

NICKEL INDUSTRY PRODUCTION COSTS : IMPLICATIONS FOR PROJECT DEVELOPMENT AND NICKEL PRICES



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Agenda

- › **A Brief Introduction to Brook Hunt and Wood Mackenzie**
- › **Costing Methodology**
- › **Historical Industry Costs**
- › **What has the decline in nickel price done for profitability**
- › **Operation Closures and Project Deferrals**
- › **Capital Expenditure and Project Costs**
- › **Long Term Incentive Price**

Introduction to Brook Hunt

- › **Brook Hunt has an in-depth knowledge of mining and metals:**
 - Industry standard supply cost analysis by asset (mines, smelters & refineries)
 - Market fundamentals analysis – supply/demand balance and price forecasting
 - Concentrates market analysis
- › **Dedicated to the global base and precious metals markets: aluminium, copper, lead, gold, nickel, silver and zinc.**
- › **We have developed over 30 years worth of proprietary information and in-house expertise.**
- › **Over 280 customers in 50 countries – mining producers, investment banks, traders, consumers and governments.**
- › **Reputation for high quality independent, in-depth analysis.**
- › **Highly experienced senior analysts from the metals industry.**

Why Wood Mackenzie Acquired Brook Hunt

- › **Wood Mackenzie acquired Brook Hunt in August 2008, following the successful integration of coal market analysts Hill & Associates and Barlow Jonker.**

- › **There are many links between the energy and metals industries:**
 - Fuel is a key cost for metals production, so understanding the future price of fuel is important for mining companies. Wood Mackenzie's understanding of energy will enhance this analysis.
 - Similarly, the cost of steel and base metals is a key issue for oil & gas infrastructure development
 - Both industries share a need to better understand trends in industrial demand, as well as the issues surrounding carbon emissions
 - Metallurgical coal is an input to the manufacture of carbon steel, and uranium has an obvious link to the nuclear sector

- › **There are remarkable similarities between the analytical approach of Brook Hunt and Wood Mackenzie. Our energy and metal teams will leverage each other's expertise to provide a stronger market view, improve quality, accuracy and value for clients.**

Costing Methodology (1)

- › **Net Direct Cash Cost (C1)** represents the cash cost incurred at each processing stage, from mining through to recoverable nickel delivered to market, less net by-product credits (if any). The M1 margin is defined as nickel price received minus C1.
- › **Production Cost (C2)** is the sum of net direct cash costs (C1) and depreciation, depletion and amortisation. The M2 margin is defined as nickel price received minus C2.
- › **Fully Allocated Cost (C3)** is the sum of the operating cost (C2), indirect costs and net interest charges. The M3 margin is defined as nickel price received minus C3.

Costing Methodology (2)

Direct Cash Costs cover:

- Mining, ore freight and milling costs.
- Ore purchase and freight costs from third parties in the case of custom laterite smelters.
- Mine-site administration and general expenses.
- Concentrate freight, smelting and smelter general and administrative costs.
- Matte freight, refining and refinery general and administrative costs.
- Marketing costs (freight and selling).

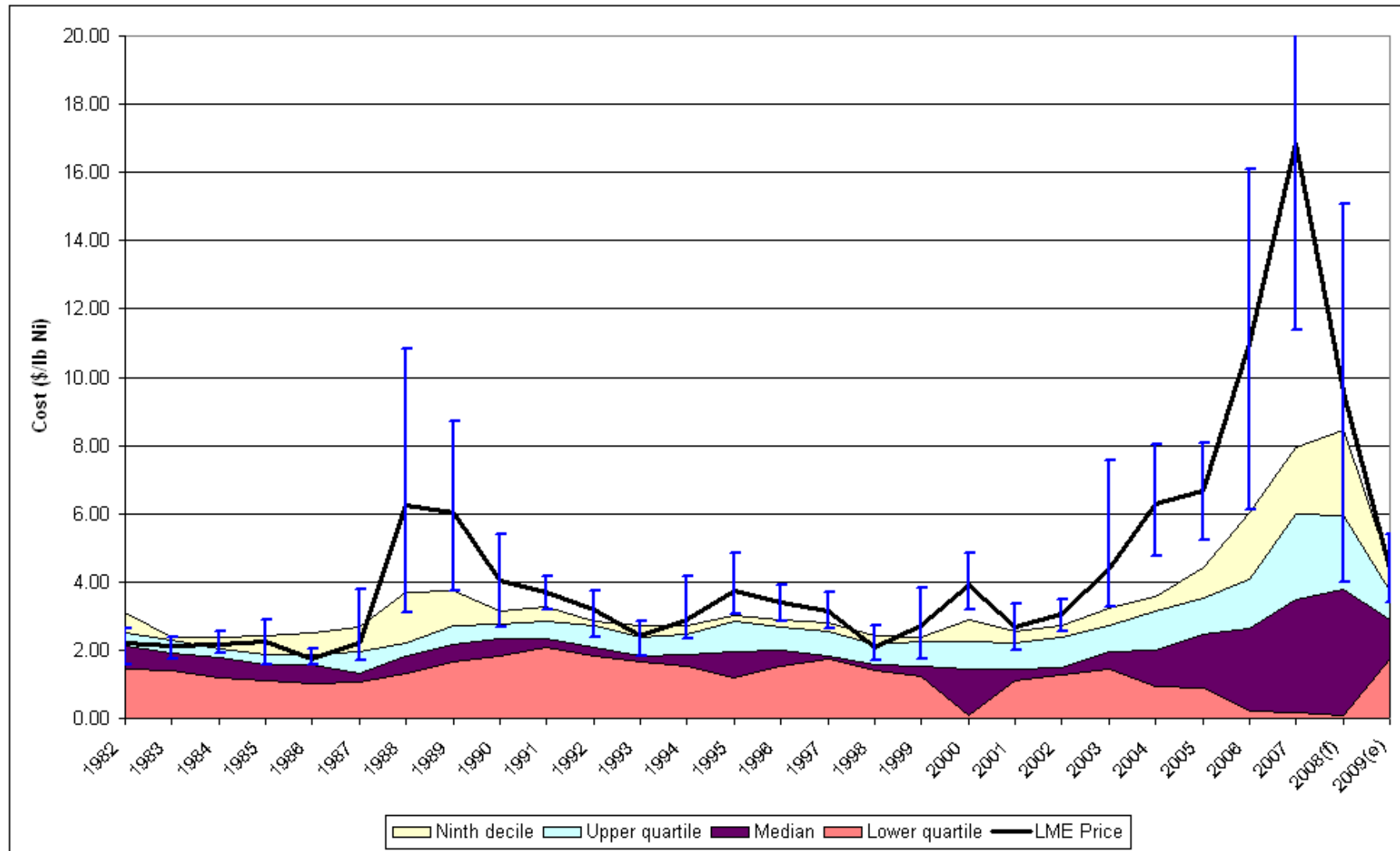
Costing Methodology (3)

Indirect Costs are the cash costs for:

- **The portion of corporate and divisional overhead costs attributable to the operation.**
- **Research and exploration attributable to the operation.**
- **Royalties and "front-end" taxes (excluding income and profit-related taxes).**
- **Extraordinary costs i.e. those incurred as a result of strikes, unexpected shutdowns etc.**

Interest charges include all interest paid, both directly attributable to the operation and any corporate allocation (net of any interest received) on short-term loans, long-term loans, corporate bonds, bank overdrafts etc.

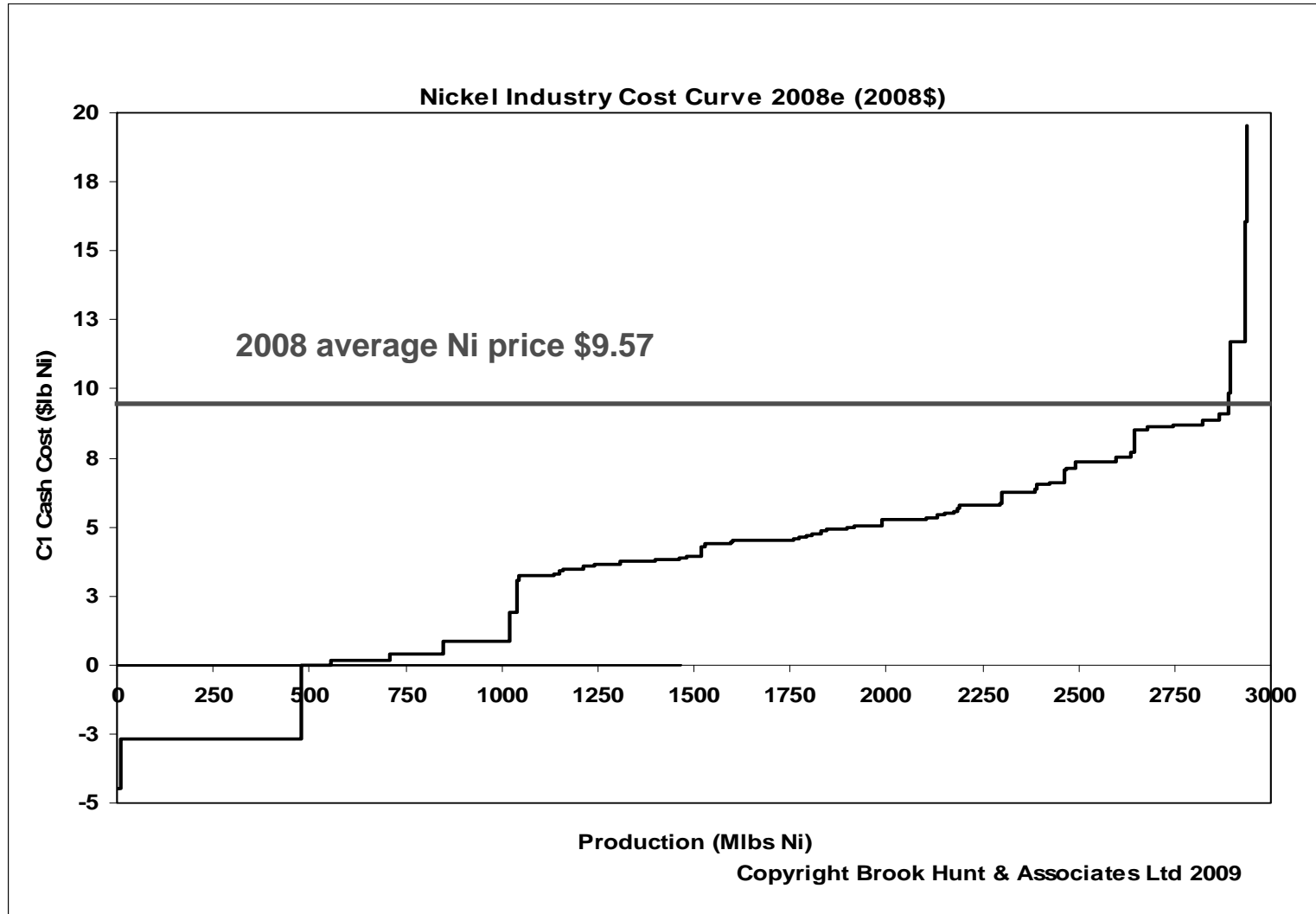
Historical Industry Costs



Historical Industry Costs (2)

		2000	2001	2002	2003	2004	2005	2006	2007	2008e
Average C1	\$/lb	0.77	0.85	1.41	1.88	1.68	2.17	2.00	3.00	3.21
Average C2	\$/lb	1.29	1.36	1.90	2.43	2.25	2.87	2.80	3.86	4.20
Average C3	\$/lb	2.28	2.50	2.70	3.37	3.17	3.76	3.88	5.03	5.34
Breakeven Percentile at C1	%	96	93	94	100	100	100	100	100	97
Breakeven Percentile at C2	%	95	83	87	94	100	97	100	100	93
Breakeven Percentile at C3	%	96	77	84	87	99	97	99	99	89
LME Nickel Price	\$/lb	3.92	2.70	3.07	4.37	6.26	6.68	11.01	16.88	9.57

Estimated 2008 Cost Curve



THE TIMES THEY ARE A CHANGIN..

- The nickel price had never been solely responsible for the closure of a nickel operation but...
- In addition “dis-integration pressure”
- Ni-pig iron – old news?

Production Losses

Avebury – Temporary ? 9kt

Bindura – Temporary? 5kt

Cawse – Permanent closure 7kt

Falcondo – Temporary 30kt

Hitura – Temporary? 2kt

Lac des Iles – Temporary 1kt

Lockerby – Permanent ? 3kt

Munali – closed 7kt

Pobuzhsky – Temporary ? 15kt

PT Antam – reduction 5-8kt

PT Inco ca. 20% cut for 2009 ~18kt

Radio Hill – Permanent 1kt

Ravensthorpe – closed 40kt

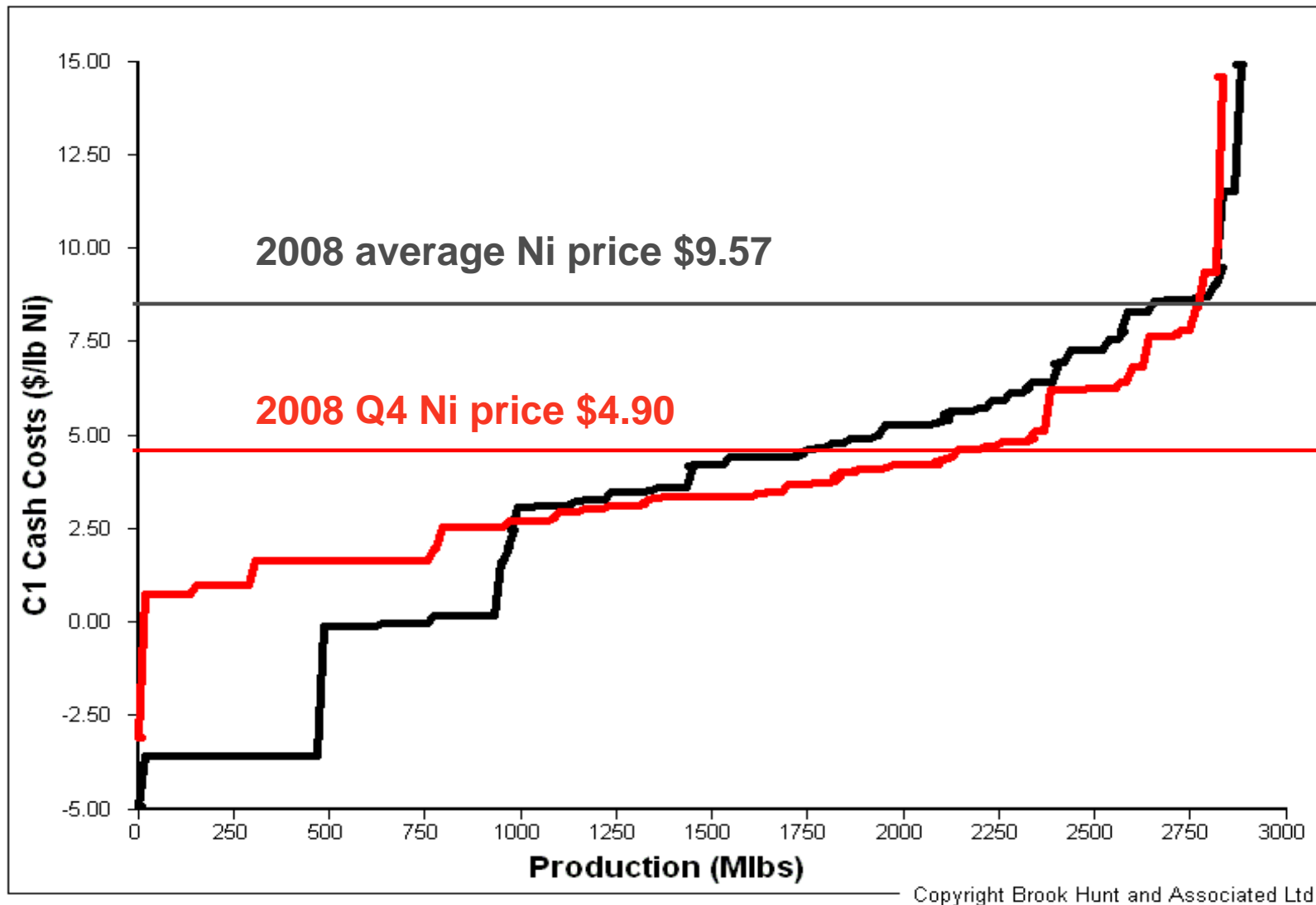
Redstone – Permanent ? 3kt

Sinclair – Temporary ? 5kt

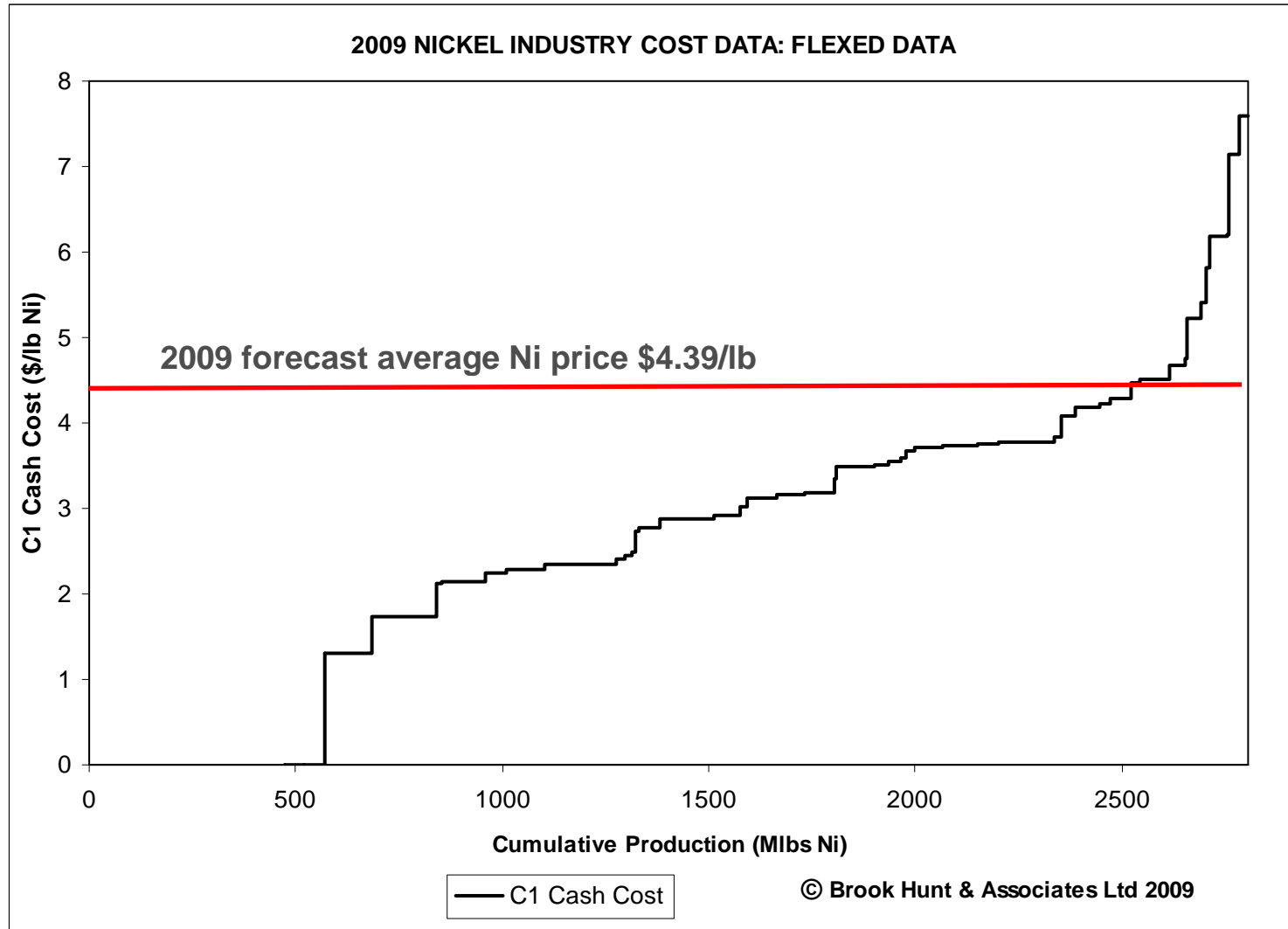
Lake Johnston / Silver Swan – closed 20kt

NPI – 72kt in 2008, expect 25kt in 2009

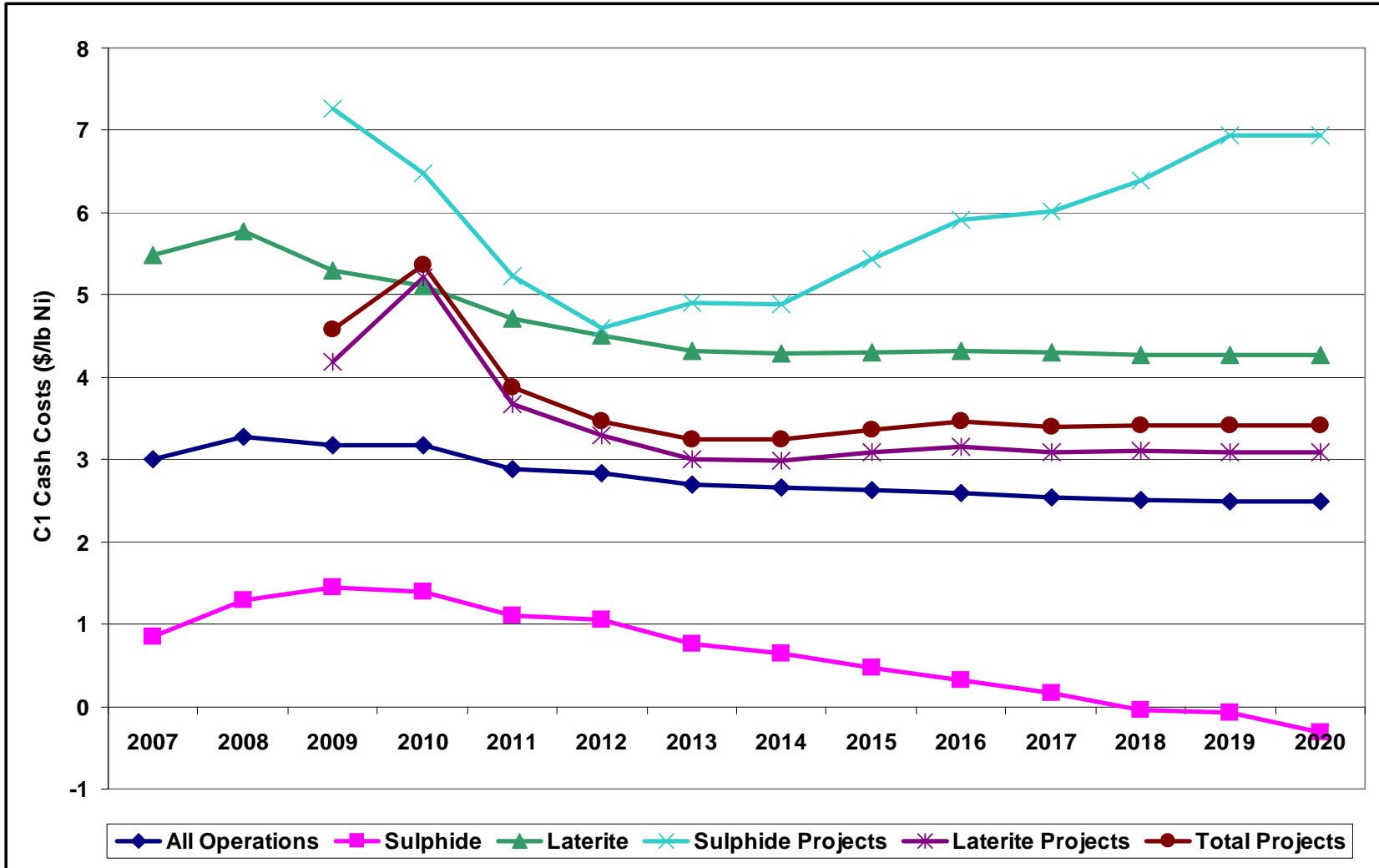
So what happened?



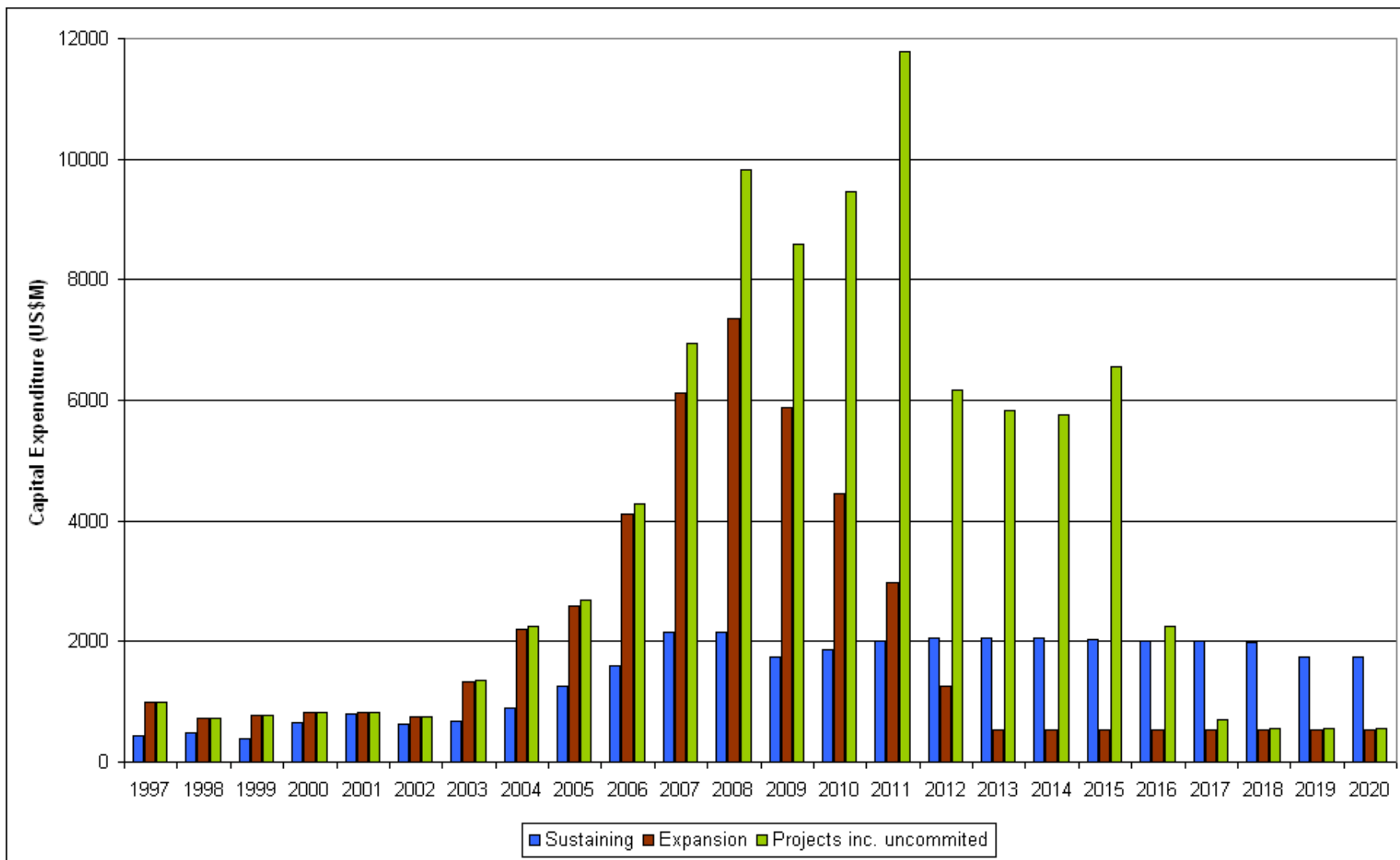
and what does 2009 hold in store...



NICKEL INDUSTRY C1 CASH COSTS 2007 to 2020 (2007\$)



Capital Expenditure



Capital Intensity By Process

› Sulphide concentrate	US\$ 28200/t Ni/a
› Ferro nickel	US\$ 49900/t Ni/a
› Heap leach	US\$ 40500/t Ni/a
› HPAL	US\$ 53400/t Ni/a
› Ni pig iron	ca. US\$ 18500/t Ni/a

However..

The cost pressures in capital costs across the industry are set to ease sooner rather than later. This easing will probably not occur until later in 2009 given the annual price contracts for steel raw materials and the lead times in the construction cycle. But with the sudden loss in liquidity and credit, many projects in the pipeline may be cancelled thereby escalating this decline in demand. Inflation will most likely ease in this environment although skilled labour markets across the resources sector are so tight that this may only bring wage inflation levels into equilibrium.

Project Deferrals

Ambatovy 50kt - delayed

Barro Alto 36kt – delayed

Ban Phuc 3kt

Desheng Nickel – delayed commissioning 7kt

Eagle 13kt - delayed

Fraser Morgan – cancelled 9kt

Goro – delayed commissioning

Kylylahti 1kt

Moa/Fort Saskatchewan – Phase 2 on-hold 9kt

Murrin Murrin heap leach 10kt

Nunavik 10kt

Onca Puma – delayed commissioning

Shakespeare 4kt

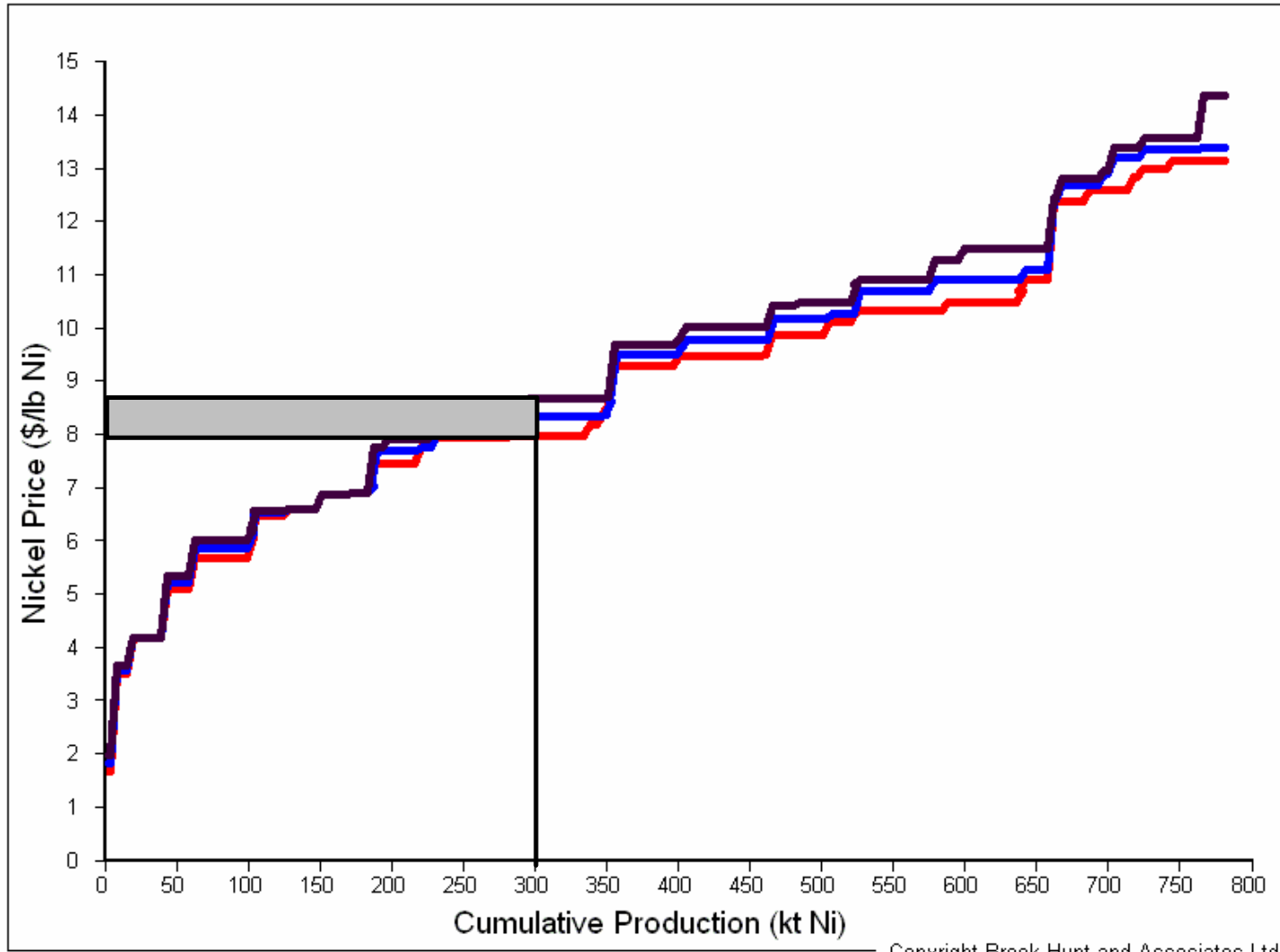
Sinosteel – delayed 16kt

Tsingshan Fu'an – delayed 12kt

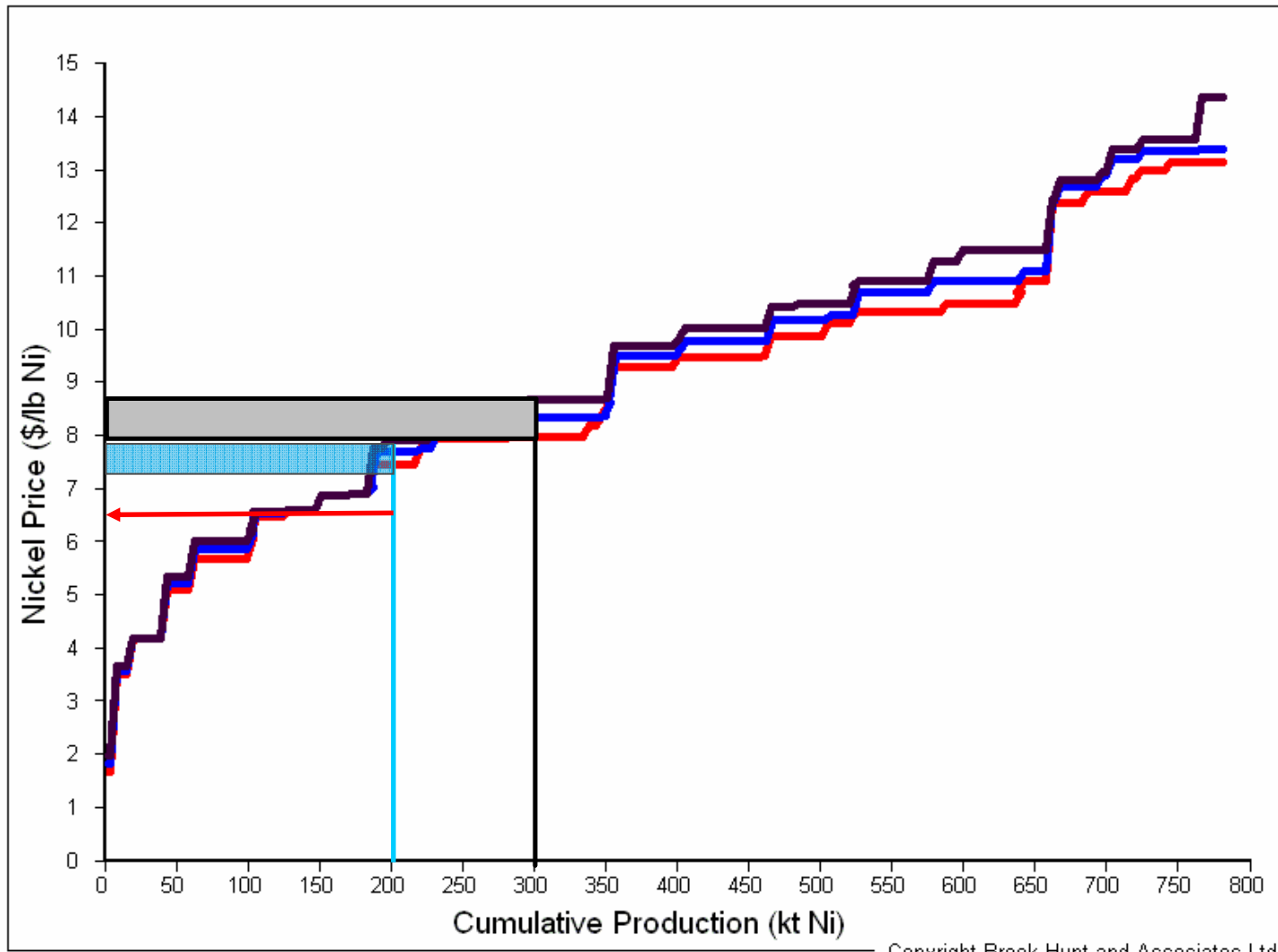
Vermelho 46kt - shelved

Taganito 30kt – pushed back

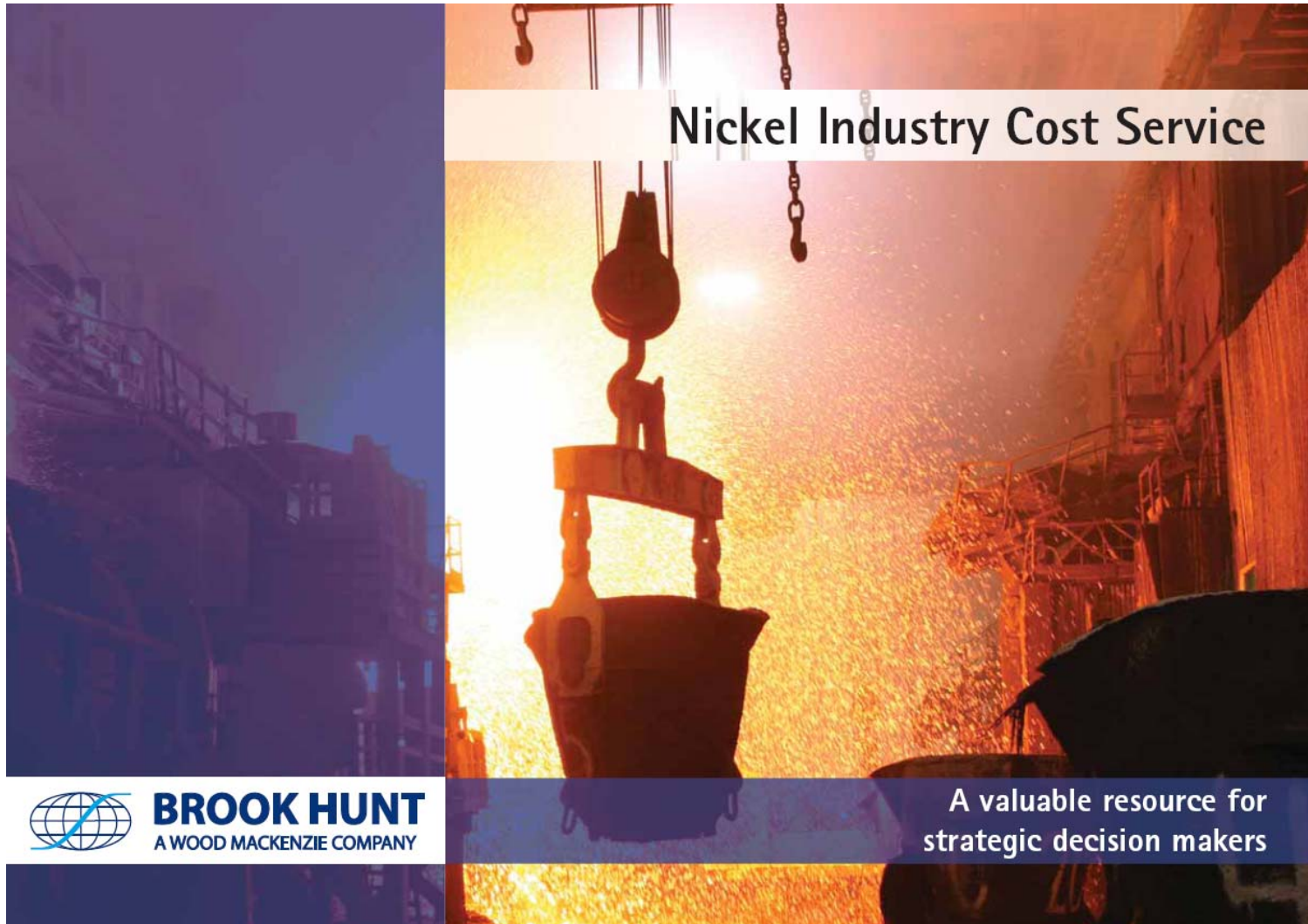
Nickel Incentive Price – THEN!



Nickel Incentive Price – AND NOW!



THANK YOU



Nickel Industry Cost Service

A valuable resource for
strategic decision makers



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A WOOD MACKENZIE COMPANY



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