



**Athena**  
Resources

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The Company Announcements Office  
ASX Limited  
4 Floor, 20 Bridge Street  
SYDNEY NSW 2000

## **BYRO IRON ORE MT NARRYER and FE1 PROJECTS**

**Bulk Super Purity Magnetite (SPFe) 72.06%Fe**

and

**Bulk High Purity Magnetite (HPFe) 71.55%Fe**

**Results for Bulk Metallurgical Sample**

**Athena Resources Limited**

24 Colin Street | West Perth | Western Australia | 6005

PO Box 1970 | West Perth | Western Australia | 6872

**Ph** 08 9222 5888

**Fx** 08 9222 5810

**E** [athena@athenaresources.com.au](mailto:athena@athenaresources.com.au)

**W** [athenaresources.com.au](http://athenaresources.com.au)

Athena Resources Limited has previously announced that subject to receiving all necessary Shareholder and regulatory approvals, the Company agreed to give Brilliant Glory Industrial Corporation Limited, a Hong Kong based company, together with Brilliant Glory Investments Pty Ltd; an Australian based company (Brilliant Glory), the right but not the obligation to purchase the Byro Project in consideration for the payment of Au\$20,000,000 and production payment of a royalty.

Brilliant Glory engaged Yantai Xinhai Mining Research and Design Co, Ltd., (Xinhai), from Shandong Province, China, to conduct mineral processing test work on the FE1 and Mt Narryer ore bodies. The ore and concentrate were subject to a full investigation undertaken by Xinhai, which required development of an appropriate beneficiation process. The work used bulk sample retrieved from drilling reported to the ASX, 19 January 2017 and 6 November 2017.

The results of the metallurgical investigation included in this announcement were compiled by Mr. Yunlong Zhang. Mr. Yunlong Zhang is the Chairman of the Yantai Xinhai Group of which the Yantai Xinhai Mining Research and Design Co, Ltd is a fully owned subsidiary. Mr. Zhang is a Fellow of the Australasian Institute of Mining and Metallurgy, (See competent person statement).

It has been demonstrated by Athena Resources Limited, that the magnetite discovered within the companies Byro mining leases is of unique quality. The processing system developed by Xinhai was specifically tailored to suite the Byro project ore type while targeting a product suitable for markets in premium industrial processes, high purity metal production and the growing global Powder Metal (PM) industries.

Xinhai demonstrated the process route can reliably produce a bulk concentrate that could be divided into two categories, a High Purity magnetite product (HPFe) 71.5%Fe < 72%Fe, and a Super Purity magnetite product (SPFe), >72%Fe, (Table 1 and Table 4).

The test work shows successful magnetic concentration was achieved using innovative processing methods without the requirement of reverse floatation circuits for both ore bodies. The consequence of not using reverse floatation means no reagents used in processing and this means close to zero harmful inputs into a system where the primary ore is very low in sulphur and very low phosphorous or other detritus. The process developed by Xinhai has a very low environmental impact and can be achieved with significant cost advantage compared to the current high-grade market equivalents.

Multi-element and phase analysis results and grain size analysis are listed below. The results are from a consistent product, a consequence of the processing flow system designed by Xinhai. The processing system developed by Xinhai resulting in a 72.06%Fe product is exceptional when considering the theoretical maximum content of iron in pure magnetite is 72.35%Fe. Multi-element and phase analysis was completed using atomic absorption spectrometry, (AAS).

Modelling of the FE1 ore body within mining lease (M09/166), forecasts annual throughput of 3,960,000t/a over an eight year mine life, producing ~1,200,000t of concentrate at 68%Fe - 70%Fe. The product is further processed to produce SPFe magnetite 450,000t at >72%Fe and HPFe magnetite 620,000t at >71.5%Fe, and 33,000t at >65%Fe. Full assay results for the FE1 HPFe and SPFe are listed in Tables 1-6 and results for the Mt Narryer ore body within mining lease M09/168 in Table-7.

The Analysis Results for SPFe Magnetite from FE1

Table 1 Multi-Element Analysis of Super-Purity Magnetite from FE1

Element	TFe	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	CaO	MgO	TiO <sub>2</sub>	MFe	FeO
Content (%)	<b>72.06</b>	0.31	0.21	0.14	0.07	0.10	71.23	22.65
Element	S	P	K <sub>2</sub> O	Na <sub>2</sub> O	Mn	V <sub>2</sub> O <sub>5</sub>	Cl	F
Content (%)	0.03	<0.01	<0.01	0.012	0.068	<0.01	<0.01	<0.01

Table 2 Phase Analysis Results of SPFe High-Purity Iron Powder of FE1 Ore

Phase	Magnetic Iron	Metallic Iron	Ferric Sulfate	Siderite	Hematite & Limonite	Iron Sulfide	Iron Silicate	Total
Iron content (%)	71.23	0.25	0.43	0.01	0.08	0.01	0.05	<b>72.06</b>
Proportion (%)	98.85	0.35	0.60	0.01	0.11	0.01	0.07	100.00

Table 3 Grain Size Screen Analysis Results of SPFe High-Purity Iron Powder of FE1 Ore

Size Fraction (Mesh)		Yield (%)		Grade (%)		Proportion (%)	
		-	Total	TFe	SiO <sub>2</sub>	TFe	SiO <sub>2</sub>
+200	>74µm	18.94	18.94	71.78	0.45	18.87	27.13
-200+325	74 µm>44µm	32.82	51.76	71.97	0.32	32.78	33.43
-325+500	44µm < 30µm	20.21	71.97	72.11	0.28	20.22	18.02
-500	<30 µm	28.03	100.00	72.32	0.24	28.13	21.42
Raw ore		100.00	-	<b>72.06</b>	0.31	100.00	100.00

The Analysis Results for HPfe Magnetite from FE1

Table 4 Multi-Element Analysis Results of High-Purity Iron Powder HPFe

Elements	TFe	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	CaO	MgO	TiO <sub>2</sub>	MFe	FeO
Contents (%)	<b>71.55</b>	0.59	0.34	0.16	0.09	0.10	70.72	21.21
Elements	S	P	K <sub>2</sub> O	Na <sub>2</sub> O	Mn	V <sub>2</sub> O <sub>5</sub>	Cl	F
Contents (%)	0.03	<0.01	<0.01	0.013	0.071	<0.01	<0.01	<0.01

Table 5 Phase Analysis Results of High-Purity Iron Powder HPFe of FE1 Ore

Phase	Magnetic iron	Metallic iron	Ferric Sulfate	Siderite	Hematite and Limonite	Iron Sulfide	Iron Silicate	Total
Iron contents (%)	70.72	0.24	0.44	0.01	0.08	0.01	0.05	<b>71.55</b>
Proportion (%)	98.84	0.34	0.62	0.01	0.11	0.01	0.07	100.00

**Table 6 Grain Size Screening Analysis Results of High-Purity Iron Powder HPFe of FE1 Ore**

Size (mesh)	Micron $\mu\text{m}$	Yield (%)		Grade (%)		Proportion (%)	
		-	Total	TFe	SiO <sub>2</sub>	TFe	SiO <sub>2</sub>
>200	>74 $\mu\text{m}$	21.94	21.94	71.04	0.89	21.78	32.96
200 <325	74 $\mu\text{m}$ >44 $\mu\text{m}$	32.53	54.47	71.31	0.65	32.42	35.69
325 < 500	44 $\mu\text{m}$ < 30 $\mu\text{m}$	18.21	72.68	71.84	0.48	18.28	14.75
<500	<30 $\mu\text{m}$	27.32	100	72.06	0.36	27.52	16.6
Raw ore		100	-	<b>71.55</b>	0.59	100	100

**The Analysis Results for HPFe magnetite form concentrate from Mt Narryer**

The test trials applied to the Mt Narryer ore body concentrate involved the same procedures applied to the FE1 concentrate. The maximum purity achievable for the Mt Narryer ore using this method is a high purity concentrate of 71.59%Fe which is HPFe magnetite. The TFe recovery was 97.82%

**Table 7. Multi-Element Analysis Results of High-Purity Iron Powder Product HPFe of MT Ore**

Elements	TFe	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	CaO	MgO	TiO <sub>2</sub>	MFe	FeO
Contents (%)	<b>71.59</b>	0.58	0.20	0.04	0.10	0.045	69.49	20.42
Elements	S	P	K <sub>2</sub> O	Na <sub>2</sub> O	Mn	V <sub>2</sub> O <sub>5</sub>	Cl	F
Contents (%)	0.07	0.003	<0.01	<0.01	0.002	<0.01	<0.01	<0.01

**Table 8. Phase Analysis Results of High-purity Iron Powder HPFe of MT Ore**

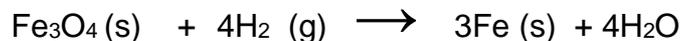
Phase	Magnetic iron	Metallic iron	Ferric Sulfate	Siderite	Hematite and Limonite	Iron Sulfide	Iron Silicate	Total
Iron contents (%)	69.49	0.57	1.36	0.03	0.059	0.021	0.06	<b>71.59</b>
Proportion (%)	97.07	0.80	1.90	0.04	0.08	0.03	0.08	100.00

**Table 9. Grain Size Screening Analysis Results of High-purity Iron Powder Product HPFe of MT Ore**

Size (mesh)	Micron $\mu\text{m}$	Yield (%)		Grade (%)		Proportion (%)	
		-	Total	TFe	SiO <sub>2</sub>	TFe	SiO <sub>2</sub>
325	>44 $\mu\text{m}$	16.21	16.21	70.23	0.88	15.9	24.57
325 + 500	44 $\mu\text{m}$ < 30 $\mu\text{m}$	17.93	34.14	71.24	0.79	17.84	24.39
-500	<30 $\mu\text{m}$	65.86	100	72.02	0.45	66.26	51.04
Raw ore		100	-	71.59	0.58	100	100

The implications of bulk High Purity and Super Purity magnetite concentrate in terms of project viability is significant. The raw product in concentrate is of the highest quality available and is not directed towards a furnace feed product or valued at the spot price plus standard premiums. This material will eventually make its way to high tech specialized applications.

While exploring markets, development work is continuing towards a further product improvement by removing the oxygen in the magnetite. This will be done by reducing the SPFe magnetite concentrate using a hydrogen reduction process to produce pure Fe and H<sub>2</sub>O in the reduction reaction,



The resulting product is 99.5% pure Fe and can be consumed as a major constituent ingredient in the production of alloys for the growing Powder Metal industry, a globally recognized “Green Technology”.

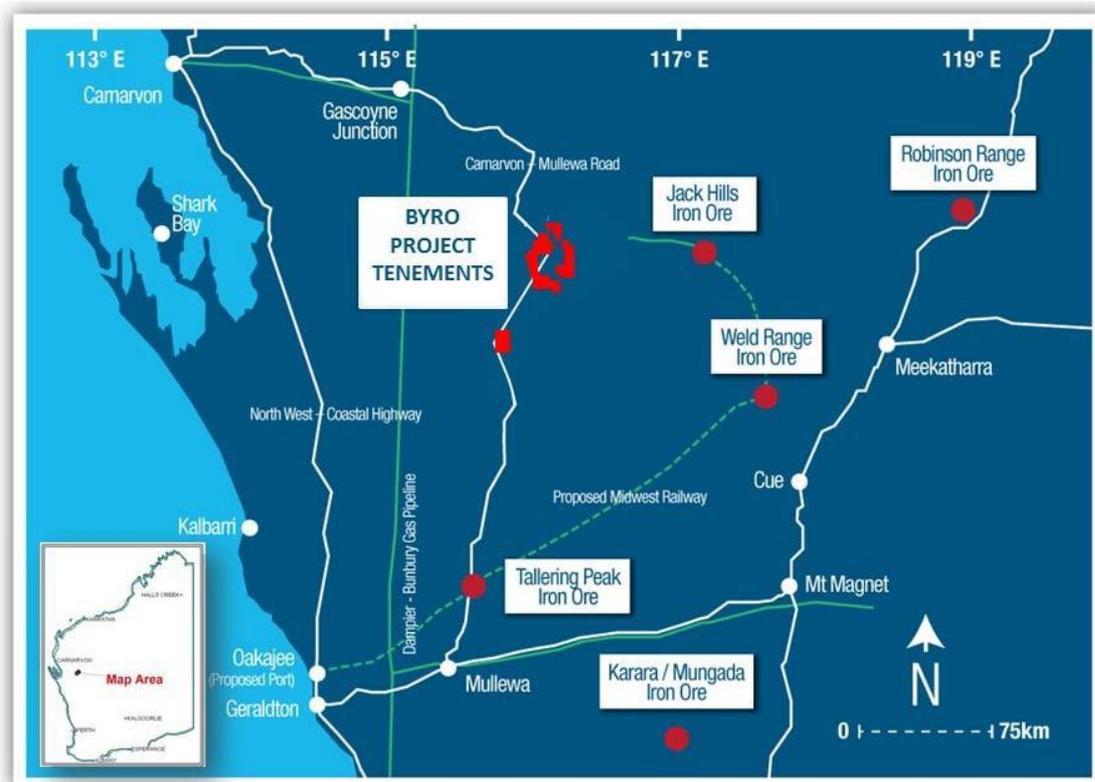
### About Yantai Xinhai Mining Technology and Equipment

Shandong Xinhai Mining Technology and Equipment Inc. (stock code 836079) is a stockholding high and new technology enterprise to provide “Turnkey Solution Plant” including design and research, machine manufacturing, equipment procurement, management service, mine operation, mine materials procurement and management as well as industry resources integration. Up to now, with 500 mine EPC projects, mining technologies and experience of 70 kinds of ores and 88 patents, Xinhai has established overseas offices in Sudan, Zimbabwe, Tanzania, Iran, Peru and Indonesia with products exported to more than 20 countries.

### About Athena Resources Limited.

Athena Resources Limited (ASX:AHN), which is based in Perth was listed on the ASX in 2006 and currently has 217 million shares on issue. Athena owns a 100% interest in the Byro Project through its subsidiaries Complex Exploration and Byro Exploration where it is exploring for copper, nickel, PGE’s and iron ore. Figure 1 below, shows the current tenement holdings.

**Figure 1 Regional Project Location**



Yours Faithfully

Ed Edwards  
**Executive Director**  
**ATHENA RESOURCES LIMITED**

**INTEREST IN MINING TENEMENTS****Athena Resources Limited 100%****Byro**

E09/1507

E09/1552

E09/1637

E09/1781

E09/1938

M09/166

M09/168

E – Exploration License

ML - Mining Lease

**Cautionary Notes****Forward Looking Statements**

This announcement contains certain statements that may constitute “forward looking statements”. Such statements are only predictions and are subject to inherent risks and uncertainties, which could cause actual values, results, performance achievements to differ materially from those expressed, implied or projected in any forward-looking statements.

Drilling to date supports aspects of the estimates in this report which were published earlier this year. The quantity and grade reported is conceptual in nature. There has been sufficient exploration to define a mineral resource and further exploration is warranted to improve understanding and reduce uncertainty about this body.

**JORC Code Compliance Statement**

*Some of the information contained in this announcement is historic data that have not been updated to comply with the 2012 JORC Code. The information referred to in the announcement was prepared and first disclosed under the JORC Code 2004 edition. It has not been updated since to comply with the JORC Code 2012 edition on the basis that the information has not materially changed since it was last reported.*

**Competent Persons Statement**

*The results of the metallurgical investigation included in the announcement were compiled by Mr Yunlong Zhang. Mr Zhang is the Chairman of the Yantai Xinhai Group of which the Yantai Xinhai Mining Research and Design Co. Ltd., is a fully owned subsidiary. Mr Zhang is a Fellow of the Australasian Institute of Mining and Metallurgy and has sufficient relevant experience in the styles of mineralisation and deposit styles under consideration to qualify as a Competent Person as defined in “The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2012 Edition)”. Mr Zhang consents to the inclusion of the information in the announcement in the context and format in which it appears, and new information announced in this report is compliant with the JORC Code 2012 Edition.*

*The information included in the announcement was compiled by Mr Liam Kelly, an employee of Athena Resources Limited. Mr Kelly is a Member of the Australasian Institute of Mining and Metallurgy and has sufficient relevant experience in the styles of mineralisation and deposit styles under consideration to qualify as a Competent Person as defined in “The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2012 Edition)”. Mr Kelly consents to the inclusion of the information in the announcement in the context and format in which it appears, and that the historical information was compliant with the relevant JORC Code, 2004 Edition, and new information announced in this report is compliant with the JORC Code 2012 Edition.*

**Competent Persons Disclosure**

*Mr Zhang is the Chairman of the Yantai Xinhai Group and currently holds securities in the Yantai Xinhai Group as well as securities in the investment company Brilliant Glory Industrial Corporation Limited which has a 19.9% holding in Athena Resources Ltd.*

*Mr Kelly is an employee of Athena Resources Ltd and currently holds securities in the company.*