

THUNDERBIRD MINERAL SANDS PROJECT - BFS UPDATE

HIGHLIGHTS

- Bankable feasibility study progressing to schedule and within budget
- Metallurgical test work on 40-tonne bulk sample confirms pre-feasibility study concentration process flow sheet
- Significant increase in heavy mineral concentrate grade
- Substantial improvement in wet concentrate and concentrate upgrade stage recoveries
- Batch tests deliver quality improvements in low temperature roast ilmenite product specifications
- Trenching confirms dozer-trap mining as preferred mining method at Thunderbird

Sheffield Resources Limited (“Sheffield”, “the Company”) (ASX:SFX) is pleased to provide an update on the bankable feasibility study (BFS) being conducted on its 100% owned world-class Thunderbird Mineral Sands Project, located near Derby in northern Western Australia (Figure 1).

The BFS, which is being undertaken by leading engineering firm Hatch on behalf of Sheffield, remains on schedule for completion by the end of 2016. The ilmenite mineral separation process flowsheet has been finalised with minimal change to the pre-feasibility study (PFS) flowsheet. Engineering design has commenced, as has pilot scale test work on the low temperature roast (LTR) ilmenite at Hazen Laboratories in Colorado, USA. Native Title negotiations and the environmental approvals process continue to progress to schedule.

Sheffield’s Managing Director Bruce McFadzean, said: “The BFS test work is on schedule and progressing extremely well. We continue to see significant improvements in metallurgical performance including higher grades in the minus 2mm sand fraction, increased heavy mineral concentrate (HMC) grades and increased stage recoveries for both zircon and ilmenite.

“Further optimisation of the LTR conditions has resulted in outstanding improvements in the LTR ilmenite product specifications including an increase in grade to 57.9% TiO₂ and an increase in the FeO:Fe₂O₃ ratio to greater than 1.0. The increase in FeO substantially improves the marketability of this product due to increased reactivity, which if confirmed by the pilot scale test work currently underway, will position the Thunderbird LTR ilmenite as one of the highest grade sulphate feedstocks available globally.

“Thunderbird is a world-class project with a projected mine life of over 40 years and is one of the few Western Australian mining projects that enjoys ‘Lead Agency’ status with the Department of Mines and Petroleum, underlining the significance of the project to the local community and the state of Western Australia. We continue to work with government departments and stakeholders as we progress Native Title, permitting and community engagement, in parallel with the Thunderbird Bankable Feasibility Study”.



Figure 1: Location of Thunderbird Mineral Sands Project

BFS Metallurgical Test Work

Metallurgical test work on a 40-tonne bulk sample derived from large diameter (700mm) Bauer drill hole samples (refer to ASX announcement 17 September 2015) is well advanced and on track for completion in August 2016. Based on the utilisation of full-scale or scalable equipment, this test work aims to confirm the PFS flowsheet using a sample representative of the projected initial 6-7 years of feed. Results from the concentration circuit stages have demonstrated higher heavy mineral (HM) feed grades and increased recoveries than compared to those achieved in PFS test work. The test work to date has been completed for the feed preparation plant (FPP), wet concentrate plant (WCP) and the concentrate upgrade plant (CUP) processing stages. Recoveries for the WCP stage have met and now exceed predicted mineral recoveries as adopted for the PFS. Bench scale batch test work on the LTR ilmenite has also demonstrated significant improvements in product specifications ahead of definitive continuous test work on a 1.5 tonne sample commencing in late June 2016. Testing of the zircon circuit has also commenced.

Feed Preparation Plant

FPP test work on the 40-tonne bulk sample has shown a substantial increase in the grade of the minus 2mm sand fraction delivered to the WCP to 26.2% HM. This significant improvement on the PFS test work was achieved by screening, scrubbing and de-sliming to remove slimes (8.1%) and oversize (31%). The decrease in slimes and increase in oversize relates to the larger and more representative bulk sample. The plus 2mm oversize outflow from the scrubber/trommel has been shown to contain proportionally less valuable HM. The effective screening and scrubbing of the oversize has resulted in substantial beneficiation of the HM content reporting to the minus 2mm sand fraction. The significantly higher grades (26.2% HM) delivered to the spirals has led to flow-on recovery increases in downstream stages.

Wet Concentrate Plant

The WCP design targets production of a high grade heavy mineral concentrate (HMC) by means of spiral gravity concentrators and a screening stage. The WCP stage test work has produced a high HMC grade of 87.6% that is a 9% improvement on the PFS results. As a consequence, for the WCP circuit, stage recoveries for ilmenite and zircon have increased by 8.6% and 2.7% respectively compared to PFS test work results.



Concentrate Upgrade Plant

The function of the CUP is to separate the magnetic minerals (predominantly ilmenite) from the non-magnetic minerals (predominantly zircon) using wet high intensity magnetic separators. Spiral separators further upgrade the non-magnetic minerals. The BFS test work for this stage has also delivered further substantial recovery improvements. For the CUP circuit, stage recoveries for ilmenite and zircon have increased by 4.2% and 3.0% respectively compared to the PFS test work results.

Low Temperature Roast Plant

The LTR stage facilitates the removal of free iron from the HMC remaining after the previous treatment stages. The LTR process enhances the magnetic susceptibility of the free iron in the HMC by exposing it to reducing gases (H_2 and CO) in a reaction vessel at elevated temperature. The more magnetic fraction is then amenable to removal through a dry magnetic separation process.

Sheffield has recently optimised roast conditions and completed related bench-scale batch tests in Australia to produce a high grade 57.9% TiO_2 LTR ilmenite, with outstanding improvements in the $FeO:Fe_2O_3$ ratio to >1.0 . Batch “sighter” digestion tests have confirmed a substantial increase in reactivity, without causing foaming.

Under the management of Hatch and Sheffield, Hazen Laboratories has commenced final BFS pilot-scale LTR continuous-flow test work, aiming to replicate these improved product specification results on a continuous basis. If confirmed, this will position Thunderbird LTR ilmenite as one of the highest-grade sulphate feedstocks available globally.

Hazen has taken delivery of 1.5 tonnes of Thunderbird ilmenite, produced from BFS metallurgical test work, for its own testing purposes. Treatment of this sample will produce a significant quantity of final product available for customer testing.

Trenching

Three trenches have recently been excavated through near surface materials in the “up-dip” region of the Thunderbird deposit. The work has confirmed dozer-trap mining as the preferred mining method at Thunderbird. The three trenches of up to nine metres depth were designed to evaluate the shallow up-dip portion of the deposit proposed for mining during the anticipated initial six years and to obtain further ore samples for materials handling studies and process test work. The trenches were excavated with a D10 dozer achieving quality productivity rates.

The exposed orebody comprised highly weathered sandstone, compacted sands and minor discontinuous iron cemented bands. The near surface material encountered classifies as medium digging to easy ripping and the observed productivity indicates that targeted BFS production rates will be readily achieved with two D11 dozers feeding a single Mining Unit Plant at 7.5-10 million tonnes per annum. Resultant feed to the WCP will be fixed at a feed rate of 750 tonne per hour solids to the rougher spirals. Excavation of a pit to evaluate potential dozer-trap production rates through the entire orebody thickness is planned following the grant of the Mining Lease.



Resource Update

An update of the Thunderbird Mineral Resource is on schedule to be completed early in July. This update will include results from an additional 110 infill holes drilled last year (refer ASX announcement 10 December 2015), and will form the basis for updated mine design and scheduling studies for the BFS.

Marketing

Sheffield has recently appointed Mr Neil Patten-Williams to the role of Marketing Manager (previously announced on 18 April 2016), further strengthening the Company's management team as it moves the world-class Thunderbird mineral sands project towards production. Final products for market appraisal and off-take discussions will be available during the second half of 2016.

Permitting

Native Title and environmental approvals processes continue to progress to schedule. Negotiations are well advanced with Traditional Owners and finalisation of an agreement is expected during the second half of 2016. The environmental approval process for Thunderbird is on track with the West Australian Environmental Protection Agency having endorsed the Thunderbird Environmental Scoping Document. This paves the way for the project Public Environmental Review process which is due to conclude during the first half of 2017. Highly credentialed Government and Communities Consultant Kim Pervan has recently been engaged to prioritise community, government and stakeholder engagement.

ENDS

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COMPLIANCE STATEMENTS

The information in this report that relates to Exploration Results (results of metallurgical test work) is based on information compiled by Mr Mark Teakle, a Competent Person who is a Member of the Australian Institute of Geoscientists (AIG). Mr Teakle is a full-time employee of Sheffield Resources Ltd and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Teakle consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

PREVIOUSLY REPORTED INFORMATION

This report includes information that relates to Exploration Results and Technical Studies which were prepared and first disclosed under the JORC Code 2012. The information was extracted from the Company's previous ASX announcements as follows:

- Thunderbird Bauer drilling: *"CONVENTIONAL DOZER TRAP MINING ASSESSED AS PREFERRED MINING METHOD AT THUNDERBIRD"* 17 September, 2015
- Thunderbird Pre-feasibility Study: *"PRE-FEASIBILITY STUDY UPDATE CONFIRMS THUNDERBIRD AS THE WORLD'S BEST UNDEVELOPED MINERAL SANDS PROJECT"* 14 October, 2015.
- Infill drilling: *"NEW HIGH-GRADE RESULTS FROM INFILL DRILLING AT THUNDERBIRD"* 10 December, 2015.
- BFS appointment: *"SHEFFIELD APPOINTS HATCH TO DELIVER BFS FOR THUNDERBIRD PROJECT"* 2 March, 2016.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of reporting of Ore Reserves, Mineral Resources and results of Pre-feasibility 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 AND CAUTIONARY 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", "targeting", "likely", "scheduled", "intends", "potential", "prospective" and similar expressions.



ABOUT SHEFFIELD RESOURCES

Sheffield Resources Limited (Sheffield) is focused on developing its 100% owned, world class Thunderbird Mineral Sands Project, located in north-west Western Australia. Sheffield continues to explore the Dampier Project for other mineral sands opportunities, including the exciting Night Train deposit 20km south west of Thunderbird along with other targets identified within the region.

Sheffield is also exploring the Eneabba and McCalls regions north of Perth, Western Australia for mineral sands deposits. As an exploration company, Sheffield continues to assess other regional exploration opportunities.

THUNDERBIRD MINERAL SANDS

Thunderbird is one of the largest and highest grade mineral sands discoveries in the last 30 years.

The deposit is rich in zircon, which sets it apart from many of the world's operating and undeveloped mineral sands projects which are dominated by lower value ilmenite.

Sheffield's Pre-Feasibility study shows Thunderbird is a modest capex project that generates strong cash margins from globally significant levels of production over a 40 year mine life.

The Company is targeting project construction commencing in 2017 with initial production in 2019. The initial planned production profile is aligned with expected emerging supply gaps in global mineral sands markets.

ASX Code:	SFX	Market Capitalisation:	\$62m
Issued shares:	147.4m	Cash (31 Mar 2016):	\$7m (approx.)