



OUTSTANDING RESULTS FROM ILMENITE UPGRADE TESTWORK

KEY POINTS

- Breakthrough result for Thunderbird, with testwork confirming that the primary ilmenite can be substantially upgraded using a simple low temperature roast (“LTR”) process
- The LTR process is a low capital addition to processing that substantially increases the TiO₂ grade of ilmenite by 22% to 56.1%
- 96% solubility in sulphuric acid confirms LTR ilmenite as ideal feedstock for sulphate process pigment manufacturing
- LTR ilmenite from Thunderbird will be one of the highest grade sulphate ilmenites globally and should be a preferred feedstock
- Smelter testwork confirms LTR ilmenite is suitable feed for producing high quality TiO₂ slag (89.8% TiO₂) and pig iron
- Work to substantially reduce initial project capital costs is well advanced and the PFS is on track for completion during Q4 2015

Mineral sands developer **Sheffield Resources Limited** (“Sheffield” “the Company”) (ASX:SFX) today announced results from metallurgical testwork conducted on ilmenite from its 100% owned Thunderbird mineral sands project, located near Derby in Western Australia (Figure 2).

The testwork focused on reducing the Fe₂O₃ levels and increasing the TiO₂ content of the ilmenite to obtain a product that will command a higher selling price and be sold into a broader market.

This was achieved by a simple, low temperature (450°C) reduction roast, and subsequent magnetic separation stage, which upgraded TiO₂ in the primary ilmenite by 22% to 56.1% TiO₂ and increased the FeO to Fe₂O₃ ratio. The LTR process proved extremely efficient at reducing Fe₂O₃ within the ilmenite, resulting in a significant increase in both TiO₂ grade and acid solubility.



Figure 1: %TiO₂ solubility vs grade, Sheffield LTR ilmenite product (red) benchmarked against known sulphate ilmenites (blue)

The results of the sulphuric acid solubility testwork show that the TiO₂ solubility for the 450°C LTR ilmenite product is very high at 96.2% using an acid-to-ore ratio of 1.67.

The TiO₂ solubility of the Thunderbird LTR ilmenite was benchmarked against several known commercial ilmenites that are suitable for existing sulphate plants (Figure 1). The LTR ilmenite is in the highest bracket of solubility, and has a higher TiO₂ grade than all the ilmenites tested in the benchmarking exercise.

Sheffield's Managing Director Bruce McQuitty said the testwork has delivered a high grade sulphate ilmenite with specifications well suited as feedstock for both the sulphate pigment market and for TiO₂ slag manufacture.

"This is a breakthrough result for the Thunderbird project. It confirms that the primary ilmenite can be substantially upgraded using a simple LTR process.

"The LTR process and magnetic separation acts as a homogenising process, reducing variability in the ilmenite product.

"It is essential in a competitive market to deliver a consistently high quality product. These results confirm that the LTR ilmenite from Thunderbird will be one of the highest grade sulphate ilmenites globally and should be a preferred feedstock that is likely to displace poorer quality ilmenites."

Background

The Thunderbird deposit is located on the Dampier Peninsula about 60km west of Derby, and 25km north of the sealed Great Northern Hwy joining Derby and Broome (Figure 2). The May 2015 prefeasibility study ("PFS") (see ASX release dated 14 May, 2015) confirmed Thunderbird as a long life zircon rich project that is anticipated to deliver strong margins over an initial 32 year mine life.

The PFS outlined an average annual production of 114,000 tonnes zircon, 439,000 tonnes ilmenite, and 30,000 tonnes of HiTi84 leucoxene (representing approximately 8% of global zircon and 4% of global TiO₂ feedstock markets). Industry experts TZMI completed an assessment of the marketability of final products and concluded that;

- Primary zircon product (66.4% ZrO₂) is suitable for the ceramics market;
- Primary ilmenite product (49.1% TiO₂) is suitable feedstock for the sulphate-route TiO₂ pigment processing; and
- HiTi84 product (87.7% TiO₂) has specifications suited to the welding electrode market

The Thunderbird primary ilmenite has many favourable characteristics, including low levels of key contaminants such as chromium and alkalis.

The PFS indicated a life of mine in excess of 32 years which would potentially deliver a long term stable supply of high quality sulphate ilmenite and zircon into global markets. Planned ilmenite output could underpin a large pigment plant or titanium smelter.

During the PFS it was identified that an upgraded LTR ilmenite would deliver significant upside potential through increased product pricing and greater market diversity.

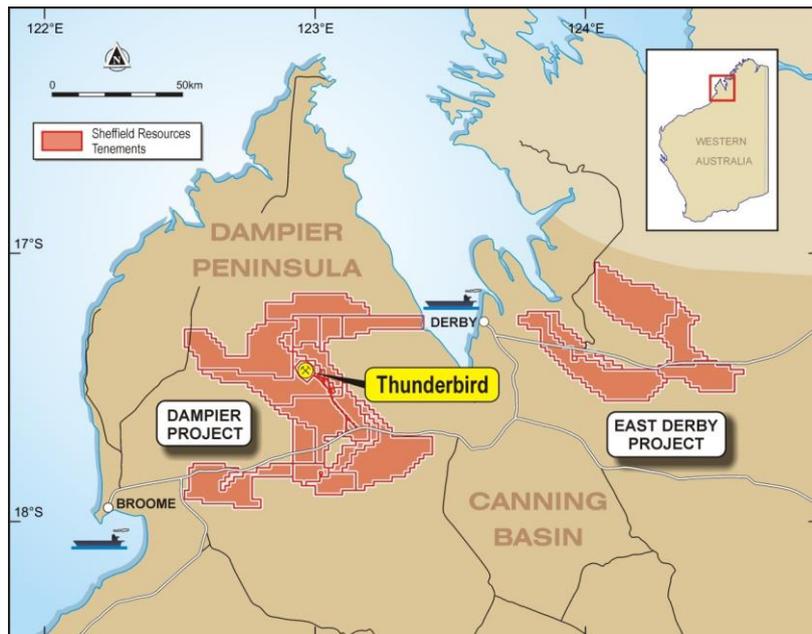


Figure 2: Location of Thunderbird project

LTR & Solubility Testwork

The recently completed metallurgical testwork programme was designed with the following objectives:

1. To determine LTR process conditions required to produce a high grade sulphate ilmenite;
2. To assess the acid solubility of LTR ilmenite and benchmark against commercial sulphate ilmenites; and
3. To assess the suitability of upgraded ilmenite as a smelter feedstock.

The low temperature roast process conditions the primary ilmenite and iron bearing minerals by partial reduction to increase the magnetic susceptibility of iron oxides, while keeping the ilmenite in a temperature range that avoids the solubility of TiO_2 being affected by "rutilisation" (conversion to less soluble rutile).

For Thunderbird, the upgrade of TiO_2 in the ilmenite concentrate is achieved by the removal of iron oxide minerals. These minerals have similar properties to ilmenite before roasting, but after roasting have a much higher magnetic susceptibility, making them easier to separate from the ilmenite fraction using standard low-intensity magnetic separators, resulting in high product yield.

Primary ilmenite products with between 46% and 49% TiO_2 content have been produced from metallurgical testwork on three bulk samples from Thunderbird during the Scoping and Pre-feasibility studies. Sub-samples of the primary ilmenite derived from the PFS metallurgical testwork program were provided to Round Hill Engineering Pty Ltd who undertook LTR testwork and sulphuric acid solubility testwork under supervision of Robbins Metallurgical Pty Ltd.

Smelter Testwork

Test work completed by Outotec on pre-reduced primary ilmenite product derived from the Prefeasibility study test work and modelling completed on LTR ilmenite indicate that high grade TiO_2 slag and pig iron can be produced. The high grade slag product (89.8% TiO_2) compares well with competing slag products from Western and Asian smelters. The testwork showed that the LTR ilmenite is capable of producing both a high quality sulphate and chloride grade slag suitable for pigment plants, further broadening potential markets.

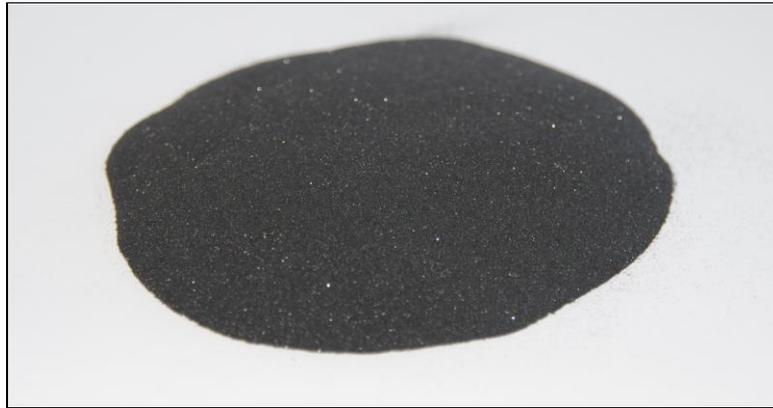


Figure 3: LTR ilmenite product

Next Steps

A larger sample of the LTR ilmenite will be produced during the next stage of work for optimising product specification and yield. This will be used for marketing and offtake discussions. The current testwork will form the basis of assessing the capital and operating costs associated with the LTR ilmenite upgrade plant for inclusion in the PFS Update.

This highly successful ilmenite upgrade testwork follows the recently announced Thunderbird resource update in which the Measured category of the high grade component of resource tripled to 110 million tonnes (Mt) @ 14.9% heavy mineral (see ASX release dated 31 July, 2015). The updated mineral resource of **3.240Bt @ 6.9% HM**, includes a coherent high grade zone of **1.09Bt @ 11.9% HM** at 7.5% HM cut-off (Measured, Indicated and Inferred, Appendix 1).

This completes two key components highlighted as potential upside for the PFS update. The remaining work comprises optimising engineering and reducing initial throughputs to deliver substantially reduced initial project capital costs. This work is well advanced and the PFS is on track for completion during Q4 2015.

ENDS

For further information please contact:

Bruce McQuitty
Managing Director
Tel: 08 6424 8440

bmquitty@sheffieldresources.com.au

Media: Luke Forrestal
Cannings Purple
Tel: 08 6314 6300

lforrestal@canningspurple.com.au

Website: www.sheffieldresources.com.au

COMPLIANCE STATEMENTS

PREVIOUSLY REPORTED INFORMATION

This report also includes information that relates to Exploration Targets, Exploration Results and Mineral Resources which were prepared and first disclosed under the JORC Code 2004. The information has not been updated since to comply with the JORC Code 2012 on the basis that the information has not materially changed since it was last reported. The information was extracted from the Company's previous ASX announcements as follows:

- Thunderbird High Grade Resource Update: *"THUNDERBIRD HIGH GRADE RESOURCE UPDATE"* 31 July 2015
- Thunderbird PFS Update progress: *"QUARTERLY REPORT FOR PERIOD ENDING 30 JUNE 2015"* 27 July 2015
- Thunderbird pre-feasibility study: *"PRE-FEASIBILITY STUDY CONFIRMS THUNDERBIRD AS NEXT MAJOR MINERAL SANDS PROJECT IN GLOBAL DEVELOPMENT PIPELINE"* 14 May 2015

These announcements are available on Sheffield Resources Ltd's web site www.sheffieldresources.com.au.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and, in the case of reporting of Exploration Results, estimates of Mineral Resources or results of Scoping Studies, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. The Company confirms that the form and context in which any Competent Person's findings are presented have not been materially modified from the original market announcement.

FORWARD LOOKING STATEMENTS

Some statements in this report regarding estimates or future events are forward-looking statements. They involve risk and uncertainties that could cause actual results to differ from estimated results. Forward-looking statements include, but are not limited to, statements concerning the Company's exploration programme, outlook, target sizes and mineralised material estimates. They include statements preceded by words such as "anticipated", "expected", "target", "scheduled", "intends", "potential", "prospective" and similar expressions.

ABOUT SHEFFIELD RESOURCES

Sheffield Resources Limited (**Sheffield**) is a rapidly emerging heavy mineral sands (HMS) company.

ASX Code:	SFX	Market Cap @ 44cps	\$59.1m
Issued shares:	134.4m	Cash: \$5.1m (at 30 June 2015)	

Sheffield's projects are all situated within the state of Western Australia and are 100% owned by the Company.

HEAVY MINERAL SANDS

The Dampier project, located near Derby in WA's northwest, contains the large, high grade zircon-rich Thunderbird HMS deposit. Sheffield's pre-feasibility study shows Thunderbird can generate strong cash margins from globally significant levels of production over a 32 year mine life.

The Eneabba project comprises multiple HMS deposits and is located near Eneabba approximately 140km south of the port of Geraldton in WA's Mid-West region.

Sheffield is also evaluating the large McCalls chloride ilmenite project, located 110km to the north of Perth.

NICKEL-COPPER

Sheffield has over 2,000km² of tenure in the Fraser Range region, including the Red Bull project which is within 20km of Sirius Resources NL's (ASX:SIR) Nova Ni-Cu deposit.

Appendix 1: Thunderbird Deposit Mineral Resource 31 July 2015

Table 2: Thunderbird Deposit Mineral Resource¹

Resource Category	Cut off (HM%)	Mineral Resources					In-situ HM (Mt)	Mineral Assemblage ²			
		Material (Mt)	Bulk Density	HM %	Slimes %	Osize %		Zircon %	HiTi Leuc %	Leuc %	Ilmenite %
Measured	3.0	230	2.1	9.4	19	10	21	7.9	2.2	2.1	27
Indicated	3.0	2,410	2.0	6.9	16	8	167	8.4	2.7	3.1	28
Inferred	3.0	600	2.0	5.6	16	9	33	8.4	2.8	3.5	28
Total	3.0	3,240	2.1	6.9	16	9	222	8.3	2.7	3.1	28
Measured	7.5	110	2.2	14.9	17	13	16	7.3	2.1	1.9	27
Indicated	7.5	850	2.1	11.8	15	10	100	7.6	2.4	2.2	28
Inferred	7.5	130	2.0	10.7	14	9	14	7.6	2.3	2.2	28
Total	7.5	1,090	2.1	11.9	15	10	131	7.6	2.3	2.1	28

Table 3: Thunderbird Deposit contained Valuable HM (VHM) Resource Inventory¹

Resource Category	Cut off (HM%)	Zircon (kt)	HiTi Leucoxene (kt)	Leucoxene (kt)	Ilmenite (kt)	Total VHM (kt)
Measured	3.0	1,700	500	500	5,800	8,400
Indicated	3.0	14,000	4,500	5,300	46,700	70,500
Inferred	3.0	2,800	900	1,200	9,300	14,200
Total	3.0	18,500	5,900	6,900	61,800	93,100
Measured	7.5	1,200	300	300	4,300	6,100
Indicated	7.5	7,700	2,400	2,200	27,800	40,000
Inferred	7.5	1,100	300	300	3,900	5,700
Total	7.5	9,900	3,000	2,800	36,000	51,700

¹ All tonnages and grades have been rounded to reflect the relative uncertainty of the estimate, thus sum of columns may not equal. ² Estimates of Mineral Assemblage are presented as percentages of the Heavy Mineral (HM) component of the deposit, as determined by magnetic separation, QEMSCAN and XRF. Magnetic fractions were analysed by QEMSCAN for mineral determination as follows: Ilmenite: 40-70% TiO₂ >90% Liberation; Leucoxene: 70-94% TiO₂ >90% Liberation; High Titanium Leucoxene (HiTi Leucoxene): >94% TiO₂ >90% Liberation; and Zircon: 66.7% ZrO₂+HfO₂ >90% Liberation. The non-magnetic fraction was submitted for XRF analysis and minerals determined as follows: Zircon: ZrO₂+HfO₂/0.667 and High Titanium Leucoxene (HiTi Leucoxene): TiO₂/0.94.