

## Hemerdon Ball - planning to be a new tungsten source.

### Event

- We present basic facts pertaining to Wolf Minerals Ltd (WLF).

### Analysis

- Tungsten (W) and tin (Sn) are strategic metals.**  
 Strategic metals are metals integral to a nation's defence, aerospace or energy industries, but domestic demand for them outstrips supply capability now or in the future. The USA and China both classify W and Sn as strategic metals. In June the European Commission determined W to be a "Critical Raw Material".
- Substantial deposit of strategic metals.**  
 WLF's Hemerdon Ball project is one of the world's largest undeveloped tungsten-tin resources outside China.
- Low sovereign risk; alternative to Chinese supply.**  
 Located in SW England, which has a mining history over centuries. Planning and development approvals in place. China contributes 80% of annual tungsten production. An attractive, politically stable, supply source for European and North American tungsten end-users seeking alternatives to Chinese supply.
- JORC-compliant resources and reserves.**  
 Definitive Feasibility Study (DFS) now underway, based on:  
**Resources: 218.5 Mt at 0.18% WO<sub>3</sub> and 0.02% Sn (as at Jun 2010)**  
**Reserves: 34.5 Mt at 0.18% WO<sub>3</sub> and 0.03% Sn (as at Nov 2008)**  
 WO<sub>3</sub> is tungstate, containing 79.3% tungsten metal. Sn is tin.
- Substantial contained metal.**  
 The reported Measured, Indicated and Inferred resources contain more than 39 million mtus of WO<sub>3</sub> (equivalent to more than 310,000t tungsten metal) and over 43,000t of tin metal. The 2008 Probable Reserve contains over 49,000t of tungsten and more than 10,000t of tin.
- Positive market outlook for tungsten.**  
 Total market consumption of tungsten metal is forecast to grow from ~60,000t in 2009 to ~80,000t in 2013. Forecast production shortfall needs to be met from new mines that can be brought onstream in that timeframe.

### Price Catalysts

- Formalised tungsten marketing and distribution agreement with major shareholder Traxys Group.
- Appointment of Project Engineer, Mine Manager and Process Engineer.
- Positive outcomes from the DFS scheduled for completion in October 2010.
- Offtake agreement, potentially before the end of calendar 2010.
- Negotiation of project funding in late 2010 / early 2011.

10 August 2010

#### Company Information

Code	WLF
Last Price	\$0.350
GICS Sector	15 : Materials
Market Capitalisation	\$12.7M
52 week high-low	\$0.530-\$0.290
Cash	\$2M
Enterprise Value	\$11M

#### Capital Structure

Shares on issue	36.3M
Options on issue (various unlisted)	3.5M
Top 20 shareholders	62%
Turnover (A\$ last month)	\$0.1M
Turnover (fpo last month)	0.7%

#### Principal Shareholders

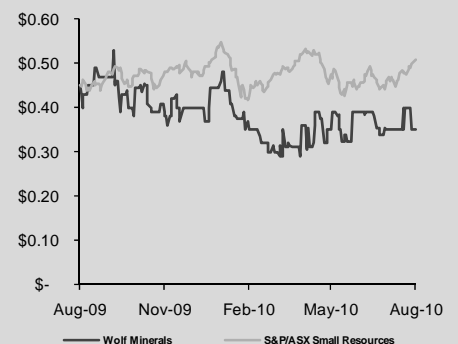
Resource Capital Funds	13.5%
Traxys Projects	13.5%
Ironbark Gold	8.3%
Corazon Mining (formerly Graynic Metals)	5.5%

#### Board and Management

Humphrey Hale	Managing Director
John Hopkins	Non Executive Chairman
Jonathan Downes	Non Executive Director
Don Newport	Non Executive Director
Adrian Byass	Non Executive Director
Jim Williams	Non Executive Director
Christopher Corbett	Non Executive Director
Rupert McCracken	Project Manager

#### Share Price Performance

(Source: IRESS)

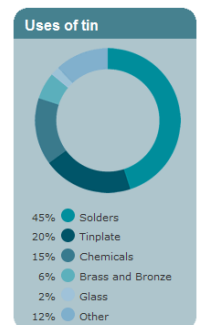


#### Analyst Details

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## Why tungsten and tin?

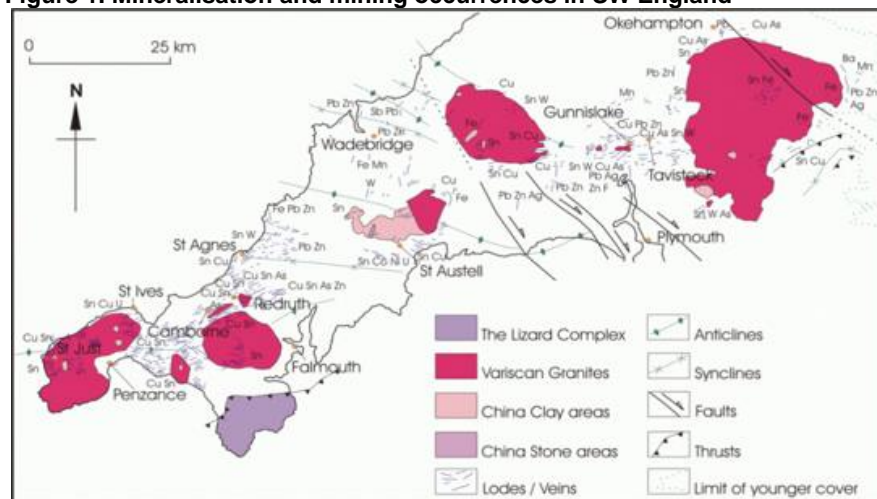
- **Tungsten - strong, hard and high temperature.**
  - Used in applications that incur high wear and tear in high temperatures situations.
  - Tungsten carbide (“cemented carbide”) used in high performance cutting and drilling tools.
  - Steel additive for extra hardness and higher temperature performance in steel cutting tools.
  - Common uses: filaments in light globes; heating elements in other electrical appliances.
  - Space technology due to high melting point (3,400°C) and high resistance to corrosion.
  - Military application in armour-piercing ammunition due to its hardness and density.
  - Tungsten carbide is an effective neutron reflector - used in nuclear applications.
  
- **Tin - clean and green.**
  - Main use is as tin solder in electronic circuitry and in joining pipes or sheet metal. It has replaced lead as it has no noticeable toxic effects.
  - Tin plate remains a common application to prevent corrosion.
  - Bonds well with other metals so used in alloys (bronze; pewter).
  - Tin chemicals are used as catalysts, as fire retardants, in cement, as glass coatings, and as anti-microbial agents.
  - High technology applications: lithium ion batteries; fuel cells (catalyst to improve efficiency).
  - Replaces lead shot in shotgun cartridges as the fallen pellets do not toxify the wetlands.



## Hemerdon Ball: a new mine development in SW England

- **Stable political setting, long history of mining.**  
Hemerdon Ball is located 10km north-east of Plymouth, a port on the coast in south-west England, making it a low sovereign risk operation.

**Figure 1. Mineralisation and mining occurrences in SW England**



Source: [www.poldark-mine.co.uk/geology](http://www.poldark-mine.co.uk/geology)

SW England has a long history of mining, mainly associated with its many granites (shown in red in the map above). Hemerdon Ball is the Sn, W occurrence just above the “u” of “Plymouth”.

- The mine last produced tungsten and tin in 1944. International miner AMAX spent over £20 million from 1977 to increase the resource base and construct a decline to access fresh rock for metallurgical testwork as part of a comprehensive feasibility study.
  
- AMAX also built a pilot gravity plant and in 1981 submitted its initial planning application. In 1986 it finally received Devon County Council approval, but falling commodity prices over the 5-year delay had made the project uneconomic, leading to AMAX withdrawing from the project in 1993.

- **Unusual pricing units for tungsten.**

The pricing of tungsten (also known as wolfram) is unique. Tungstate ( $WO_3$ , or tungsten trioxide) and contained tungsten metal are quoted in "\$ / mtu", where "mtu" stands for "metric tonne unit", and 1 mtu = 10kg of product.  $WO_3$  contains 79.3% W metal.
- **Definitive Feasibility Study underway.**
  - GR Engineering appointed to conduct the DFS on the 3Mtpa proposed plant.
  - Ammtec is conducting metallurgical testwork to confirm the process flowsheet design.
  - Coffey Mining to design waste dump and tailings facility.

The DFS is scheduled for completion in October 2010.
- **Established reserve and resource base.**

Respected industry consultants SRK have recalculated the JORC-compliant resource estimate:

**Measured, Indicated and Inferred: 218.5 Mt at 0.18%  $WO_3$  and 0.02% Sn**

This resource contains 393,000t of  $WO_3$  (>210,000t tungsten metal) and >43,000t tin metal.

In late 2008 Cube Consulting derived an ore reserve based on the previous SRK resource:

**Probable: 34.5 Mt at 0.18%  $WO_3$  and 0.03% Sn**

Part of the DFS process will involve pit optimisations based on the recalculated resource base to establish a new reserve on which to plan the optimal mining approach.
- **Low strip ratio.**

Work to date indicates the proposed mining operation should have a low strip ratio in the order of 1.46:1 Waste to Ore (1.46t of waste moved per tonne of ore). The DFS will confirm a final figure.
- **Project development on track.**

A number of other studies and reviews are either underway or have been completed:

  - Mine development approval: granted.
  - Planning permission: current and valid until 2021 for commencement of mining.
  - Environmental review: completed - reptile survey remaining.
  - Flora and Fauna baseline studies: completed.
  - Groundwater study: completed.
  - Infrastructure and Archaeological review: underway.
  - Resource / reserve confirmation drilling: completed.

### **The tungsten market: characteristics and outlook**

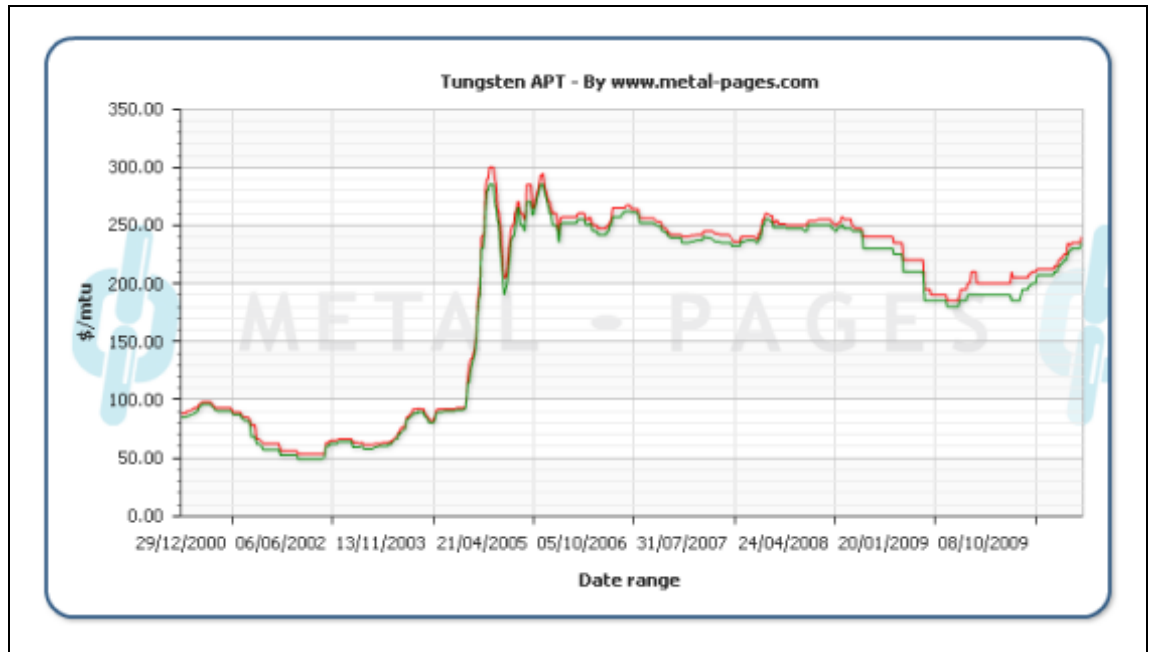
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- **Offtake agreements are of paramount importance.**

Tungsten trades mainly in private contracts between producer and end-user, with or without a trading intermediary. A secure, robust offtake agreement with a reputable counterparty is thus vital for bank finance. Major shareholder Traxys Europe (a global provider of financing and metals marketing and distribution) has signed agreements to market 100% of WLF's tungsten concentrate production and offtake for 100% of the tin concentrates at spot market prices.
- **The global tungsten market is not transparent.**

China does not publish costs for its tungsten production. This makes identification of a project's position on the global cost curve at best questionable. As a guideline, prices of APT (ammonium paratungstate, the main secondary downstream tungsten product), fell to \$185 per mtu during the GFC and then held that level (Figure 2 below). Prices have subsequently recovered to today's level of ~\$240 per mtu.

**Figure 2. Historical tungsten APT price performance.**



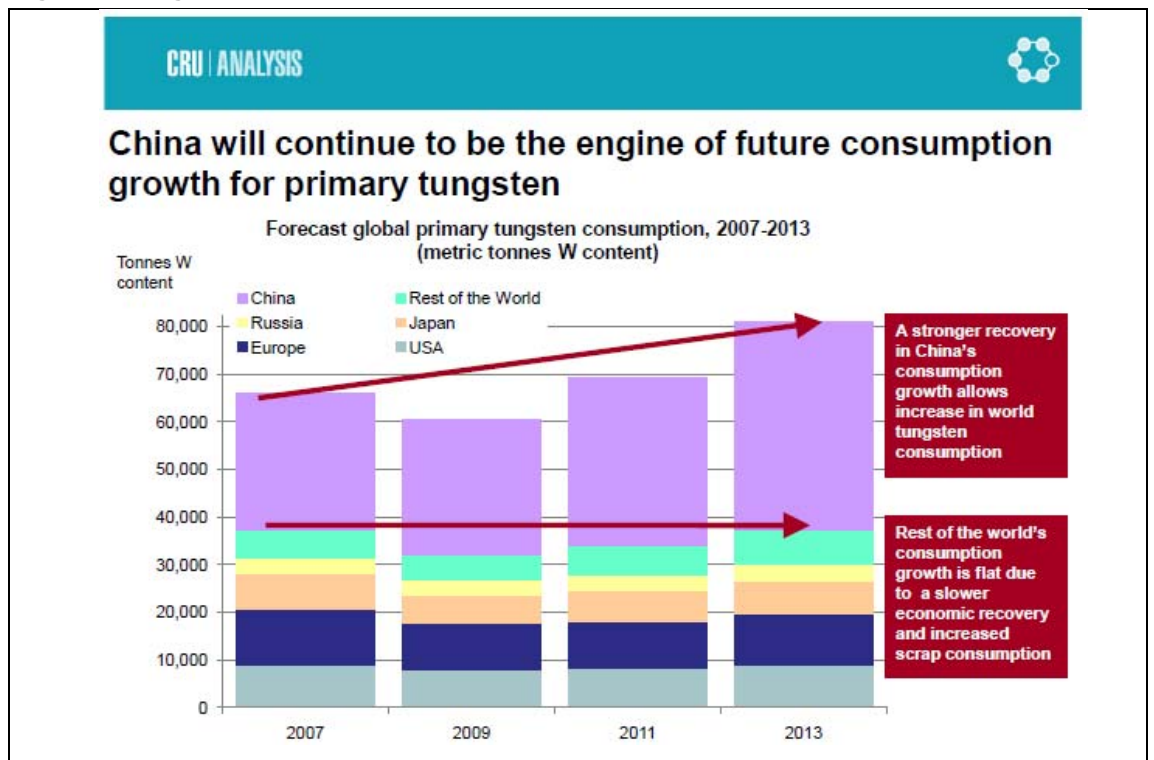
Source: www.metal-pages.com

- **China is the principal market driver.**

Estimated current global consumption of tungsten metal outside China is ~32,000t (refer Figure 3 below). This was from total 2009 market consumption of about 60,000t tungsten metal.

Estimated current 2009 global mine supply outside China: ~14,000tpa (Source: CRU)

**Figure 3. Tungsten consumption trends.**



Source: CRU Press Release, "The outlook for tungsten to 2013"

China's demand for tungsten is forecast to continue to grow, so it will remain a net importer of concentrates and ore. The net result is likely to be a growing supply deficit for users outside China unless new mines come on stream in Western countries.

Hemerdon Ball appears to be one of few Western projects that is sufficiently advanced to be in a position to contribute new tungsten production into the production shortfall forecast by 2013.

### Project risks and advantages

- The absence of Chinese shareholders distinguishes WLF from many other tungsten plays (tin is a by-product). China views tungsten and tin as strategic metals: it has ~60% of global tungsten resources and ~80% of annual global production. China's government policy towards tungsten is designed to support its local industry (from both supply and demand perspectives).
- By disallowing export of any tungsten ores or concentrates and only permitting sale of down-stream products, China enjoys considerable market influence. Thus long-term stable sources of tungsten supply outside China's influence are of particular value to non-Chinese consumers.

#### Principal Advantages

- Low sovereign risk.
- Independent of Chinese influence.
- Open pitable.
- Established infrastructure, power, water, workforce in SW England.
- Close to market (product can be loaded onto trucks at Hemerdon Ball and driven via the Channel Tunnel for direct delivery to European end-users. No double handling).
- Reputable major shareholders with relevant sector experience (Traxys, Resource Capital Funds).

#### Principal Risks

- Relatively low grade (0.18% WO<sub>3</sub>).  
**Mitigant:** open pitable from surface with forecast low strip ratio and relatively simple metallurgy.
- Metallurgical complexities: possibility of contaminants in concentrates produced.  
**Mitigant:** metallurgical testwork will be finalised during the DFS. Initial indications are that minor levels of contaminants may attract pricing penalties but that projected concentrate specifications remain saleable.
- Possibility of bureaucratic delays in receipt of relevant approvals.  
**Mitigant:** most approvals already in place. Mining licence being updated.
- Extraction and discharge licence still outstanding.  
**Mitigant:** no indication of any hold-up foreshadowed. China clay mining operations to the immediate north of the Hemerdon Ball site are currently fully operational without concerns.
- Failure to secure robust offtake agreement.  
**Mitigant:** major shareholder Traxys Group is a global metals marketer with all relevant contacts and is assisting WLF to secure an appropriate and suitable offtake agreement.
- Failure to secure finance.  
**Mitigant:** major shareholder RCF and current Directors have extensive contacts through the finance industry that should be able to assist in obtaining finance as required. Any offtake agreement may possibly include a funding component from the offtake partner.
- Limited exploration upside.  
**Mitigant:** resource is already one of the largest undeveloped tungsten resources in the Western world. Potential to extend mineralisation may exist at depth.

### ASX-listed tungsten plays

- There are a number of ASX-listed companies with tungsten exposure, but only one other (Venture Minerals : VMS) that has both tungsten and tin resources.
- The table below provides summary details on the relevant companies.

**Figure 4. ASX-listed tungsten companies**

Tungsten Players	ASX	Last	Mkt Cap A\$M	Project	Location	Resources	Chinese Holdings (direct and indirect)
Newcrest	NCM	\$34.84	16,870	O'Callaghans	WA	Inf : 59Mt @ 0.29% WO <sub>3</sub> for 170,000t WO <sub>3</sub>	
Heemskirk	HSK	\$0.30	69	Los Santos	Spain	MII : 4.7Mt @ 0.24% WO <sub>3</sub> for 11,151t WO <sub>3</sub>	No substantial
Venture	VMS	\$0.37	62	Mt Lindsay	Tas	Inf : 8.6Mt @ 0.28% WO <sub>3</sub> for 24,080t WO <sub>3</sub>	14% City Glory (HK)
Hazelwood	HAZ	\$0.19	41	Big Hill	WA	MII : 16.2Mt @ 0.16% WO <sub>3</sub> for 25,426t WO <sub>3</sub>	No substantial
Vital	VML	\$0.08	15	Watershed	Qld	Ind : 15.1Mt @ 0.46% WO <sub>3</sub> for 69,300t WO <sub>3</sub>	14.8% Aragon, in turn held 28.5% by MLX
Wolf	WLF	\$0.36	13	Hemerdon	England	MII : 218.5Mt @ 0.18% WO <sub>3</sub> for 393,000t	No substantial
King Island	KIS	\$0.17	11	Dolphin	Tas	I+I : 15.9Mt @ 0.66% WO <sub>3</sub> for 105,550t WO <sub>3</sub>	50% + finance: Hunan Non-Ferrous
Icon	III	\$0.07	7	Mt Carbine	Qld	Inf : 10.6Mt @ 0.21% WO <sub>3</sub> for 22,400t WO <sub>3</sub>	<5% MLX
Planet	PMQ	\$0.10	6	Wolfram Camp	Qld	MII : 0.95Mt @ 0.41% WO <sub>3</sub> for 3,900t WO <sub>3</sub>	76% Metallica, in turn 18% Chinese-owned
Paradigm	PDM	\$0.03	3	White Rock	NSW	Inf : 0.26Mt @ 0.7% WO <sub>3</sub> for 1,800t WO <sub>3</sub>	No Chinese - Sempra Metals 7.6%
Thor	THR	\$0.01	2	Molyhil	Qld	MII : 3.8Mt @ 0.32% WO <sub>3</sub> for 12,000t WO <sub>3</sub>	No substantial.

Source: Blackswan Equities Research, Company reports.

### Estimated Project Timeline

- October 2010: Completion of Definitive Feasibility Study.
- December quarter 2010: Offtake agreement.
- December 2010: Arrange equity / debt funding.
- March quarter 2011: Construction starts.
- March quarter 2011: Mining operations commence.
- November 2012: Plant construction completion.
- December 2012: Plant commissioning and first production.

### Summary

- Large, near surface resource of tungsten mineralisation: 393,000t WO<sub>3</sub>.
- Tungsten metal reserves: 49,000t (resources: 310,000t )
- Additional tin credits: 10,300t tin metal in reserves.
- Located in SW England, close to European markets: low sovereign risk.
- Established mining history - last production of tin and tungsten in 1944.
- Granted mining licence.
- Most of the required government approvals and licences in place.

### Price catalysts

- Formalised tungsten marketing and distribution agreement with major shareholder Traxys.
- Appointment of Project Engineer, Mine Manager and Process Engineer.
- Positive outcomes from the DFS, scheduled for completion in October 2010.
- Offtake agreement, potentially before the end of calendar 2010.
- Negotiation of project funding in late 2010 / early 2011.

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