What is the outlook for the coking coal supply/demand balance?
What will happen to future coking coal price settlements?
What are the implications of reduced carbon emissions on the industry?
Is there going to be sufficient coking coal to meet projected steel production rates?

“I would positively recommend Metal Bulletin Research as a unique provider of steel and its raw materials market analysis and forecasts”
Michael Amez, Manager, A.T. Kearney, USA
Foreword

The revival of the coking industry was driven by an increase in world steel demand. Steel consumption had been relatively lackluster and stable compared to other commodities, but the last decade was defined by a drastic increase in world steel and iron making, led by China, accompanied by the associated demand for coking coal and coke. Economic growth reached a crescendo by the first half of 2008 after which major economies have sunk into severe recessions, with the exception of China and ASEAN nations, who to a large extent kept demand for raw commodities afloat. While Europe and the USA decreased their appetite for coking coal, iron and coke, China continued to import. We believe that despite a severe downturn, growth in the developing nations in particular has not yet peaked. Two questions therefore arise, namely how much coking coal is needed and assuming we have the ability to meet coking coal requirements, do we have the same ability to the demand of the coking sector? We set out to answer these questions in a bi-volume report. This report, Volume 1, addresses the first question and delves into the dynamics of the coking coal market.

Glossary of Terms

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Explanation</th>
<th>Term/Abbreviation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Btu</td>
<td>British Thermal Units</td>
<td>JFY</td>
<td>Japanese Fiscal Year</td>
</tr>
<tr>
<td>Bn</td>
<td>billion</td>
<td>JV</td>
<td>Joint Venture</td>
</tr>
<tr>
<td>CAGR</td>
<td>Compound annual growth rate</td>
<td>m</td>
<td>Million</td>
</tr>
<tr>
<td>Dwt</td>
<td>Dead weight tonnes</td>
<td>m³</td>
<td>Metres cubed</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Assessment</td>
<td>NDRC</td>
<td>National Development and Reform Commission</td>
</tr>
<tr>
<td>HCC</td>
<td>Hard coking coal</td>
<td>RBCT</td>
<td>Richard’s Bay Coal Terminal</td>
</tr>
<tr>
<td>Hot Banking</td>
<td>A technique used among Japanese coke producers to temporarily idle coking capacity</td>
<td>tpa</td>
<td>Tonnes per annum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tpm</td>
<td>Tonnes per month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tpd</td>
<td>Tonnes per day</td>
</tr>
<tr>
<td>IEA</td>
<td>International Energy Agency</td>
<td>y-o-y</td>
<td>Year on year</td>
</tr>
</tbody>
</table>
Table of Contents

1. Executive Summary.................................................................................................................................11
2. Global Overview ......................................................................................................................................14
   2.1 Supply................................................................................................................................................14
      2.1.1. Production Outlook...............................................................................................................18
   2.2 Demand.............................................................................................................................................21
      2.2.1 Forecast Methodology ............................................................................................................21
      2.2.2 Overview of Coke Supply .......................................................................................................21
      2.2.4 Structure of Coke Production ..................................................................................................23
      2.2.5 Trends in Coke Production .....................................................................................................25
      2.2.6 Demand Outlook......................................................................................................................28
   2.3 Trade .................................................................................................................................................29
      2.3.1 Overview of Coking Coal Trade ..............................................................................................29
   2.4 Dry Bulk Freight Market ....................................................................................................................37
   2.4 Carbon Emissions ..............................................................................................................................40
   2.5 Price ..................................................................................................................................................42
      2.5.1 Overview of 2009 .......................................................................................................................42
      2.5.3 Supply-Demand Balance .........................................................................................................44
      2.5.5 Forecast to 2020 ........................................................................................................................47
3. Types of Coal...........................................................................................................................................49
   3.1 Hard Coking .......................................................................................................................................52
   3.2 Semi-Hard Coking..............................................................................................................................53
   3.3 Semi-soft coking ................................................................................................................................53
   3.3 PCI .....................................................................................................................................................53
   3.3 Anthracite .........................................................................................................................................53
4. Mining Methods and Processing Of Coking Coal .................................................................................54
   4.1 Underground Mining Methods .........................................................................................................54
   4.2 Surface Mining Methods ..................................................................................................................56
   4.3 Beneficiation ....................................................................................................................................56
5. Cost of Production ..................................................................................................................................57
## Country Analysis

### 6. Australia

#### 6.1 Overview

#### 6.2 Supply

#### 6.3 Demand

#### 6.4 Trade

### 6. Bangladesh

#### 6.1 Supply

### 6. Brazil

#### 6.1 Supply

#### 6.2 Demand

### 6. Canada

#### 6.1 Supply

#### 6.2 Demand

#### 6.3 Trade

### 6. Chile

#### 6.1 Demand

### 6. China

#### 6.1 Supply

#### 6.2 Demand

#### 6.3 Trade

### 6. Colombia

#### 6.1 Supply

#### 6.2 Demand

#### 6.3 Trade

### 6. EU & UK

#### 6.1 Overview

#### 6.2 Supply

#### 6.3 Demand
Coking Coal: A Strategic Market Outlook to 2020

6.18.2 Demand...................................................................................................................................................183
6.19 Ukraine......................................................................................................................................................184
6.19.1 Supply....................................................................................................................................................184
6.19.2 Demand...................................................................................................................................................185
6.20 USA............................................................................................................................................................188
6.20.1 Overview ..............................................................................................................................................188
6.20.2 Supply-USA.........................................................................................................................................189
6.20.3 Demand...................................................................................................................................................201
6.20.4 Trade .....................................................................................................................................................206

List of Charts, Figures, Tables

Charts
Chart 1: Regional contribution to production......................................................................................................19
Chart 2: Coke Production by Country ..................................................................................................................24
Chart 3: Average age distribution of existing coke plants ..................................................................................25
Chart 4: Average age of existing coke plants by country ..................................................................................26
Chart 5: World coke versus iron output .........................................................................................................28
Chart 8: Baltic index average ................................................................................................................................38
Chart 9: Outlook for fleet capacity .................................................................................................................40
Chart 10: Australian- Japan contract coking coal prices ...............................................................................43
Chart 11: Chinese domestic prices compared to contract prices ..................................................................44
Chart 12: Outlook for hard coking coal ............................................................................................................48
Chart 13: Outlook for low volatile PCI Coal ......................................................................................................48
Chart 14: Outlook for semi soft coking coal .....................................................................................................48
Chart 15: Australian coke supply ....................................................................................................................80
Chart 16: Australian seaborne exports ............................................................................................................82
Chart 17: Canadian Producers .........................................................................................................................89
Chart 18: Teck Coal Production Profile (000 t) ...............................................................................................92
Chart 19: WCCC production targets ..............................................................................................................93
Chart 20: Outlook for WCCC by coal type .......................................................................................................94
Chart 21: Outlook for Canadian Exports .........................................................................................................99
Chart 22: New structure of China’s coke industry .........................................................................................107
Chart 23: Chinese coke production by region .................................................................................................108
Chart 24: Chinese coke production by plant type ..........................................................................................108
Chart 25: China seaborne net export .............................................................................................................110
Coking Coal: A Strategic Market Outlook to 2020

Chart 26: China's consumption rate ................................................................. 118
Chart 27: Outlook for Colombian coking coal production .......................... 120
Chart 28: outlook for Colombian coking coal demand ................................ 122
Chart 29: Exports from Czech Republic ......................................................... 130
Chart 30: France seaborne imports ............................................................... 131
Chart 31: German seaborne imports ............................................................... 132
Chart 32: Polish seaborne exports ............................................................... 133
Chart 33: UK seaborne imports ..................................................................... 133
Chart 34: Indian seaborne imports ............................................................... 146
Chart 35: Indonesian seaborne exports ......................................................... 152
Chart 36: Age profile of Japan's coke ovens .................................................. 156
Chart 37: Japanese Seaborne Imports ............................................................ 160
Chart 38: Chinese coking coal imports ......................................................... 161
Chart 39: Mongolian supply ........................................................................ 164
Chart 40: Korean Seaborne Imports ............................................................... 172
Chart 41: Taiwan Seaborne Imports .............................................................. 173
Chart 42: Russian seaborne exports ............................................................. 180
Chart 43: South African coking coal demand .............................................. 184
Chart 44: Outlook for Ukrainian Coking Coal Market .................................. 184
Chart 45: Market share of USA metallurgical coal producers .................... 189
Chart 46: Comparative sales volumes of USA companies ........................... 189
Chart 47: USA metallurgical production by region & type ........................... 190
Chart 48: Central Appalachian production .................................................. 191
Chart 49: Average mining costs of USA companies ...................................... 191
Chart 50: USA metallurgical coal sales to USA coke plants ....................... 192
Chart 51: Coke production from USA Steel .................................................. 204
Chart 52: Forecast of North American coking coal consumption ................ 206
Chart 53: USA seaborne exports ................................................................. 207

Figures
Figure 1: Metallurgical Coal Seaborne Trade Flows 2009 ............................. 33
Figure 2: Long term trade patterns ............................................................... 36
Figure 3: Indicative coal curves combining rank, grades and types of coal .... 52
Figure 4: Room & Pillar Mining ................................................................. 55
Figure 5 Longwall shearer .......................................................................... 55
Figure 6: Longwall shield supports ............................................................. 56
Figure 11: Pro forma MacArthur ownership structure .................................. 73
Figure 12: China major coal routes ............................................................. 115
Figure 14: Location of Japanese coke producers ......................................... 155
Figure 15: Schematic Diagram of SCOPE 21 ............................................. 157
Figure 16: Location of Russian Coking Coal Mines ................................... 174
Tables
Table 1: World Metallurgical Coal Production ................................................................. 17
Table 2: Planned Metallurgical Coal projects from 2009-2012 ........................................ 18
Table 3: World coking coal production outlook ............................................................ 20
Table 4: Largest coke producers .................................................................................. 22
Table 5: Worlds’ largest coke producers .................................................................... 24
Table 6: Permanent coke battery shutdowns ................................................................ 27
Table 7: Additional coke capacity ................................................................................ 27
Table 8: Demand outlook for coking coal ................................................................... 29
Table 9: Trade of Coking Coal ..................................................................................... 30
Table 10: Analysis of the seaborne market .................................................................. 35
Table 11: Estimations for Green border trade .............................................................. 37
Table 12: Overview of the bulk trade market ................................................................. 39
Table 13: Total coking coal demand-supply balance: ................................................. 44
Table 14: Traded coking coal balance .......................................................................... 45
Table 15: Explanation of coal properties ...................................................................... 50
Table 16: Classification of coal .................................................................................... 51
Table 17 Longwall Equipment Costs ........................................................................... 58
Table 18: Outlook for Australian coking coal ............................................................... 59
Table 19: Outlook for Australian coking coal production ............................................. 64
Table 20: Estimated coking coal production from Anglo Coal .................................... 65
Table 21: Production outlook for Isaac Plains ............................................................... 66
Table 22: Forecast of Eagle Down’s production ......................................................... 66
Table 23: Cost estimates of Eagle Down’s project ....................................................... 67
Table 24: Resources of Belvedere deposit .................................................................... 67
Table 25: Production outlook for Washpool ................................................................. 68
Table 26: Outlook for BHP Australian coking coal production ..................................... 69
Table 27: Outlook for Sonoma project ......................................................................... 70
Table 28: Production outlook for Coal & Allied Industries .......................................... 70
Table 29: Outlook for Felix Coal .................................................................................. 71
Table 30: Outlook for Gloucester’s production ......................................................... 75
Table 31: Production outlook for Middlemount ............................................................ 76
Table 32: Production outlook for Olive Downs ............................................................. 76
Table 33: Outlook for Peabody Energy’s Australian metallurgical coal ...................... 77
Table 34: Outlook for Rio metallurgical coal production ............................................. 79
Table 35: Consumption of coking coal by plant ........................................................... 81
Table 36: Outlook for traded Australian coking coal .................................................. 84
Table 37: Freight capacity as compared to Australian seaborne supply ..................... 86
Table 38: Overview of Brazilian coking coal industry .................................................. 87
Table 39: Overview of Canadian coking coal market ................................................................. 88
Table 40: Performance of Grande Cache Coal ........................................................................ 89
Table 41: Summary of Reserves .................................................................................................. 90
Table 42: Summary of Peace River Coal Operations ................................................................. 91
Table 43: Performance of Teck Coal ......................................................................................... 92
Table 44: WCCC Operations ..................................................................................................... 95
Table 45: Canadian Metallurgical Coal Prospects ................................................................. 97
Table 46: Outlook for Canadian Coal Production ................................................................. 97
Table 47: Canadian Coal Ports ............................................................................................... 100
Table 48: Chile coke production .............................................................................................. 100
Table 49: Summary of China's coking coal industry ............................................................... 101
Table 50: Outlook for Chinese coking coal production ........................................................ 105
Table 51: Chinese coking coal demand .................................................................................. 110
Table 52: Major coal transporting rail lines in Shanxi, Shaanxi and Inner Mongolia Area ...... 116
Table 53: Chinese port capacity 2009 .................................................................................... 116
Table 54: China railway capacity .......................................................................................... 117
Table 55: Summary of Colombian coking coal ..................................................................... 119
Table 56: Costs of Hunza Coal Project .................................................................................. 120
Table 57: Columbian coke production .................................................................................... 121
Table 58: Outlook for Czech Republic production ............................................................... 123
Table 59: Outlook for German hard coal production ............................................................ 124
Table 60: Outlook for the production of Polish coking coal .................................................. 125
Table 61: Czech Republic coke production outlook ............................................................. 127
Table 62: Polish coke capacity .............................................................................................. 128
Table 63: Outlook for Polish coking coal demand by coking facility .................................... 128
Table 64: Consumption of imported coal by types ............................................................... 129
Table 65: Consumed by steel industry .................................................................................. 129
Table 66: Overview of Indian Coking Coal ........................................................................... 134
Table 67: Indian coal reserves .............................................................................................. 135
Table 68: Coal reserves by state ........................................................................................... 136
Table 69: Production of coking coal ...................................................................................... 140
Table 70: Coke Capacity ........................................................................................................ 143
Table 71: Cost of Saurashtra Fuels Expansion ..................................................................... 145
Table 72: Coking coal requirements for Indian coke production ......................................... 145
Table 73: Projected port capacity in India .............................................................................. 147
Table 74: Outlook for Indonesian Coking Coal Production .................................................. 151
Table 75: Indonesian coal port capacity ............................................................................... 153
Table 76: Overview of Japanese coking coal market ............................................................. 154
Table 77: Japanese coking coal consumption by coke oven plant ....................................... 158
Table 78: Japan's coking coal requirements ......................................................................... 159
Table 79: Comparison of Benga Coal with Australian Coal

Table 80: Benga Coal phases of development

Table 81: New Zealand Coking Coal Production

Table 82: Coking coal consumption in Asia by coke plant

Table 83: Overview of Russian coking coal

Table 84: Russian Coal Production

Table 85: Russian coke producers

Table 86: Analysis of Russian infrastructure capacity

Table 87: Ukrainian coke production

Table 88: Summary of USA coking coal market

Table 89: Metallurgical coal acquisitions by USA companies

Table 91: Summary of Alpha Coal Reserves

Table 92: Production Outlook for Cliffs

Table 93: Summary of Cliffs reserves

Table 94: Forecast of Suncoke Coke Production

Table 96: USA coal port capacity
6.20.2 Supply - USA
The North American market is highly fragmented and competitive. Alpha Resources, Massey Energy, Walter Resources, Patriot and Cleaveland Cliffs constitute the five largest metallurgical coal producers and are responsible for 72% of the total production.

![US Metallurgical Coal Producers](chart)

**Chart 45: Market share of USA metallurgical coal producers**  
Source: Tex, MBR

![Comparative Sales Volumes & Cash Margin per tonne](chart)

**Chart 46: Comparative sales volumes of USA companies**  
Source: MBR, Company Sources

Major coal producing centres include the Appalachian region, the Illinois Basin, Powder River Basin and other western coalfields. Central Appalachia, incorporating Central and Southern West Virginia, Eastern Kentucky and South Western Virginia is the second largest coal producing region in the USA and is the primary source of high quality, low, mid and high volatile metallurgical coal. This coal typically has high
fluidity levels, low sulphur content and is in high demand from the country’s main export partners, namely Europe and South America.

In general demand for coal in the USA remains dismal, though there are signs of encouragement. Even before the financial crisis, output from major USA producing regions have been declining for almost a decade, while costs escalated.
Now with the recent financial crisis, production has declined to unprecedented levels. With respect to metallurgical coal, sales to domestic coke foundries declined by as much as a quarter (Chart 50). To date product rationalization with announced production cuts in coal stand at a 100m tonnes on an annualized basis. We however believe that the market has bottomed out and rationalization has
occurred to a large extent, characterized by a series of corporate takeovers and a synonymous injection of capital and revival of production.

<table>
<thead>
<tr>
<th>Metallurgical Coal Property Purchases</th>
<th>m tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ArcelorMittal</strong></td>
<td>1.7</td>
</tr>
<tr>
<td>Mid vol</td>
<td></td>
</tr>
<tr>
<td>Concept</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Mechel</strong></td>
<td>1.5</td>
</tr>
<tr>
<td>Bluestone</td>
<td></td>
</tr>
<tr>
<td><strong>Serverstal</strong></td>
<td>1.5</td>
</tr>
<tr>
<td>PBS</td>
<td></td>
</tr>
<tr>
<td><strong>Metinvest</strong></td>
<td>2.5</td>
</tr>
<tr>
<td>United Coal</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7.9</td>
</tr>
</tbody>
</table>

*Table 89: Metallurgical coal acquisitions by USA companies   Source: Company Sources, MBR*

It is our view that we are now at the beginning stages of recovery. Overall we expect the recovery to be slow as in many developing countries, whose financial markets were not sophisticated enough to allow them to participate directly in the securitization of sub-prime debt have only recently begun feel the full effects of the financial crisis. The USA is heavily dependent on Brazil and other South American countries as a trading partner and therefore it will be a while before capital projects are brought back on stream and demand fully recovers.

Only 11.9m tonnes of crude steel was produced in the first quarter of 2009, representing a decline of 53% from the prior year. In a discussion with Metal Bulletin, Kevin Crutchfield, chief executive officer of Alpha Natural Resources, indicated that he felt encouraged by the recent uptick in the second quarter and renewed interest from metallurgical coal buyers who had been absent from the market since the financial crisis began. As steel production increases globally, it is expected to have favorable impact
demand for Appalachian coal since the selling prices are in the region of $115/t as compared with $165-$175/t in Asia.

Cruchfield continued saying that Europe, which accounts for around 40% of USA exports, has lagged other regions with respect to metallurgical coal demand though metallurgical coal enquiries are becoming more frequent, indicating that the market may be poised for a turnaround. Other signals of an impending turnaround include:

- Oak Grove Resources LLC, a wholly owned subsidiary of Cliffs, recalled 100 workers in August to the Oak Grove metallurgical coal mine, prompted by an improvement in current orders
- Walter Energy reported that its June shipments increased dramatically. In the first half of the year, shipments fell by 12% from the same period in the previous year owing to a 40% decline in European and Brazilian shipments
- Alpha Resources sold 600,000 tonnes of additional metallurgical in June compared to May 2009
- There has been resurgence in Chinese demand and eleven USA cargoes have been booked to China. In May 2009 Consol had an opportunity to export 88,000 tonnes of coal to China, which is unusual since freight costs make these deals prohibitive. At the time it was uncertain whether this was a once-off deal, but it seems that Chinese are taking advantage of the lower metallurgical prices and freight rates and could increase USA shipments
- Massey Energy has rehired some of workers and expects Korea and India to consume 50% of their exports
- Buchanan and Pinnacle longwall mines have returned to production
- On the 15th of December 2009, it was announced that XCoal had secured a supply contract to supply the Chinese with 3.7m tonnes of coking coal of various grades for an average price of $190/t for 2010.

We foresee the largest hindrance to the pace of USA metallurgical coal recovery is due to the excess coke inventories. The process of idling coke ovens is extremely costly, resulting in may coke producers keeping their ovens running, even as steel mills were shut down and warehousing the output. It is estimated that there is at least a half a year’s supply of coke in storage.

**Alpha Coal (Foundation Coal)**

Alpha coal was incorporated in 2002. On the 15th of July the company merged with Cliffs who acquired all their shares and then in turn merged with Foundation Coal on the 11 May 2009.

*It produces, processes and sells steam and metallurgical coal from four regions, namely Virginia, West Virginia, Kentucky (thermal coal only) and Pennsylvania. Its metallurgical coal production in general comprises 44% of sales volume and constitutes 66% of revenue. The company’s*
exposure to the export market is significant and accounts for 22% of all metallurgical coal exports from the USA.

Table 90 below shows a summary of the Alpha deposits and reserves

<table>
<thead>
<tr>
<th>Regional Business</th>
<th>State</th>
<th>Recoverable, Proven &amp; Total Tons</th>
<th>Total Tons</th>
<th>Coal Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Probable Reserves</td>
<td>Assigned</td>
<td>Unassigned</td>
</tr>
<tr>
<td>Paramont/Alpha Land &amp; Reserves</td>
<td>Virginia</td>
<td>188</td>
<td>60</td>
<td>128</td>
</tr>
<tr>
<td>Dickenson-Russell</td>
<td>Virginia</td>
<td>41</td>
<td>41</td>
<td>0</td>
</tr>
<tr>
<td>Kingwood</td>
<td>West Virginia</td>
<td>12</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Brooks Run North</td>
<td>West Virginia</td>
<td>41</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>Brooks Run South</td>
<td>West Virginia</td>
<td>85</td>
<td>38</td>
<td>47</td>
</tr>
<tr>
<td>Amfire</td>
<td>Pennsylvania</td>
<td>69</td>
<td>50</td>
<td>19</td>
</tr>
<tr>
<td>Enerprise</td>
<td>Kentucky</td>
<td>143</td>
<td>64</td>
<td>78</td>
</tr>
<tr>
<td>Callaway/Cobra</td>
<td>West Virginia</td>
<td>20</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

Alpha had less than half a million tonnes of metallurgical coal committed and priced for 2010 with approximately 9.5m tonnes open for contract. The company anticipates settling some of its 2010 open tonnage in the 2nd half of this year.

The company’s CEO has indicated that they expect margins for high quality metallurgical coal to improve as steel consumption increases from current recessionary levels. The company has therefore cautioned that while the current outlook is for coking coal demand to improve markedly in 2010, its projected 22m tonnes could be reduced by two thirds, but continues on its current operating schedule.

Arch Coal

Arch coal is the second largest producer in the United States, based on total annual production of approximately 140m tonnes and accounts for roughly 12% of total domestic production. The company mines and processes predominantly low-sulphur coal for domestic coal-fired electric generation facilities. Metallurgical production is small overall and accounted for 4.4m tonnes of the overall production in 2008.

In the second half of 2009, revenue declined by nearly 30% owing to a decline in volumes and softer prices. The company sold only 2.7m tonnes from its Appalachian mines, a 30% drop from the same period the year before and the average sale price fell 12.8% to $60.66/t from $69.54/t in the same comparison.
Coking Coal: A Strategic Market Outlook to 2020

Cleaveland Cliffs (“Cliffs”)

Cleaveland Cliffs boasts a reserve base (proven and probable) in excess of 240m tonnes of high quality, low volatile metallurgical coal. They own and operate two North American coal mining complexes located in West Virginia and Alabama that currently has a joint capacity of 6.5m tpa and have a 45% stake in an Australian concern. For the year ended 31 December 2008, they sold a total of 3.2m tonnes of coking coal, compared with 2.8 m tonnes on an annualized basis in the prior year. (1.2m tonnes was sold for the five months ended 31 December 2007)

The North American operations are well located with excellent access to infrastructure. Both mines are positioned near rail or barge lines, providing access to international shipping ports and allow Cliffs to focus on the export market. In 2008 56% of the company’s North American coal supplied to the seaborne market, mostly to Europe. This compares with 66% export-orientated coal in 2007, which is indicative of the financial crisis as European steelmakers have limited their demand. Another measure to consider in order to appreciate the effects the financial crisis has had on the company and the coal industry at large is that in 2008 approximately 84% of the 2008 production was committed under 1-year contracts to supply integrated steel and coke producers in Europe and America. This compares to only 45% of production committed in 2009 which includes carry-over tonnage.

Cliff’s North American mines are underground operations and include the Pinnacle Complex, Green Ridge and Oak Grove mines. The Pinnacle Complex has been in operation since 1969 and is located 30 miles South West of Beckley, West Virginia and comprises the Pinnacle and Green Ridge mines. Green Ridge mine has been operational since 2004 and produces roughly 0.3-0.5m tonnes of coal annually. Pinnacle Mine has produced between 1.4-2.5m tpa for the last five years.

The Oak Grove mine is located 25 miles out of Birmingham Alabama. The mine has operated since 1972 and produced 1-1.7m tonnes over the past five years.

The company has a 45% interest in the Australian open cut Sanoma Project, a mixed metallurgical (~30%) and thermal (~70%) coal deposit from the Permian Mooranbah coal measures in Queensland’s Bowen Basin. First shipments commenced in 2008 with equity sales volumes equivalent to 933 tonnes. In 2009 the company expects to sell 3.2m tonnes of coal.

The Sanoma deposit has 27m tonnes of reserves and metallurgical supply agreements with JFE and China Steel. It supplies its thermal coal to Korean Utility.

<table>
<thead>
<tr>
<th>Production (m tonnes)</th>
<th>2008 *</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2015</th>
<th>2018</th>
<th>2020</th>
<th>Type</th>
<th>Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinnacle Complex</td>
<td>1.64</td>
<td>3.50</td>
<td>3.60</td>
<td>3.67</td>
<td>3.86</td>
<td>4.16</td>
<td>4.82</td>
<td>5.58</td>
<td>6.15</td>
<td>Low Vol, Met coal</td>
<td>N. America, Europe</td>
</tr>
<tr>
<td>Oak Grove</td>
<td>0.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanoma Project</td>
<td>7.70</td>
<td>8.60</td>
<td>8.77</td>
<td>9.21</td>
<td>9.21</td>
<td>9.21</td>
<td>9.21</td>
<td>9.21</td>
<td>9.21</td>
<td>Met/Therm</td>
<td>China, Japan</td>
</tr>
</tbody>
</table>

*Annualised from date of acquisition 31 July 2007

Table 91: Production Outlook for Cliffs

Source: Company Sources, MBR
YES I WOULD LIKE TO ORDER:

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