Coal in British Columbia
and the
Raven Underground Coal Mine

BACKGROUNDER

May 10, 2011
incorporating the Updated Project Description

Arthur Caldicott
CO$_2$: 2000 ppm → 280 ppm

200  150  65 million years  1800 AD

Jurassic - Cretaceous  Peat  Heat  Pressure  Time  Coal & Methane

Raven Underground Coal Mine
Holy Coal!
Atmospheric Carbon

Atmospheric CO$_2$ at Mauna Loa Observatory

Scripps Institution of Oceanography
NOAA Earth System Research Laboratory

Raven Underground Coal Mine

350 ppm

300 ppm

300 ppm — YEAR
**World Coal Production 2008**

- **China**: 2782 MT (41%)
- **USA**: 1063 MT (16%)
- **EU**: 579 MT (9%)
- **India**: 512 MT (8%)
- **Australia**: 402 MT (6%)
- **Canada**: 68 MT (1%)

**World Coal Exports 2008**

- **Australia**: 278 MT (26%)
- **Indonesia**: 228 MT (21%)
- **Russia**: 115 MT (11%)
- **USA**: 84 MT (8%)
- **Colombia**: 82 MT (8%)
- **China**: 69 MT (6%)
- **South Africa**: 68 MT (6%)
- **Canada**: 37 MT (3%)

**Canadian Coal Production**

- **Metallurgical**
- **Thermal**
Coal Mining in BC

**METALLURGICAL COAL**
- Northeast BC ~5.0 MT
  - Willow Walter
  - Brule Walter
  - Wolverine Walter
  - Trend PRC
- Teck Cominco ~20.0 MT
  - Fording River
  - Greenhills
  - Line Creek
  - Elkview
  - Coal Mtn

**THERMAL COAL**
- Quinsam ~0.70 MT
New & prospective BC coal mines

Pre-application stage at EAO
- **Central South**, 2010, NE BC, 1.5 mt/a, First Coal
- **Gething**, 2006, NE BC, 2 mt/a, Cdn Dehua
- **Horizon**, 2005, NE BC, 1.6 mt/a, Hillsborough
- **Line Creek**, 2009, SE BC, 2.6 mt/a, Teck
- **Lodgepole**, 2006, SE BC, 2 mt/a, Cline
- **Mt. Klappan**, 2004, NW BC, 1.5 mt/a, Fortune
- **Raven**, 2009, Vancouver Island, 2.2 mt/a, Compliance

Application stage at EAO
- **Roman**, 2007, NE BC, 2-4 mt/a, Peace River Coal

Approved
- **Brule**, 2006, NE BC, 2 mt/a, Walter
- **Hermann**, 2006, NE BC, 1 mt/a, Walter
- **Willow Creek**, 2002, NE BC, 0.9 mt/a, Walter
- **Wolverine**, 2005, NE BC, 3.5 mt/a, Walter

Not in EA process
- **Bingay Creek**, 2010, SE BC, Centermount Coal
- **Bullmoose River**, 2 mt/a, Cdn Dehua
- **Murray River**, NE BC, 2 mt/a, Cdn Dehua
- **Quintette**, 2010, NE BC, Teck (*reopen*)

Raven Underground Coal Mine
Coal Prices 1987-2009

- Apr-Jun 2011
  - $330/tonne

**Raven Underground Coal Mine Slide 9 of 35**

- Teck $US/tonne
- Japan coking coal import CIF price
- Japan steam coal import CIF price
- Anglo-American Apr-Jun 2011
- Raven SSBC

Raven Biz Case
- $174/tonne
Compliance Energy Corp?

2000 - Beanstalk Capital Corp.
2002 - Basin Coal Mine, Tulameen, 140,000 tpa
  - coalbed methane in Tulameen & Van Island
2002 - Basin Coal Mine, Tulameen, 140,000 tpa
2004 - Bear Deposit (Hamilton Lake), SW Cumberland
2005 - coal-fired generation plant in Princeton
2006 - Raven Deposit, started exploring
2008 - Comox Joint Venture for Raven
  - Compliance keeps 60%
2010 - 5 copper prospects on Vancouver Island
  - new Beanstalk Capital

not stock promoters
want to build a mine

Raven Underground Coal Mine
Comox Joint Venture

- 60% Compliance Energy
  - through subsidiary Compliance Coal Corp.
- 20% ITOCHU Corp., Japanese trading company
- 20% LG International, Korean trading company
- ITOCHU & LG provided $11.25 million to:
  - complete purchase of West Fraser coal rights
  - fund activities up to production decision on Raven
- ITOCHU & LG have global marketing rights
- CJV owns 29,000 ha of coal on Vancouver Island

TO DO:
- Environmental Assessment (2Q 2012 ?)
- Bankable Feasibility Study (May 2011)
Tsable River Coal Mine 1946-1966
Baynes Sound Coal Mine 1875-1877
Truck route to Port Alberni

42 tonne B-trains
3-4 per hour
7x24
Production Details

- 1.93 million tonnes (MT) per year for 15.5 years
- “run of mine” (ROM) or “raw” coal is crushed and washed in magnetite bath
- result is “clean coal” and wastes

<table>
<thead>
<tr>
<th></th>
<th>ROM</th>
<th>THERMAL</th>
<th>COKING</th>
<th>“CLEAN”</th>
<th>WASTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 yrs</td>
<td>29.9</td>
<td>1.6</td>
<td>11.5</td>
<td>13.1</td>
<td>16.8</td>
</tr>
<tr>
<td>1 year</td>
<td>1.93</td>
<td>0.85</td>
<td>1.1</td>
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</table>

Capital costs $240 million
What is High Volatile A Bituminous?

East Kootenay

Comox Coalfield
(Raven coal in red)

BC Ministry of Energy & Mines

Raven Underground Coal Mine

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Thermal vs Coking or Metallurgical? Semi-Soft Coking Coal?

High Fixed Carbon + Ash + coking properties = coking/steel-making

Raven coal MUST be blended with higher grade of coking coal to be used in steel-making

High Ash, Sulphur, Volatiles = thermal/electricity generation
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Base Case</th>
<th>Alternative Case</th>
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</thead>
<tbody>
<tr>
<td>Cost of Production (C$/Product tonne)</td>
<td>48.27-70.10</td>
<td>39.77-54.89</td>
</tr>
<tr>
<td>Production and Processing Costs Range</td>
<td>57.45</td>
<td>45.78</td>
</tr>
<tr>
<td>Onsite Costs Average</td>
<td>60.3</td>
<td>48.63</td>
</tr>
<tr>
<td>Offsite Costs Average</td>
<td>15.07</td>
<td>14.76</td>
</tr>
<tr>
<td>Total Cost of Sales Average</td>
<td>75.37</td>
<td>63.39</td>
</tr>
<tr>
<td>Revenue (C$/Product tonne)</td>
<td>140.00-156.87</td>
<td>144.95</td>
</tr>
<tr>
<td>Semisoft Price Range</td>
<td>117.23</td>
<td>116.41</td>
</tr>
<tr>
<td>Semisoft Price Average</td>
<td>117.23</td>
<td>116.41</td>
</tr>
<tr>
<td>Thermal Price Range</td>
<td>105.56-128.67</td>
<td>105.56-128.67</td>
</tr>
<tr>
<td>Thermal Price Average</td>
<td>117.23</td>
<td>116.41</td>
</tr>
<tr>
<td>Overall Price Average</td>
<td>141.64</td>
<td>116.41</td>
</tr>
<tr>
<td>Earnings (C$/Product tonne)</td>
<td>66.28</td>
<td>53.02</td>
</tr>
<tr>
<td>EBITA Average</td>
<td>141.64</td>
<td>116.41</td>
</tr>
<tr>
<td>Capital (C$ million)</td>
<td>217.8</td>
<td>213.3</td>
</tr>
<tr>
<td>Total Capital Outlay</td>
<td>272.1</td>
<td>267.6</td>
</tr>
<tr>
<td>Financial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPV_{2012}</td>
<td>308.4</td>
<td>305.8</td>
</tr>
<tr>
<td>NPV_{Base year 2012}</td>
<td>308.4</td>
<td>305.8</td>
</tr>
<tr>
<td>NPV_{2010}</td>
<td>159.2</td>
<td>143.2</td>
</tr>
<tr>
<td>Internal Rate of Return</td>
<td>20.70%</td>
<td>20.00%</td>
</tr>
<tr>
<td>Undiscounted Cash Flow Payback</td>
<td>Year 7</td>
<td>Year 7</td>
</tr>
</tbody>
</table>

**NOTE** – will change when Feasibility Study is released

<table>
<thead>
<tr>
<th></th>
<th>SSCC</th>
<th>Thermal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite</td>
<td>60</td>
<td>49</td>
</tr>
<tr>
<td>Offsite</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>SSCC</th>
<th>Thermal</th>
</tr>
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<tbody>
<tr>
<td>Average</td>
<td>142</td>
<td>116</td>
</tr>
</tbody>
</table>

**IRR** 20.7% 20%
## Local & Regional Impacts

**WATER, SALMON, SHELLFISH, ACID DRAINAGE**

<table>
<thead>
<tr>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baynes Sound shellfishery (600+ jobs)</td>
</tr>
<tr>
<td>salmon, esp. in Cowie Creek, Tsable River</td>
</tr>
<tr>
<td>groundwater removal from coal</td>
</tr>
<tr>
<td>water for washing coal</td>
</tr>
<tr>
<td>wastes, acid drainage, toxics</td>
</tr>
<tr>
<td>operation noise (blasting, coal removal)</td>
</tr>
<tr>
<td>dust and other airborne substances</td>
</tr>
<tr>
<td>methane removal</td>
</tr>
<tr>
<td>trucks (3-4 per hour + return, 24 hours per day)</td>
</tr>
<tr>
<td>operational viability and intermittency</td>
</tr>
<tr>
<td>carbon consequences</td>
</tr>
<tr>
<td>remediation/bonding</td>
</tr>
</tbody>
</table>
Water Impacts

• aquifers, hydrological dynamics poorly understood
• aquifer mapping & baseline data s/b precondition
• tributaries of Cowie Creek will be obliterated
• EVERY resident between the mine and Baynes Sound depends on groundwater
• Baynes Sound: more than half of BC cultured shellfish, $9-$10 million, and 500+ jobs.
• water removed from mine, used for wash process
• mining happens IN aquifers and groundwater
Acid Mine Drainage

• removal of sulphur-bearing material from the ground exposes it to oxygen
• acids continue to form for hundreds of years
• process can be slowed down, mitigated, but not stopped
• acids are themselves toxic in environment
• acids leach toxic metals out of mine wastes
• Tsolum River from copper mine on Mt. Washington: one of BC’s worst acid drainage
Quinsam Mine

“Arsenic concentrations are elevated in Long Lake as a result of acid rock drainage and other chemical process associated with mine waste.”

<table>
<thead>
<tr>
<th></th>
<th>Arsenic</th>
<th>Magnesium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guideline levels:</td>
<td>11-20 ppm</td>
<td>460 ppm</td>
</tr>
<tr>
<td>Long Lake level:</td>
<td>630 ppm</td>
<td>28,000 ppm</td>
</tr>
</tbody>
</table>
Human Health Impacts

established "significant relationships between ecological integrity and human cancer mortality in West Virginia, and suggested important effects of coal mining on ecological communities and public health."

Ecological Integrity of Streams Related to Human Cancer Mortality Rates
Nathaniel P. Hitt and Martin Hendryx, EcoHealth, June 2010
Mine Reclamation & Bonding

Security is required of a mining company to cover costs of decommissioning & reclamation

Over $100 million in unsecured liabilities
Quinsam: $1.5 million
Tsolum River/Mt. Washington: $6 million, plus volunteer time, loss of salmon fishery

"Security now being taken ... is inadequate to remediate the known mines sites in BC where contamination exists."

- BC Auditor General, 2003
Coal Area Disturbed vs Reclaimed

- Disturbed: 22,000 ha
- Reclaimed: 8,000 ha

Chief Inspector of Mines 2008 annual report
Jobs and Taxes

**Jobs**
- “studies show” 350 jobs
- 280 at/in the mine
- 50 transportation
- 21 at the port

**BC Mineral Tax**
- 2009/10 $237 million
- $9-$11 per tonne
- Raven 900,000 tonnes ~ $8-$10 million

**Consider that:**
- mines shut down when not profitable
- many jobs not likely to go to local residents
- 17 year mine life
- puts 500+ sustainable jobs in shellfishery at risk
- impact of mine on existing economy

**Local Taxes**

**Corporate Income Taxes**
“The Corporation has spent $750,000 on an exploration program for the Bear Coal Project and estimates that 5.0 million tonnes would be accessible by open pit methods for cleaning at the Raven facility.”
COMPLIANCE COAL CORP.
BEAR DEPOSIT CLAIMS
& CUMBERLAND's
WATER SUPPLY
Federal Triggers
- fish and fish habitat
- the port and related marine issues

Comprehensive Study Report
- call for panel review rejected

Public Comments
- Sep 2010 deadline
- ~1900 comments
- virtually all opposed

Participant Funding
- Dec 2010 deadline
- CoalWatch: $20,500
- Alberni Env. Coalition: $28,375
- BC Shellfish Growers: $28,600
- Sierra Club Comox Valley: $4,180
Comment Period
• May 18 - June 27
• SEND COMMENTS!

Public meetings
• Courtenay, May 30
• Port Alberni, Jun 1
• Union Bay, Jun 6
• PACK THE HALL!

AIR = Application Information Requirements
- a list of issues to address in the formal application
Thank-you

www.coalwatch.ca  info@coalwatch.ca

WildernessCommittee.org/coal

Alberni Environmental Coalition

www.stopcoal.org

www.nocoalmine.net