

25 Aug 2011

## Woulfe Mining (WOF.V)

**Price: C\$0.26**

Mining Sector

*Woulfe Mining continues to fast-track development at its Sangdong tungsten-molybdenum project in South Korea. Since our initiation note of April 2011, the company has continued an aggressive drilling programme at Sangdong, leading to the calculation of an NI 43-101-compliant mineral resource, and preparation of a revised mine plan for the deposit that is expected to lead to production on, or ahead of schedule. Further, recent developments have prompted Woulfe to commission a formal valuation of Sangdong with the intent of obtaining a more favourable agreement for development of the deposit. The combined effect of these and other key developments is a significant increase in our valuation of Sangdong and Woulfe.*

### UPDATE

- Continued drilling at Sangdong has allowed the preparation of a mineral resource estimate**  
Woulfe Mining has wrapped up a Phase 1 drilling programme at Sangdong that has produced assays exceeding expectations of both grade and width across the three mineralised zones. The drilling programme targeted the remaining mineralisation in the upper section of the mine above the second level, for mine planning and feasibility reserve estimation purposes.

The Main zone yielded 0.64% tungsten oxide (WO<sub>3</sub>) over a true width of 10.2 metres. The Footwall zone yielded 0.43% WO<sub>3</sub> over 10.4 metres, while the Hangingwall zone yielded 0.49% WO<sub>3</sub> over 7.5 metres.

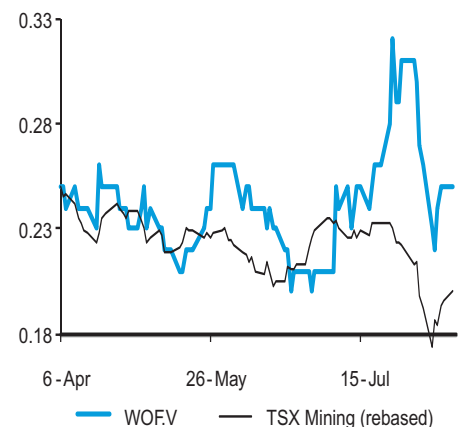
In July, Woulfe received an NI 43-101-compliant mineral resource estimate prepared by Wardrop for the upper portion of Sangdong, accounting for approximately 25 percent of the mineralisation. The estimate, which is based on modern drilling only, included an indicated resource of 5.968 million tonnes averaging 0.42% WO<sub>3</sub> and 0.04% molybdenum disulfide (MoS<sub>2</sub>). This resource is based on drilling at 25-metre centres and has a high degree of confidence. A further inferred resource of 18.57 million tonnes averaged 0.45% WO<sub>3</sub> and 0.05% MoS<sub>2</sub>.

In 2010, Wardrop prepared a mineral resource estimate for the entire Sangdong deposit. This included a 45.8 million-tonne inferred resource in the Hangingwall zone, which averaged 0.32% WO<sub>3</sub> and 0.05% MoS<sub>2</sub>, and a 57.4 million-tonne inferred resource in the Footwall zone, which averaged 0.37% WO<sub>3</sub> and 0.04% MoS<sub>2</sub>. This resource was based on extensive historical drilling data, but which did not meet current NI 43-101 quality standards, resulting in an inferred classification.

- Woulfe has obtained a US\$300m valuation opinion for Sangdong**  
The company commissioned Ross Glanville and Associates to prepare a valuation opinion of the fair market value of Sangdong. This work arrived at a net present value, discounted at 8 percent, of US\$300m, within a range of US\$200m to US\$400m. Some of the key assumptions used by Glanville were a US\$375 per metric tonne unit price for WO<sub>3</sub>, a mine operating at 1.2 million tonnes per year for 21 years, and an average grade of 0.41% WO<sub>3</sub>.
- Woulfe has refined its proposed mine plan, reducing costs and shrinking timelines**  
The company has prepared a new capital cost estimate for a Sangdong mine, based on construction of a 1.2-million-tonne-per-year operation. Woulfe commissioned Contromation Indonesia, an independent company with extensive experience in design and construction of projects in Asia, to design and cost the processing plant for Sangdong. Based on the crushing and milling portion of the design, the company now expects the capital cost for development at US\$135m, approximately 10 percent less than our earlier assumption of US\$150m for a comparable operation. The company's scoping study had projected a capital cost of US\$289m for a 2.4-million-tonne-per-year mine.

The revised estimate carries a level of accuracy of approximately 20 percent. As a result, we have decreased our capital cost estimate to US\$145m, whilst retaining our more conservative view.

### Price chart (C\$)



### Value of equity\*

Expected Value	C\$182.2m
<b>Value per share</b>	<b>C\$0.68</b>
Optimistic Scenario	C\$351.6m
<b>Value per share</b>	<b>C\$1.33</b>

### Company details

#### Quote

Shares	
- TSX Venture	WOF.V
- Frankfurt	OZ4.F
- OTC QX	WFEMF
Hi-Lo last 12-mos. (C\$)	0.07 - 0.55
Shares issued (m)	268.2
Fully diluted (m)	326.3
Market Cap'n (C\$m)	72.4
Website:	<a href="http://www.woulfemining.com">www.woulfemining.com</a>

#### Analysts:

Will Purcell  
[will@objectivecapital.co.uk](mailto:will@objectivecapital.co.uk)

Richard Thompson  
[richard.thompson@objectivecapital.co.uk](mailto:richard.thompson@objectivecapital.co.uk)

#### Objective Capital Research Limited

Token House  
11-12 Tokenhouse Yard  
London EC2R 7AS  
Tel: +44-20-7754-5994  
Fax: +44-(0)203-137-0076  
US toll-free: 1-888-802-7215  
[editor@objectivecapital.com](mailto:editor@objectivecapital.com)

Corporate: [www.ObjectiveCapital.com](http://www.ObjectiveCapital.com)  
Research: [www.ObjectiveCapital.co.uk](http://www.ObjectiveCapital.co.uk)

## Fair value summary\* (C\$m)

Scenario	Base	Pessimistic	Optimistic
Property portfolio			
- Sangdong	221.7	78.8	428.5
- Muguk & others	5.0	5.0	5.0
Total	226.7	83.8	433.5
Less: overhead	25.9	25.9	25.9
Expected value of portfolio	200.8	57.9	407.6
Add: other investments	0.0	0.0	0.0
Add: starting cash + new funds	13.0	13.0	13.0
Total current value for firm	213.7	70.8	420.5
Less: bank & other debt	0.0	0.0	0.0
Total value to equity claims	213.7	70.8	420.5
Less: warrants and options	31.6	7.1	68.9
Ordinary equity holders	182.2	63.7	351.6
Value per share (C\$)	<b>0.68</b>	<b>0.24</b>	<b>1.33</b>

## Expected fair value of Woulfe Mining

Scenario	Risked mineable resources (m tonnes)	Sangdong property value (US\$m)	WOF Valuation (C\$m)	Value per share (C\$)
<b>Base case outlook</b>	<b>15.7</b>	<b>224.6</b>	<b>182.2</b>	<b>0.68</b>
<b>Value for scenarios of further exploration success</b>				
Full proved up	41.4	672.7	560.8	2.09
Optimistic outlook	27.0	428.5	357.2	1.33
Pessimistic outlook	8.1	78.8	64.7	0.24
<b>Value with no further exploration success</b>				
Current resource estimate	10.2	116.4	96.4	0.36

### Notes:

- 'fully proven up' scenario assumes that current mineable resource estimates are upgraded to 'Proven' status

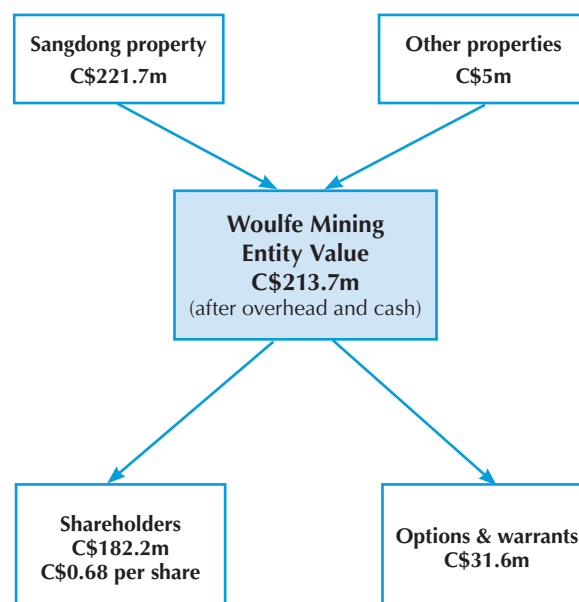
## Sensitivity to market assumption on...

Long run real tungsten price (US\$/lb)	160	185	<b>210</b>	235	260
Value (C\$/share)	0.21	0.44	<b>0.68</b>	0.88	1.04
Change in value (%)	-69%	-35%		+30%	+53%
Time for tungsten price to revert to mean (years)	10	11	<b>12</b>	13	14
Value (C\$/share)	0.54	0.61	<b>0.68</b>	0.74	0.81
Change in value (%)	-21%	-10%		+10%	+19%
Volatility of tungsten price (%)	30%	<b>35%</b>	40%	45%	50%
Value (C\$/share)	0.60	<b>0.68</b>	0.78	0.91	1.06
Change in value (%)	-12%		+15%	+34%	+56%
Interest rate (%)	2.1%	2.2%	<b>2.3%</b>	2.4%	2.5%
Value (C\$/share)	0.70	0.69	<b>0.68</b>	0.67	0.66
Change in value (%)	+3%	+2%		-2%	-3%

## Sensitivity to operating assumption on ...

Recovery rate (%)	66%	68%	<b>+70%</b>	+72%	+74%
Value (C\$/share)	0.53	0.60	<b>0.68</b>	0.75	0.82
Change in value (%)	-22%	-11%		+11%	+21%
Operating Costs (US\$ per tonne)	0.86	<b>0.91</b>	0.95	1.00	1.04
Value (C\$/share)	0.75	<b>0.68</b>	0.60	0.51	0.43
Change in value (%)	+11%		-12%	-25%	-37%
Increase in Capital Cost (%)	<b>+0%</b>	+10%	+20%	+30%	+40%
Value (C\$/share)	<b>0.68</b>	0.66	0.65	0.63	0.61
Change in value (%)		-2%	-5%	-7%	-10%

## Components of Woulfe Mining's entity value



## Sangdong valuation (US\$m)

Scenarios for exploration success	Base	Optimistic	Pessimistic
<b>Net value of production</b>	<b>1587.3</b>	1587.3	1587.3
Expected mining success*	37%	61%	20%
<b>Expected net value of production</b>	<b>582.5</b>	970.4	314.4
Add: tax shield on depreciation charge	67.8	67.8	67.8
Less: development & operational capex	222.3	222.3	222.3
<b>Value of mining operations</b>	<b>428.0</b>	815.9	159.8
Probability of putting into production	54%	54%	54%
<b>Expected value of deposit</b>	<b>231.1</b>	440.6	86.3
Less:			
- expect pre-development costs**	6.5	6.5	6.5
- further exploration costs ***	—	—	—
Expected value of project	<b>224.6</b>	434.1	79.8
effective risk haircut	<b>84%</b>	69%	94%
Ownership	<b>100%</b>	100%	100%
Woulfe Mining's share	<b>224.6</b>	434.1	79.8

\* portion of reserve/resource expected to be converted to a mineable resource, probability-weighted for our confidence they will be proven-up

\*\* shown as expected value of being incurred after allowing for likelihood of reaching each development stage

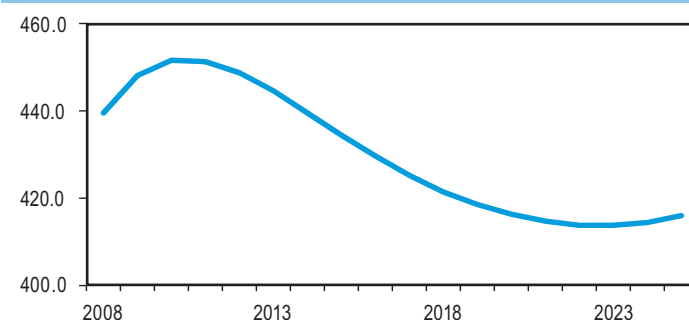
\*\*\* present value

## Commodity assumptions

Tungsten prices are assumed to be mean reverting based on

Historic average real level at current prices	210.0 US\$/MTU
Avg time to revert to mean	12.0 years
Volatility	35%
Inflationary price growth	2.0%

## Expected tungsten price (inflation-adjusted) (US\$/MTU)



Woulfe's current plan calls for an underground drift-and-fill mining operation focused on the top 25 percent of the deposit, which lies primarily above the valley floor on the eastern side of the deposit. This area, which hosts the recently calculated resource estimate, has sufficient indicated resource to support a five-year mine life, and probably in excess of 10 years, assuming a substantial portion of the inferred resource can be upgraded.

We continue to hypothesise that Sangdong will eventually yield a significantly larger resource, allowing for further expansion of the mine plan in future years. As a result, we continue to hypothesise expansion in future years at Sangdong, reaching a rate of 2.4 million tonnes per year at a cost of US\$105m before inflation.

- **Woulfe is maintaining its aggressive timelines with no discernible slippage**

The company has an aggressive development plan for the next year at Sangdong. Woulfe continues with its prefeasibility study of Sangdong, and anticipates publication of the report by the end of September. This would immediately be followed by a full feasibility study, expected to be complete early next year. Final permitting and construction would follow, and Woulfe's management anticipates placing Sangdong into production by the end of 2012.

- **Higher tungsten prices have a positive impact on our valuation**

Since our initiation note of April 2011, the price of ammonium paratungstate has increased significantly, in excess of 15 percent. This short-term variation has a significant impact on our model, given tungsten's lengthy time to revert to the long-term mean, some 12 years, and the relatively short timeline to commencement of production. Lower interest rates also have a positive impact on our valuation.

- **An agreement with Korea Zinc remains an uncertainty for valuation purposes**

Korea Zinc, a large Woulfe shareholder, had a 60-day option to take up 51 percent of the project for an investment of C\$38m into Sangdong Mining Corp, a joint venture company. This option expired in February 2011. Woulfe subsequently agreed to provide Korea Zinc an exclusivity period during which Woulfe would not finance the project until the drilling programme was completed and KZ had an opportunity to make a revised offer.

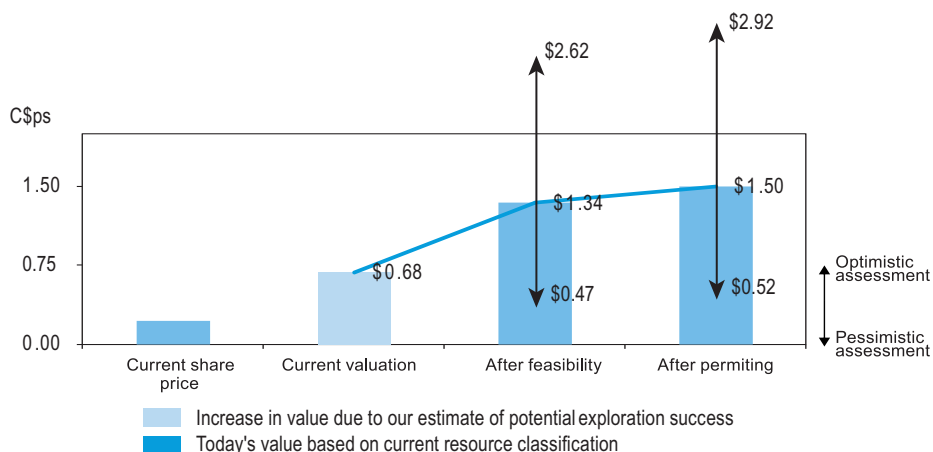
Woulfe remains in discussions with Korea Zinc and with other parties to secure non-dilutive equity financing, followed by debt financing to cover the majority of the capital costs. Woulfe's management believes the company has several options to obtain required financing.

As a result, we continue to value Woulfe based on a 100-percent interest in Sangdong. Should the remaining terms of the agreement close as originally negotiated, Woulfe's interest in the project would decrease to 49 percent, reducing the value flowing through to Woulfe by approximately one-half. This would be mitigated, at least in part, by a concurrent cash contribution to Woulfe, or more likely, to a joint venture company.

- **Our revised valuation is adjusted upward, to C\$0.69 per share**

Based on these developments, our base-case valuation of Woulfe increases from C\$0.46 per share to C\$0.69 per share. Our more optimistic assessment, based on higher confidences of exploration and development success, increase modestly from C\$1.20 to C\$1.33 per share. Assuming success at all stages through feasibility and permitting, our base-case and optimistic assessments increase to C\$1.50 and C\$2.92 per share respectively.

### What Woulfe could be worth - now and in the future



Source: Objective Capital

# Financials

## Profit and Loss

Year ending June (C\$m)	2009A	2010E	2011E	2012E	2013E	2014E	2015E
<b>Revenues</b>	—	—	—	—	58.7	174.1	172.1
COGS	—	—	—	—	(25.0)	(65.9)	(67.6)
Gross profits	—	—	—	—	33.7	108.2	104.5
Administrative Costs	(2.1)	(3.0)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)
<b>EBITDTA</b>	<b>(2.1)</b>	<b>(3.0)</b>	<b>(2.5)</b>	<b>(2.5)</b>	<b>31.2</b>	<b>105.7</b>	<b>102.0</b>
Depreciation & amortisation	(0.0)	1.9	—	—	(17.1)	(20.1)	(20.3)
EBIT	(2.4)	(1.1)	(3.9)	(2.5)	14.0	85.6	81.7
Interest	(0.1)	—	0.3	(1.0)	(2.9)	(2.4)	(0.1)
EBT	(2.5)	(1.1)	(3.6)	(3.5)	11.1	83.2	81.6
Tax paid	0.7	0.2	0.6	0.7	—	—	—
<b>Earnings</b>	<b>(1.8)</b>	<b>(0.9)</b>	<b>(3.0)</b>	<b>(2.8)</b>	<b>11.1</b>	<b>83.2</b>	<b>81.6</b>
Dividends	—	—	—	—	—	—	—
<b>Retained earnings</b>	<b>(1.8)</b>	<b>(0.9)</b>	<b>(3.0)</b>	<b>(2.8)</b>	<b>11.1</b>	<b>83.2</b>	<b>81.6</b>

## Cashflow

Year ending June (C\$m)	2009A	2010E	2011E	2012E	2013E	2014E	2015E
EBIT	(2.4)	(1.1)	(3.9)	(2.5)	14.0	85.6	81.7
Depreciation	—	—	—	—	17.1	20.1	20.3
Stock-based Comp, Writedowns, Tax Recovery	0.8	(0.8)	—	—	—	—	—
(Increase) decrease in receivables	0.3	(0.1)	0.2	—	(8.8)	(17.3)	0.3
(Increase) decrease in inventory	0.4	(0.1)	(0.0)	—	(3.8)	(6.1)	(0.2)
Increase (decrease) in payables	1.1	(1.2)	(0.3)	—	2.0	3.3	0.1
<b>Net cash from Ops</b>	<b>0.2</b>	<b>(3.3)</b>	<b>(4.0)</b>	<b>(2.5)</b>	<b>20.6</b>	<b>85.5</b>	<b>102.2</b>
Tax paid	—	—	0.6	0.7	—	—	—
Dividends	—	—	—	—	—	—	—
Net interest recieved (paid)	(0.1)	—	0.3	(1.0)	(2.9)	(2.4)	(0.1)
New equity	0.1	10.2	10.0	30.0	—	—	—
New (deposits) borrowings	1.5	—	—	50.0	—	(20.0)	(30.0)
Capital expenditure	(2.3)	(2.3)	—	(47.3)	(30.5)	(2.4)	(2.5)
<b>Net cash from financing</b>	<b>(0.7)</b>	<b>7.9</b>	<b>10.9</b>	<b>32.4</b>	<b>(33.4)</b>	<b>(24.8)</b>	<b>(32.5)</b>
<b>Net increase (decrease) in cash</b>	<b>(0.6)</b>	<b>4.6</b>	<b>6.9</b>	<b>29.9</b>	<b>(12.8)</b>	<b>60.7</b>	<b>69.7</b>

## Balance sheet

Year ending June (C\$m)	2009A	2010E	2011E	2012E	2013E	2014E	2015E
Fixed assets at NAV	22.9	27.5	27.5	74.8	88.1	70.4	52.5
Cash	0.0	4.7	11.6	41.5	28.7	89.5	159.1
Receivables	0.0	0.1	(0.1)	(0.1)	8.7	26.0	25.7
Inventory	0.0	0.2	0.2	0.2	4.0	10.1	10.3
Less Payables	(3.3)	(2.3)	(2.1)	(2.1)	(4.1)	(7.3)	(7.5)
<b>Net current assets</b>	<b>(3.3)</b>	<b>2.6</b>	<b>9.7</b>	<b>39.5</b>	<b>37.3</b>	<b>118.2</b>	<b>187.7</b>
Less loans	(2.1)	—	—	(50.0)	(50.0)	(30.0)	—
<b>Capital employed</b>	<b>17.6</b>	<b>30.1</b>	<b>37.1</b>	<b>64.3</b>	<b>75.4</b>	<b>158.6</b>	<b>240.2</b>
<i>Represented by</i>							
Shares in issue	29.1	39.3	49.3	79.3	79.3	79.3	79.3
Add retained profit							
Prior periods	(9.8)	(8.3)	(9.2)	(12.1)	(15.0)	(3.8)	79.4
This period	(1.8)	(0.9)	(3.0)	(2.8)	11.1	83.2	81.6
<b>Shareholders' funds</b>	<b>17.5</b>	<b>30.1</b>	<b>37.2</b>	<b>64.3</b>	<b>75.5</b>	<b>158.7</b>	<b>240.2</b>

Source: Objective Capital

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