the TECH Project.**
- ✓ **The TECH Project will produce over 600,000tpa hematite pellets in Stage 1 - testwork results obtained will be important for marketing and securing offtake.**
- ✓ **CSIRO also tested the properties of sinter produced with QPM hematite included in a generic sinter blend.**

Queensland Pacific Metals Ltd (**ASX:QPM**) ("**QPM**" or "the **Company**") is pleased to announce the results of hematite pellet testwork undertaken by CSIRO's Carbon Steel Materials Group, in Queensland.

Hematite Co-Product

The laterite ore to be processed by QPM at the TECH Project has a typical iron ("**Fe**") grade around 42%. The DNi Process™ dissolves Fe into solution and recovers it as a high purity hematite precipitate. The hematite product can then be agglomerated into a material suitable for direct feed to a blast furnance. QPM engaged Australia's national science agency, CSIRO, in 2022 to undetake this program, utilising hematite product produced from previous testwork including pilot plant operations. After an initial material characterisation phase, CSIRO tested agglomeration of the hematite product using two widely used approaches:

1. Pelletisation
2. Sintering

Pelletisation Testwork

Hematite pellets with properties suitable for direct feed to a blast furnace were produced under various conditions, using industrial standard methods. QPM are currently engaging with pellet plant suppliers to complete the process design and capital estimation of the commercial plant.

Figure: Indurated pellets produced by CSIRO in testwork

Chemical and physical analyses of the pellets produced by CSIRO were completed, with the results presented in the table below.

Property	Result
$Fe_{(total)}$	62.84%
FeO	0.5% (estimated)
SiO_2	1.76%
Al_2O_3	2.39%
P	0.006%
S	0.016%
CaO	0.95%
MgO	0.64%
Strength	2493N / pellet
Size	8 – 16 mm
Reducibility Index (RI)	60.3%
Reduction Disintegration Index (RDI)	2.9% -2.8mm

Figure: Chemical and physical analyses of pellets

The pellets produced in the CSIRO testwork were below typical thresholds for impurities such as SiO_2, P and S that attract penalties in the iron ore market. This will make the hematite product produced at the TECH Project an attractive feed option for steel mills, particularly when combined with the world class ESG credentials of the TECH Project. Based on this work, QPM's preference for the hematite product is to produce pellets.

Sinter Testwork

The QPM hematite product was added in increasing concentrations of up to 15% into a base blend of iron

ores to determine what effect the product could have on sintering (see table below). The QPM hematite has a relatively fine particle size, so magnetite concentrates were initially substituted in Blends 2 and 3 to give a comparison between materials of a similar size. A generic Asian steel mills blend was used as the base blend.

Ores	Base Blend	Blend 2	Blend 3	Blend 4
Brazilian Ores	25%	25%	25%	25%
Australian Ores	65%	65%	65%	60%
Magnetite Concentrate	10%	5%	0%	0%
QPM Hematite	0%	5%	10%	15%

The results showed that the green bed permeability improved with increasing amounts of QPM hematite in the blend. The sinter's Reducibility Index (RI), Tumble Index (TI) and Mean Product Diameter all improved with the addition of the QPM hematite, while there was a marginal increase in Reduction Disintegration Index (RDI).

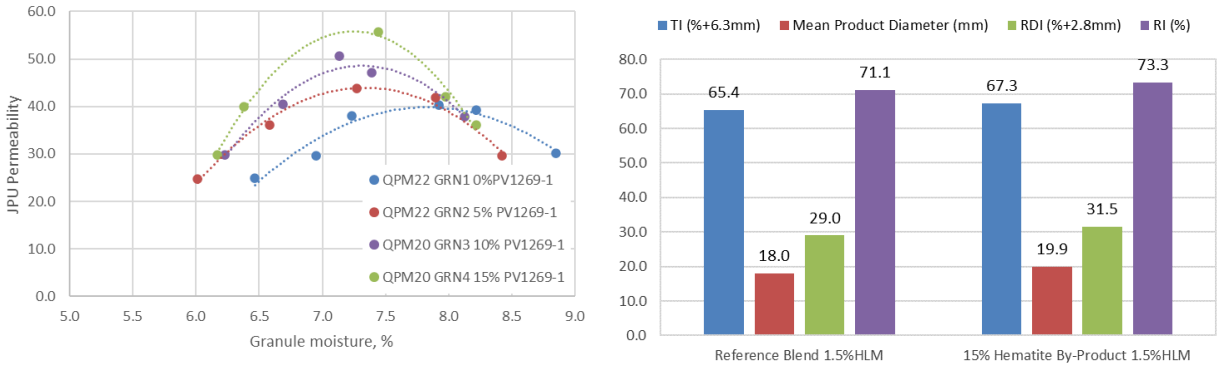

Figure: Green bed permeability (L) and sinter characteristics (R)

However, the improvement in green bed permeability did not correspond to an improvement in sinter productivity likely due to the reduced heat transfer and internal melting in the granulated particles within the bed. This resulted in a 28% reduction in sinter productivity and a 2.7% increase in fuel rate.

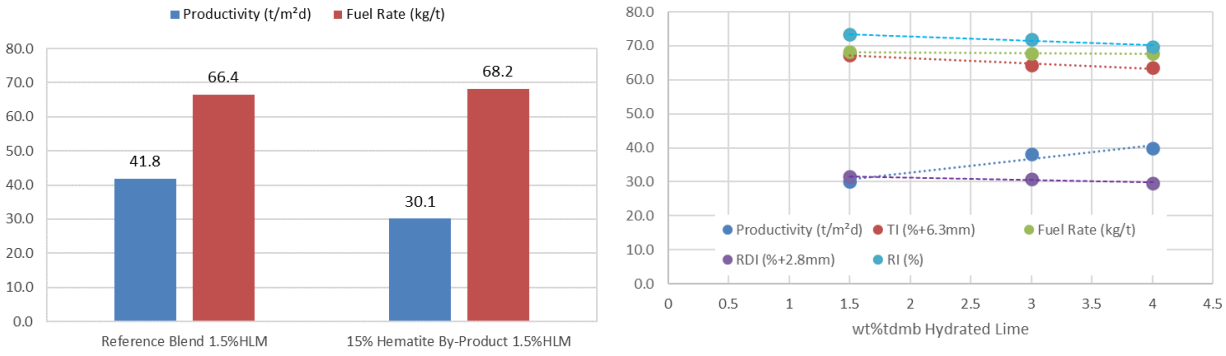

Figure: Sinter characteristics

CSIRO's test work demonstrated that increasing hydrated lime (HLM) concentrations from 1.5% to 4% in the sinter blend did overcome the sinter productivity loss, returning it to 40t/m^2/d. There were marginal decreases in RI and TI as well as slight improvement in RDI for sinter with increased hydrated lime.

Marketing

QPM has recently appointed Geoff Beros as Technical Marketing Manager to drive the sales of co-products produced at the TECH Project. Geoff previously worked for Fortescue Metals Group as Senior Manager Technical Marketing. The testwork undertaken by CSIRO will greatly assist QPM in its ongoing engagement with potential offtake partners for the hematite product.

This announcement has been authorised for release by the Board.

Competent Persons Statement

Information in this announcement relating to the processing and metallurgy (including the JORC table in Annexure) is based on technical data reported by the CSIRO Carbon Steel Materials Group and compiled by Dr Stephen Grocott who is a Fellow of the Australasian Institute of Mining and Metallurgy. Dr Grocott has sufficient experience which is relevant to the metallurgy and processing method under consideration to qualify as a Competent Person as defined in the JORC Code. Dr Grocott is a full time employee of QPM and has consented to the inclusion of the information contained in this announcement in the form and context which it appears.

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ANNEXURE – JORC TABLES

1.1 Section 1 Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• The hematite product used in the testwork were produced from various testwork streams undertaken by QPM.
Drilling techniques	• *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• No exploration drilling was undertaken
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• No exploration drilling was undertaken
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.*	• No exploration drilling or logging was undertaken

Criteria	JORC Code explanation	Commentary
	• *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Samples were generated using CSTRs and autoclaves at a laboratory facility in Perth, Western Australia. A representative solids sample of about one tonne was sent to CSIRO for testing.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• CSIRO used established methods to produce the results reported in this release. The methods reported are used for naturally occurring iron ore samples.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• No exploration drilling or sampling was undertaken
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic*	• No exploration drilling was undertaken

Criteria	JORC Code explanation	Commentary
	control.	
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• No exploration drilling was undertaken.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• No exploration drilling was undertaken.
Sample security	• *The measures taken to ensure sample security.*	• Samples were shipped directly from the place of production in Western Australia to CSIRO Pullenvale, using couriers.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• No external audits have been completed.

1.2 Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• Not Applicable
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Not Applicable
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Not Applicable.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* ○ *easting and northing of the drill hole*	• No exploration drilling or sampling was undertaken.

Criteria	JORC Code explanation	Commentary
	collar ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• No exploration drilling or sampling was undertaken. • Metal equivalents were not used or reported.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• No exploration drilling was completed.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• No exploration drilling was completed.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• No exploration results have been reported.
Other substantive	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological*	• Exploration drilling was not carried out.

Criteria	JORC Code explanation	Commentary
exploration data	*observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• No drilling or exploration work is planned.