



**Breakaway  
Research**

July 2014

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### Company Information

ASX Code	TGN
Share Price	A\$0.039
Ord Shares (29 Jun 2014)	212.0m
Options (31 Mar 2014)	16.8m
<b>Market Cap</b>	<b>A\$8.268m</b>
Cash (est, 29 Jun 2014)	A\$2.6m
Total Debt	Nil
<b>Enterprise Value</b>	<b>A\$5.668m</b>

### Directors

Non-Exec Chairman	Patrick McManus
Managing Director	Paul Berndt*
Non-Exec. Director	Chew Wai Chuen
Non-Exec. Director	David Sanders
Non-Exec. Director	Lee Kong Leng

\*Transition to NED role on 1 August 2014

### Substantial Share Holders

GWR Group	16.5%
Lavington International Limited	9.4%
Wynnes Investment Holdings Ltd	7.1%

### Company Details

Address	Suite 3, 23 Belgravia Street, Belmont WA 6104
Phone	+61894773031
Web	www.tungstenmining.com

### 1 Year Price Chart



Source: IRESS

# Tungsten Mining NL (TGN)

*Activity ramps up*

**Recommendation: Speculative BUY**

## Company Update

### Key Points

- **Successful capital raising of \$4.34m (before costs) in a subdued small-resources market seen as a significant achievement**
- **Proceeds of the capital raising to be used to advance feasibility studies, including further drill outs, metallurgical test work and engineering studies, infrastructure requirements and permitting and marketing**
- **Australian iron ore company GWR Group Limited has become the largest shareholder, securing a 16.5% interest in the recent entitlement issue**
- **Additional metallurgical studies carried out in 2013 have indicated the potential for Dense Medium Scalping which, if successful, would effectively reduce the amount of ore to be processed by more than 50%**
- **Successful implementation of Dense Medium Scalping has the potential to significantly reduce processing plant capital requirements and overall capital and operating costs**
- **Paul Berndt will stand down as Managing Director but will continue as a non-executive director and consultant to the company from 1 August 2014**

*Following the recent capital raising Tungsten Mining is poised to recommence drilling and feasibility studies on its flagship Kilba Project with the intention of transitioning into production in a short time frame.*

## Company Overview

Tungsten Mining NL (ASX: TGN) is an Australian mineral exploration company focused on the development and exploitation of tungsten projects.

Following the establishment of a maiden JORC resource at its flagship Kilba Project in the Gascoyne region in WA, the company released the results of an in-house scoping study which indicated a viable and economically attractive project. The project is on a granted Mining License and all environmental studies have been completed. Based on a tungsten price of US\$440/mtu APT, average annual production of 154,000 mtu over a 7 year mine life, recovery of 80%, capital cost of A\$56m and average LOM operating costs of US\$212/mtu, the project NPV<sub>7</sub> was \$36m. Previous modelling by Breakaway confirmed a valuation in line with the Company's estimate.

A shortage of funding slowed down activities over the past 6-9 months, but following the recent capital raising, drilling will re-commence and full feasibility studies begin.



## Capital Raising

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On 27 March 2014, Tungsten Mining announced that it had entered into agreements to raise up to \$4.24m (before costs) by way of an institutional placement and a renounceable entitlement offer.

### Institutional Placement

*Placement of 10m shares raised \$400,000 before costs*

A placement of 10m shares at an issue price of \$0.04 per new share to two clients of Eight Carat Securities Pty Ltd was completed on 1 April 2014. The effective date of the issue was 31 March. The placement raised \$400,000 before costs. The placement shares were issued pursuant to the Company's available 15% capacity under the ASX Listing Rules.

### Entitlement Offer

*1:1 renounceable entitlement offer to raise a further \$3.84m*

Pursuant to the Prospectus lodged on 2 April 2014, Tungsten Mining raised a further \$3.84m (before costs) through a partially underwritten, renounceable pro-rata entitlement offer. The company offered new, fully paid shares to eligible shareholders at an issue price of \$0.04 each on the basis of 1 new share for every 1 share held at the record date of 10 April 2014. The entitlement offer was partially underwritten by Eight Carat Securities Pty Ltd up to a maximum amount of \$3.0m. The issue price represented a 42.8% discount to the closing price on 31 March 2014.

*Significant shortfall placed by underwriter*

On 5 May 2014, the Company announced that the Entitlement Issue had closed. The shortfall of the issue was 90.276m shares. This shortfall was placed in accordance with the underwriting agreement, raising \$3.611m before costs.

### Use of Proceeds

The proceeds of the Entitlement Offer will be used primarily to advance feasibility studies on the Company's Kilba Project. This includes:

*Proceeds to be used to advance feasibility studies...*

*...and provide working capital*

- Further drill outs - the objective of the proposed drilling programme is to upgrade the Kilba mineral resource (zones 8 and 11 only) from Indicated and Inferred, to Indicated or better to be consistent with the requirement of a Definitive Engineering Study and mine development decision
- Additional metallurgical test work and engineering studies to define the process route for ore beneficiation
- Resolving infrastructure requirements
- Addressing permitting and marketing aspects

Proceeds will also be used for general working capital purposes.

### New Major Shareholders

*GWR Group now the largest shareholder*

GWR Group Limited (ASX: GWR), an Australian iron ore company focused on high quality direct shipping ore (DSO), became a 16.51% shareholder in TGN through participating in the placement of shortfall shares in TNG's recent entitlement issue.

Other groups who became substantial shareholders following the entitlement issue are Lavington International Limited (20m shares or 9.43%) and Wynnes Investment Holdings Limited (15m shares or 7.07%).



## ***Managing Director to Stand Down***

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Having successfully overseen the capital raising, Managing Director Paul Berndt announced his intention to stand down from his role to pursue other opportunities. While his day to day input will be missed, his industry experience will not be entirely lost as he will continue as a Non-Executive Director and will provide consultancy services to Tungsten Mining. Mr Berndt will transfer to the NED role from 1 August 2014.

## ***Project Update***

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### **Scoping Study Update – Additional Metallurgical Test Work**

*Dense Medium Scalping expected to more than halve mill treatment tonnage*

In October 2013, in an update on its scoping study, TGN announced that metallurgical test work had shown the Kilba ore to be amenable to Dense Medium Scalping. In the case of Kilba, this would mean crushing the ore to approximately 5mm before treating in a dense medium cyclone circuit. This is expected to effectively reject in excess of 55% of the mass of run-of-the-mine (ROM) ore as barren waste. This means that only the remaining 45% of the ore, now at twice the original grade, would need to be delivered to the mill for treatment by conventional gravimetric circuits to produce saleable tungsten concentrate.

*Technology currently being used overseas*

Dense medium separation is a proven process that has been successfully used at other tungsten projects, including the Panasqueira mine in Portugal and is also a key component in the design of the processing plant for the Hemerdon Tungsten/Tin Project currently under construction in the United Kingdom. Application of the Dense Medium Scalping process is expected to:

*Application expected to reduce capital requirements and costs*

- Significantly reduce capital requirements for the process plant
- Potentially reduce capital costs as determined in the scoping study
- Potentially reduce operating costs

### **Proposed Drilling Programme**

*First phase 40m pattern over high grade Zone 11 to confirm grade and continuity*

The proposed plan involves a staged drilling programme initially targeting high-grade zones at Zone 11. The first phase of drilling will complete a 40 metre drill pattern over high-grade mineralisation to confirm the grade and continuity of this zone. Drilling of high-grade scheelite mineralisation identified by Union Carbide drilling in the 1980s at Zone 8 and Zone 12 will also be tested by 80 metre spaced drill sections.

*Second phase mainly infill drilling...*

The second phase of the drilling programme will be the completion of the 40 metre spaced sections in the current optimised pit shells of Zone 8 and Zone 11. Further diamond drilling will also be completed to collect bulk samples for metallurgical test work, geotechnical and geological data. Limited exploration drilling is planned at Zone 8 to define additional high grade tungsten mineralisation that has been identified from surface mapping and night lamping. Geological mapping has identified numerous skarn units at Zone 8 that have not been adequately drill tested and future exploration will focus on evaluating these targets.

*...with some bulk sampling drilling and target definition*

*Denser drilling pattern expected to improve the resource categories*

The drilling carried out to date by Tungsten Mining has demonstrated remarkably good continuity of the skarn mineralisation and the Company is confident that further infill drilling on a 40m x 40m spacing will prove up the resource to a higher category consistent with more detailed levels of study. A 6,000m programme of mainly RC drilling is planned.



## Kilba Project

### Location

The Kilba Tungsten Project is located in the Gascoyne Region of Western Australia, approximately 320 kilometres northeast of the regional town of Carnarvon and 250 kilometres southwest of the town of Karratha. The principal access to the project area is provided by the Northwest Coastal Highway, a sealed dual-lane carriageway with direct links to the ports at Dampier, Geraldton and Fremantle. Specific access is via ~10km of dirt road followed by good quality station tracks and then refurbished exploration tracks to the area of interest.

*Located in the Gascoyne Region, WA*

### Mineral Resource

On 28 May 2014, Tungsten Mining announced a maiden JORC resource for Kilba. The Resource is made up of two zones of mineralisation at 'Zone 8' and 'Zone 11' which combine to give a total resource of 5Mt @ 0.27% WO<sub>3</sub> (based on a 0.10% WO<sub>3</sub> cut-off).

#### Kilba Project: JORC Resource

Zone	Category	Tonnes (000's t)	WO <sub>3</sub> %	WO <sub>3</sub> (t)
8	Inferred	230	0.56	1,300
	<b>Total</b>	<b>230</b>	<b>0.56</b>	<b>1,300</b>
11	Indicated	1,300	0.30	4,000
	Inferred	3,500	0.24	8,500
	<b>Total</b>	<b>4,800</b>	<b>0.29</b>	<b>13,000</b>
<b>Total</b>	Indicated	1,300	0.30	4,000
	Inferred	3,730	0.26	9,800
	<b>Total</b>	<b>5,030</b>	<b>0.27</b>	<b>13,800</b>

*Maiden resource of 5.0Mt at 0.27% WO<sub>3</sub> containing 14,000t of WO<sub>3</sub>...*

*Source: Tungsten Mining*

The 'Zone 11' deposit hosts the majority of the Resource (~95%) and includes a **high grade component of 1.3Mt @ 0.57% WO<sub>3</sub>**. The Zone 11 ore body is interpreted to dip at 30-70 degrees towards the southwest with the mineralisation predominantly associated with skarns and calc-silicate units.

*...including a high grade zone*

### Mineralogy

Historic metallurgical testing by Union Carbide in the 1980's indicated a tungsten recovery rate of ~84% from the tungsten bearing ore (scheelite). This exceptionally high recovery was due to the coarse grained nature of the mineralisation making it relatively easy to liberate and simple to process.

*Historical recovery rates >80% reported...*

As part of the scoping study, Tungsten Mining confirmed these high recovery rates (of at least 80%) though work carried out with ALS-Ammtec. Test work indicates that the optimum liberation size (grind size) of the scheelite mineralisation is 1-2mm and at this size, the ore responds well to conventional gravity separation techniques, such as spirals and shaking tables. The simple beneficiation techniques lead to relatively modest CAPEX requirements.

*...confirmed in the TGN scoping study*

### Scoping Study

Tungsten Mining completed a preliminary in-house scoping study designed to assess the viability of the Kilba Tungsten Project, the results of which were released on 12 June 2014. The most important outcomes of this study are summarised in the table below.



## Scoping Study Outcomes

Anticipated initial mine life	7 years
Total production (LOM), WO <sub>3</sub>	1.1M mtu
Average production p.a. WO <sub>3</sub>	154,000 mtu
Capital Cost A\$	A\$56 million
Average LOM Operating Cost	US\$ 212/mtu
Tungsten recovery overall	80%
Tungsten concentrate grade	>68% WO <sub>3</sub>
IRR	34%
<b>NPV at 7% (@ US\$440/mtu APT price)</b>	<b>\$36 million</b>

Source: Tungsten Mining

Scoping study indicated a project NPV of \$36m...

...in line with Breakaway's valuation

Price of APT remains currently in excess of US\$350/mtu

Breakaway has previously modelled the Kilba project based on the cost inputs of the Scoping Study. Based on a US\$440/mtu APT price (as forecast by Roskill to 2016), the project valuation was in line with the company's estimate of NPV<sub>7</sub> \$36m. Earlier processing of higher grade ore has a very positive effect on the project economics.

## Tungsten Pricing

After breaking through the US\$400/mtu level in March 2011, the price of APT (ammonium paratungstate) peaked at just over US\$470/mtu in June of that year. After holding reasonably steady in the \$US\$430-US\$470/mtu range until April 2012, the price declined fairly sharply over the next nine months, falling to marginally below US\$300/mtu by the end of 2012. Thereafter, the price again rose to US\$400/mtu before receding to trade in the more recent US\$365/US\$380 range.

## Breakaway's View

Following its listing in December 2012, Tungsten Mining made steady progress in establishing a maiden JORC resource and completing an in-house scoping study. This study established that the Kilba Project:

- is considered to have positive economic potential;
- has no fatal flaws relating to the development of the project; and
- could be brought into production in a relatively short space of time.

The project is located on an already-granted Mining Licence, significantly reducing the lead time to production.

Based on the outcomes of the Scoping Study, Tungsten Mining estimated a modest CAPEX requirement of approximately A\$56m, including A\$44m for the construction of a 0.75Mtpa plant. This comparatively low CAPEX is a function of the relatively simple processing route required to process the scheelite ore. Subsequent metallurgical test work suggests that the use of Heavy Medium Scalping could further simplify the process and reduce both capital and operating costs. Tungsten Mining's strategy of processing higher grade ore in the early years is sensible in Breakaway's view as it maximises shareholder values and also allows the Company to rapidly pay back any debt.

Lack of funding over the past nine months has held up the project development timetable, but the recent capital raising should ensure that the feasibility study is completed in a timely manner, allowing a development decision to be made.



### **Analyst Verification**

We, Grant Craighead and Basil Burmeister, as the Research Analysts, hereby certify that the views expressed in this research accurately reflect our personal views about the subject securities or issuers and no part of analyst compensation is directly or indirectly related to the inclusion of specific recommendations or views in this research.

### **Disclosure**

Breakaway Investment Group (AFSL 290093) may receive corporate advisory fees, consultancy fees and commissions on sale and purchase of the shares of Tungsten Mining and may hold direct and indirect shares in the company. It has also received a commission on the preparation of this research note.

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