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HARD ROCK COAL MINING

Testing and Analysing of Standard Project No: VR001

For Proximate, Total Sulfur, Calorific Value and Relative Density analysis

Report No: 21010554

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Sampled By: Client

Samples Received: February 2012

Order No: HRCMEX 51

Date Reported: 26 March 2012

Greg Van Gestel
Laboratory Manager
ALS Coal Division - Richlands



REPORT No: 21010554
Date: 06/03/12 Page 2 of 7

ANALYSIS AND TESTING REPORT

HARD ROCK COAL MINING

| Sample Details | Standard Project - VR001 Sample:HVC001 Mass:2.62 kg | Standard Project - VR001 Sample:HVC002 Mass:0.70 kg | Standard Project - VR001 Sample:HVC003 Mass:1.99 kg |
|---------------------------|---|---|---|
| PROXIMATE ANALYSIS | | | |
| Air Dried Moisture % | 8.3 | 7.4 | 7.0 |
| Ash % | 65.1 | 59.6 | 47.4 |
| Volatile Matter % | 9.5 | 13.7 | 14.6 |
| Fixed Carbon % | 17.1 | 19.3 | 31.0 |
| Total Sulfur % | 0.01 | 0.07 | 0.08 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 5.86 | 7.95 | 13.74 |
| Calorific Value kcal/kg | 1400 | 1898 | 3282 |
| Relative Density | 2.07 | 1.93 | 1.80 |

| Sample Details | Standard Project - VR001 Sample:HVC004 Mass:3.97 kg | Standard Project - VR001 Sample:HVC005 Mass:1.78 kg | Standard Project - VR001 Sample:HVC006 Mass:0.94 kg |
|---------------------------|---|---|---|
| PROXIMATE ANALYSIS | | | |
| Air Dried Moisture % | 7.6 | 5.3 | 5.2 |
| Ash % | 58.7 | 53.0 | 38.6 |
| Volatile Matter % | 12.9 | 16.4 | 18.6 |
| Fixed Carbon % | 20.8 | 25.3 | 37.6 |
| Total Sulfur % | 0.05 | 0.10 | 0.11 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 8.12 | 11.89 | 16.83 |
| Calorific Value kcal/kg | 1940 | 2840 | 4018 |
| Relative Density | 1.95 | 1.86 | 1.73 |

| Sample Details | Standard Project - VR001 Sample:HVC007 Mass:7.65 kg | Standard Project - VR001 Sample:HVC008 Mass:3.71 kg | Standard Project - VR001 Sample:HVC009 Mass:0.58 kg |
|---------------------------|---|---|---|
| PROXIMATE ANALYSIS | | | |
| Air Dried Moisture % | 5.5 | 4.8 | 4.2 |
| Ash % | 52.2 | 42.4 | 52.2 |
| Volatile Matter % | 17.3 | 21.0 | 20.5 |
| Fixed Carbon % | 25.0 | 31.8 | 23.1 |
| Total Sulfur % | 0.10 | 0.17 | 0.32 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 12.07 | 17.45 | 12.62 |
| Calorific Value kcal/kg | 2884 | 4168 | 3014 |
| Relative Density | 1.89 | 1.77 | 1.88 |

All results reported to air dried basis

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ANALYSIS AND TESTING REPORT

HARD ROCK COAL MINING

| Sample Details | Standard Project - VR001 Sample:HVC010 Mass:0.47 kg | Standard Project - VR001 Sample:HVC011 Mass:1.18 kg | Standard Project - VR001 Sample:HVC012 Mass:0.61 kg |
|---------------------------|---|---|---|
| PROXIMATE ANALYSIS | | | |
| Air Dried Moisture % | 5.4 | 5.5 | 6.7 |
| Ash % | 26.7 | 22.0 | 30.0 |
| Volatile Matter % | 21.4 | 27.8 | 23.5 |
| Fixed Carbon % | 46.5 | 44.7 | 39.8 |
| Total Sulfur % | 0.30 | 0.42 | 0.41 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 22.13 | 23.75 | 20.67 |
| Calorific Value kcal/kg | 5286 | 5672 | 4938 |
| Relative Density | 1.55 | 1.49 | 1.55 |

| Sample Details | Standard Project - VR001 Sample:HVC013 Mass:1.49 kg | Standard Project - VR001 Sample:HVC014 Mass:1.65 kg | Standard Project - VR001 Sample:HVC015 Mass:2.76 kg |
|---------------------------|---|---|---|
| PROXIMATE ANALYSIS | | | |
| Air Dried Moisture % | 5.0 | 5.5 | 4.0 |
| Ash % | 23.6 | 36.3 | 42.4 |
| Volatile Matter % | 28.1 | 18.0 | 24.0 |
| Fixed Carbon % | 43.3 | 40.2 | 29.6 |
| Total Sulfur % | 0.43 | 0.24 | 0.23 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 23.40 | 18.46 | 16.39 |
| Calorific Value kcal/kg | 5588 | 4410 | 3914 |
| Relative Density | 1.49 | 1.65 | 1.70 |

| Sample Details | Standard Project - VR001 Sample:HVC016 Mass:1.55 kg | Standard Project - VR001 Sample:HVC017 Mass:2.67 kg | Standard Project - VR001 Sample:HVC018 Mass:1.21 kg |
|---------------------------|---|---|---|
| Ash % | | | 81.2 |
| PROXIMATE ANALYSIS | | | |
| Air Dried Moisture % | 6.9 | 6.7 | |
| Ash % | 32.0 | 48.5 | |
| Volatile Matter % | 19.5 | 17.3 | |
| Fixed Carbon % | 41.6 | 27.5 | |
| Total Sulfur % | 0.41 | 0.11 | |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 20.09 | 13.56 | 0.07 |
| Calorific Value kcal/kg | 4798 | 3240 | 18 |
| Relative Density | 1.58 | 1.79 | |

All results reported to air dried basis



ANALYSIS AND TESTING REPORT

HARD ROCK COAL MINING

| Sample Details | Standard Project - VR001 Sample:HVC019 Mass:0.89 kg | Standard Project - VR001 Sample:HVC020 Mass:1.20 kg | Standard Project - VR001 Sample:HVC021 Mass:2.41 kg |
|-------------------------|---|---|---|
| Ash % | 77.6 | 76.5 | 79.5 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 0.12 | 0.14 | 0.15 |
| Calorific Value kcal/kg | 28 | 32 | 36 |

| Sample Details | Standard Project - VR001 Sample:HVC022 Mass:1.04 kg | Standard Project - VR001 Sample:HVC023 Mass:0.64 kg | Standard Project - VR001 Sample:HVC024 Mass:2.55 kg |
|-------------------------|---|---|---|
| Ash % | 75.1 | 81.4 | 81.0 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 0.17 | 0.23 | 1.01 |
| Calorific Value kcal/kg | 40 | 54 | 240 |

| Sample Details | Standard Project - VR001 Sample:HVC025 Mass:2.11 kg | Standard Project - VR001 Sample:HVC026 Mass:1.04 kg | Standard Project - VR001 Sample:HVC027 Mass:0.27 kg |
|-------------------------|---|---|---|
| Ash % | 91.3 | 73.4 | 78.2 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 0.03 | 3.56 | 0.11 |
| Calorific Value kcal/kg | 6 | 850 | 26 |

| Sample Details | Standard Project - VR001 Sample:HVC028 Mass:3.05 kg | Standard Project - VR001 Sample:HVC029 Mass:3.98 kg | Standard Project - VR001 Sample:HVC030 Mass:0.28 kg |
|-------------------------|---|---|---|
| Ash % | 90.5 | 87.6 | 59.2 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 0.08 | 0.08 | 8.01 |
| Calorific Value kcal/kg | 20 | 18 | 1912 |

| Sample Details | Standard Project - VR001 Sample:HVC031 Mass:4.39 kg | Standard Project - VR001 Sample:HVC032 Mass:3.07 kg | Standard Project - VR001 Sample:HVC033 Mass:2.04 kg |
|-------------------------|---|---|---|
| Ash % | 88.5 | 81.8 | 76.4 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 0.03 | 0.24 | 1.02 |
| Calorific Value kcal/kg | 6 | 56 | 242 |

All results reported to air dried basis



ANALYSIS AND TESTING REPORT

HARD ROCK COAL MINING

| Sample Details | Standard Project - VR001 Sample:HVC034 Mass:1.56 kg | Standard Project - VR001 Sample:HVC035 Mass:2.17 kg | Standard Project - VR001 Sample:HVC036 Mass:2.10 kg |
|-------------------------|---|---|---|
| Ash % | 89.6 | 83.7 | 90.1 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 0.09 | 1.23 | 0.08 |
| Calorific Value kcal/kg | 22 | 294 | 20 |

| Sample Details | Standard Project - VR001 Sample:HVC037 Mass:6.23 kg | Standard Project - VR001 Sample:HVC038 Mass:3.35 kg | Standard Project - VR001 Sample:HVC039 Mass:1.98 kg |
|-------------------------|---|---|---|
| Ash % | 90.4 | 85.2 | 83.4 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 0.09 | 0.05 | 0.08 |
| Calorific Value kcal/kg | 20 | 12 | 18 |

| Sample Details | Standard Project - VR001 Sample:HVC040 Mass:3.03 kg | Standard Project - VR001 Sample:HVC041 Mass:2.20 kg | Valley Audit 1 Sample:HVCAA1 Mass:1.16 kg |
|-------------------------|---|---|---|
| Ash % | 85.9 | 64.2 | 21.4 |
| CALORIFIC VALUE | | | |
| Calorific Value MJ/kg | 0.05 | 7.36 | 22.11 |
| Calorific Value kcal/kg | 10 | 1756 | 5282 |

| Sample Details | Valley Audit 1 Sample:HVCAA3 Mass:2.87 kg |
|-------------------------|---|
| Ash % | 29.8 |
| CALORIFIC VALUE | |
| Calorific Value MJ/kg | 18.75 |
| Calorific Value kcal/kg | 4480 |

All results reported to air dried basis



ACCREDITED TESTS

| HARD COAL TEST | ABBREVIATION | STANDARD /REFERENCE |
|-------------------------------|---|----------------------------|
| Abrasion Index | AI | AS1038.19 |
| Adiabatic Self Heating | | AL035 (In-House) |
| Ash | A | AS1038.3 |
| Ash Fusibility | | AS1038.15 |
| Carbon | | AS1038.6.4 |
| Carbonate Carbon | C _m | AS1038.23 |
| Chlorine | Cl | AS1038.8 |
| Crucible Swelling Number | CSN | AS1038.12.1 |
| Dilatometer | | AS 1038.12.3 |
| Fixed Carbon | FC | AS1038.3 |
| Float/Sink Analysis | F/S | AS4156.1 |
| Forms of Sulfur | FOS [S _o , S _p , S _s] | AS1038.11 |
| Gieseler | | AS1038.12.4.1 |
| Gray King Coke Type | GKCT | AS1038.12.2 |
| Hardgrove Grindability Index | HGI | AS1038.20 |
| Hydrogen | H | AS1038.6.4 |
| Moisture (residual) | M _r | AS1038.3 |
| Moisture Holding Capacity | MHC | AS1038.17 |
| Nitrogen | N | AS1038.6.4 |
| Oxygen | O | AS1038.16 |
| Phosphorus | P | BS1016.14 |
| Relative Density | RD | AS1038.21.1.1 |
| Relative Ignition Temperature | RIT | AL030 (In-House) |
| Size Analysis | | AS3881 |
| Gross Calorific Value | q | AS1038.5 |
| Total Moisture | M | AS1038.1 |
| Total Sulfur | S | AS1038.6.3.3 |
| Volatile Matter | VM | AS1038.3 |
| Ash Analysis | | AL044 (In-House) * |

| COKE TEST | ABBREVIATION | STANDARD /REFERENCE |
|--------------------|---------------------|----------------------------|
| Proximate Analysis | | AS 1038.4 |

Note(s):

1. Acceptance and reporting of results is in accordance with AS1038.16
2. Sampling by ACIRL is in accordance with the following AS2617 (seams, insitu);
AS4264.1 Sampling Procedures ;
AS4264.4 Determination of Precision and Bias
3. All analyses reported to Air-Dried Basis unless otherwise indicated.
- *4. Ash Analysis performed at ACIRL Maitland laboratory (accreditation held).
Based on AS1038.14.2, variation ICP instead of flame for species excitation.



NON ACCREDITED TEST

The following tests are not covered in by the scope of accreditation relating to the laboratories technical accreditation.

| <u>TEST</u> | <u>STANDARD/REFERENCE</u> |
|--------------------|--|
| Drop Shatter | AS2519 |
| Durham Cone | AS1038.25 |
| Froth Flotation | AS4156.2 and Client Specific Procedures |
| Mineral Matter | AS1038.22 |
| Pre- Treatment | AS2519 |
| Roadway Dusts | QLD Department of Mines and Energy – Quality of incompatible dust, sampling and analysis of roadway dust in underground coal mine – Coal Mining Safety and Health Act 1999 Recognised Standard – No. 05, July 2003 |
| Roga Index | ISO335 |
| Caking Index | ISO15585 |
| Sapozhnikov | Journal of Mine Metals and Fuels India Oct 1978 |
| Size Adjustment | AS2519 |

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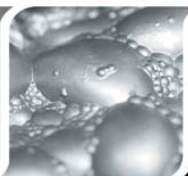
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