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# Report

## MARKETABILITY OF COAL PRODUCTS FROM A NEW COLLIERY FOR THE LOCAL INDUSTRY OR EXPORT

XM Prevost

2010

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# INDEX

## INTRODUCTION

This report was prepared based on information provided by two reports. Both provided information on the new areas the client intended to mine in the future. Certain assumptions were made to make up for data not provided, as in the case of lack of processed “washed” coal analysis and “daf” (dry ash free) information.

After Part II of the report was compiled and presented, the contracting company delivered new additional information. This new set of data, for Types 1, 2, 3 and 4 presents a totally new scenario for the marketing of the client’s coal products. The need of still more detailed information, on parameters such as Phosphorous content and petrographics (maceral content of some of the coal products) particularly those aimed for the metallurgical market, needs to be highlighted. Without that information, some of the assumptions made cannot be proven.

The spreadsheets contained in Part I of the present report are a result of our analysis of the potential market for the five types of coal products.

We assume that the analytical information provided by the client is a true reflection of the coal resources being investigated. We also believe that the Volatile Matter percentages that identify each Type are given on a daf (dry ash free) basis.

To highlight the differences between the findings of the study made using the report made available to the researchers recently and the research prepared using the two previous reports; we have kept the previous information as Part II of this final marketing report.

**COMMENTS ON THE POTENTIAL MARKETS FOR TYPES 1, 2, 3.1, 3.2 & 4)**

**The comments are made to each Type starting with Type 4 (highest volatiles and finishing with Type 3.1 (lowest volatiles).**

**Type 4:**
This Type conforms to RB1 specification (Export) – According to "as received basis", with excellent ash and S well below RB1 limits and would do well as export – typically to South African markets in Europe and elsewhere.

**Type 1:**
Export – Marginally outside the main RB1 specifications, given volatiles (as received) minimum required is 22%; ash may be too high for premium LVPCI (Low Volatile Pulverized Coal Injection), but should be ideal for PF systems combusting such coals – process dependent – or even as PF to feed cement kilns.

**Type 3.2:**
Present use of such coals in South Africa is not known. For export, should consider PF combustion in suitable boilers; ash may be too high for LVPCI, but worth the attempt to enter this market.

**Type 2:**
Although slightly lower in volatiles when compared to Type 3.2, this type (similar to Leeuwpan low volatiles); could be blended with Anthracite fines and exported to pelletizing market (e.g. Brazil). The Ash is a little too high for premium LVPCI. See also Type 3.1 below.

**Type 3.1:**
Perhaps semi-anthracitic in rank, and provided it is a -16mm product, can feed directly into certain sinter and pelletizing markets export, alone in some cases or in a blend – process specification dependent. In addition, to feed the pelletizing export market described above. Could be suitable also for certain sinter processes.
Ash may be too high for LVPCI. Suitable for PF boilers that combust low volatiles coals such as Aberthawe (Wales) and certain others in France and Bulgaria, also some Mediterranean markets.

**SOME POTENTIAL USES (<u>if sized</u>, for example as pea or small nut)**

**Type 4:**
As "A Grade" coal this coal is suitable for industries using chain grate stokers. In addition, provided level of Phosphorus is not excessive, as bituminous coal feed into selected ferroalloy reduction processes that use bituminous coal in their blend of reductants, or for charring to provide a reductant with higher carbon content and very low volatiles (<4%).

**Type 1:**
Subject to test work, perhaps same applications as Type 4; alternatively, if +20mm and if this coal handles well, then suitable for export into domestic use/market in Turkey. The ash and S are well accepted by these markets.

**Type 3:**
Volatiles are marginally too low for Turkey domestic use, but perhaps blended with Type 1, sized +20mm and subject to good handlability, would suit Turkish sized coal market.

**Type 2:**
If sized, depending on other factors, suitable perhaps for charring to yield sized products with higher carbon as feed into the metallurgical market.

**Type 3:**
As for Type 2. Also, if robust in handling, sold as A Grade fuel for domestic use (smokeless fuel).

**IN ADDITION TO THE ABOVE, THE FOLLOWING CONSIDERATIONS SHOULD BE TAKEN INTO ACCOUNT:**

**Types 2 and 3:**
Increase yield by washing at higher density to an ash of maximum 17% (dry) and provided FC (dry) is >70%, this product will sell into pelletizing market in Brazil (0 x 16mm) comfortably, AT API4 values or higher. Although higher in ash = lower price, the improved yield and therefore volume may result in improved returns.
If the qualities are retained as shown, and provided impurities such as phosphorus are not prohibitive; seek PCI/metallurgical applications that would accommodate such volatiles (10-14%) in India, South Korea and Mediterranean countries – and power generation as well.

**Types 1 and 3:**
If these coals hold their own in sizing (and +20mm), even with an ash of 17% (dry) by washing at higher density to increase yield, they could be a winner for exports of sized coal to Turkey. If they don't hold their own in

sizing, then consider PCI use where the ash content may have to be negotiated.

THE ABOVE COMMENTS ARE ONLY PRELIMINARY, GIVEN THAT PROCESSES REQUIRE ASSESSMENT OF MANY MORE PARAMETERS YET UNAVAILABLE.

PART II: REPORT ON THE MARKETABILITY OF CERTAIN POTENTIAL COAL PRODUCTS FROM THE CLIENT.

It is our understanding that the company desires to market the following types of coal:

- "Type 1": Bituminous Coal, 16-22% Volatile Matter (VM) with an average of 21% VM, 16% Ash
- "Type 2": Anthracitic/Lean Bituminous Coal, 6-16%VM with an average of 11% VM, 16% Ash
- Type 3.1. Anthracite. 6-12% VM with an average of 10%VM. ~9.5% Ash
- Type 3.2 Lean Bituminous Coal, 12-16% VM with an average of ~15%VM, Ash ~16%

According to reports provided product quality for "Type One" exists in the area of study, whereas that for "Types Two", 3.1 and 3.2 seem to be absent.

The report contains a profile of the Upper Seam showing that of the 3.16m thickness, about 30% consists of carbonaceous shale, and this limits the washability of the seam, perhaps expected not to exceed 60% at about 1.60 RD. The Upper Seam is the main seam in the area.

Dolerite sills (and dykes?) present in the area are not modeled and therefore the extent of their influence in both the mining plan and on the quality of the coal cannot be properly assessed.

**The LB (Lean Bituminous) Coals**

From the wash analysis (Table 2, Report) the products obtained at RD 1.50 and RD 1.60 are considered to be the most suitable for further evaluation, given the yields and qualities reported.

The iso-contour plots show for the Upper Seam that the area east reports the coal with the lower ash coal, but with the higher Sulphur (S).

The qualities of products at RD 1.60, prepared from compositing of borehole samples for the identified areas are the main suite of data used in the assessment of the marketability of these products. From the existing information the following is clear:

Key: LB = Lean Bituminous; GT = Upper Seam Top; GB = Upper Seam Bottom

Note: The term Lean Bituminous is an unfortunate term, given that these coals (labeled LB) are in fact classified (or ranked) as Bituminous coals (volatiles in excess of 16% on a dry, ash-free basis (daf)). In ASTM terminology, these coals would be termed Medium Volatile Bituminous coals (22 – 31% volatiles, dry, mineral matter-free basis).

| BLOCK | Potential Market |
|---|---|
| **LB 1 GT** | Eskom, with a S problem |
| **LB 1 GB** | Eskom |
| **LB 2 GT** | Volatiles are too low, the ash is too high for any current user (including Eskom), perhaps blended with others? |
| **LB 2 GB**[1] | Eskom (combined with LB 2 GT , for use in cement kilns as pulverized fuel (PF)) |
| **LB 3 GT** | Eskom, with a S problem. Could be a "RB3"[2] specification for India? |
| **LB 3 GB** | Eskom, or bleed and blend with other current steam coal exports (API4 less $5 via RBCT only) |
| | |

At RD 1.60, the LB coals (Top or Bottom) are not recommended for stoker–type boiler combustion (typically used in the paper and sugar industries), given that the volatiles are too low, and the ash considered to be too high. In addition, stokers require sized coal, typically peas or small nuts (6X20mm, 20X40mm, etc.), the production yield of which we cannot ascertain without further exploration and testing.

In general, all the products generated at RD 1.60 are considered suitable for combustion in a Fluidized Bed (FB). In addition, if blended with higher volatile bituminous coals, these products could perhaps be used as PF in cement kilns – however, this would have to be tested to confirm and to establish the proportion of such coals in a blend.

Products at RD 1.60 with >20% volatiles are potentially suitable for Eskom power utility boilers. For practical reasons, and in order to ameliorate the quality deficiencies, it is suggested that the Top and Bottom sections of the Gus Seam be combined in all cases (LB1, LB2 and LB3).

[1] Ash <15%, P < 0.03%, Volatiles 22.5%, S 0.92%, perhaps for charring but needs a) petrographic characterization to establish suitability, b) preliminary assessment of production costs (i.e. charring) versus current inland market prices for such products, c) security of tonnage and consistency of feed quality.

[2] RB3 specification does not exist at present but will ultimately be implemented and will be typified by high ash (i.e. significantly higher than the current ash of 15% (as received) which characterises both established RB1 and RB2 specifications). The Indian market seeks cheaper coals, typically high ash for domestic /inland consumption.

Given its reported quality, only product 2 is considered to be potentially suitable for char making – i.e. S < 1% and P <0.03% and Ash <15% - char for use as a reductant in selected metallurgical processes, such as sintering and pelletizing (if char is in the form of fines) or in smelters (if char is sized as a pea or nut). It is however important to quantity the petrographic composition of this product so as to conclude whether or not the char will be physically and organically suitable (alternately, char testing ought to be carried out).

**The LA (Lean Anthracite) blocks**

Only ROM "raw" analyses are available, and given the unacceptably high ash, no suitable market is available at present. However, the following points are pertinent to the coal marked as LA:

1. The correct use of volatiles as a rank parameter must be volatiles on a dry, ash-free basis (daf). When such volatiles are calculated for the LA products, these coals are classified as **Bituminous** (**not Lean**), with the exception of LA 2 and LA 3, which are classified as **Lean** coal (synonymous with Semi-anthracite (according to old South African terminology).
2. Coal products with volatiles (ad) <20% are not suitable for any Eskom power utility.
3. The ash content of the LA "raw" coals is too high for any current use, and these coals require beneficiation to yield products that can be assessed, as done with the LB coals.
4. Be that as it may, the products that could originate from beneficiating the LA raw coals are expected to report volatiles (ad) <20%, and in such a case, they would be considered unsuitable for stoker combustion, but could perhaps be used in FB combustion.
5. For use of such beneficiated LA products as PF feed in cement kilns, much will depend on user process technology.

Concluding, the LA coal is not considered saleable as a raw coal, and beneficiation is required at RD 1.60 (for example). Should the yield at such density so justify, then the resulting product/s can be assessed in light of current markets. Charring may be considered to produce a high C reductant, provided contaminants such as ash, P and S in the product are acceptable prior to charring.

## SOME ADDITIONAL REMARKS

This report was compiled with the constraint that the only information available was sourced from the reports mentioned. It is the view of the research team that a more comprehensive report can be written, provided some more detailed information is made available from the mine. A large amount of "reserves" (blocks 1 to 3) as shown on page 2 of the report, a total of 74Mt, or 39Mt (if washed) were given no market value. The value of these blocks could increase, if further assessed. The researchers believe that another study should be conducted, with more time and information on the "Lean Anthracite".

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**APPENDIX I** (this table is more than a year old it should be replaced by 2009)

**THE SOUTH AFRICAN INLAND COAL MARKET**

**Period 2008:01 to 12**

| INDUSTRY | Local Sales | | |
|---|---|---|---|
| Commodity | Mass (t) | Value (R) | Price |
| **AGRICULTURE** | | | |
| BITUMINOUS STEAM | 53 370 | 45 242 033 | 848 |
| **BRICK AND TILE** | | | |
| BITUMINOUS STEAM | 85 187 | 12 942 596 | 152 |
| **CEMENT AND LIME** | | | |
| BITUMINOUS STEAM | 1 207 504 | 454 189 320 | 376 |
| **CHEMICAL INDUSTRIES** | | | |
| COAL | 1 844 028 | 289 432 434 | 157 |
| ANTHRACITE (TOTAL) | 5 119 | 4 047 243 | 791 |
| BITUMINOUS STEAM | 157 280 | 20 394 315 | 130 |
| **ESKOM** | | | |
| BITUMINOUS STEAM | 119 289 457 | 13 323 403 130 | 112 |
| **GOLD AND URANIUM MINES** | | | |
| BITUMINOUS STEAM | 33 879 | 20 018 087 | 591 |
| **MITTAL STEEL** | | | |
| BITUMINOUS (TOTAL) | 1 248 940 | 794 006 683 | 636 |
| BITUMINOUS STEAM | 76 550 | 22 169 158 | 290 |
| BITUMINOUS COKING | 47 475 | 38 989 361 | 821 |
| **MERCHANTS AND DOMESTIC** | | | |
| COAL | 10 320 096 | 3 451 314 621 | 334 |
| ANTHRACITE (TOTAL) | 7 436 | 2 395 465 | 322 |
| BITUMINOUS STEAM | 579 439 | 164 400 961 | 284 |
| **IRON AND STEEL** | | | |
| COAL | 3 003 010 | 1 988 931 731 | 662 |
| ANTHRACITE (TOTAL) | 25 879 | 16 117 372 | 623 |
| BITUMINOUS (TOTAL) | 229 379 | 90 435 558 | 394 |
| BITUMINOUS STEAM | 42 390 | 20 147 201 | 475 |
| BITUMINOUS COKING | 186 989 | 70 288 357 | 376 |
| **ELECTRICITY** | | | |
| BITUMINOUS STEAM | 1 479 968 | 166 024 383 | 112 |
| **INDUSTRIES** | | | |
| COAL | 4 597 016 | 1 416 800 354 | 308 |
| ANTHRACITE (TOTAL) | 8 160 | 3 844 953 | 471 |
| BITUMINOUS STEAM | 229 045 | 66 616 341 | 291 |
| **MINING** | | | |
| BITUMINOUS STEAM | 325 320 | 199 342 147 | 613 |
| **METALLURGICAL** | | | |
| COAL | 1 173 909 | 698 272 088 | 595 |
| ANTHRACITE (TOTAL) | 35 654 | 16 457 264 | 462 |
| BITUMINOUS STEAM | 48 076 | 14 828 653 | 308 |
| **SYNTHETIC FUELS** | | | |
| BITUMINOUS STEAM | 44 064 080 | 5 615 593 817 | 127 |
| **TRANSPORT** | | | |
| BITUMINOUS STEAM | 160 566 | 98 794 271 | 615 |
| **Grand total** | 188 886 330 | 28 574 307 695 | |

The 2008 table above lists the most significant consumers of coal types available to the South African inland market, from big ones such as Electricity (121Mtpa) and Sasol (44Mtpa), to medium-sized such as Merchants/Domestic (10.3Mtpa), Metallurgy (5.4Mtpa), Industries (4.6Mtpa), Chemical Industries (1.8Mtpa), Cement and Lime (1.2Mtpa) and even smaller ones: Mines (359ktpa), Transport (160ktpa), Brick and Tile (85ktpa) and Agriculture (53ktpa).

The quality of coal used by all 15 groups varies significantly, as does the price (as the table shows) from as little as R112/t (Eskom and Electricity) to as much as R848/t (Agriculture).

Prices depend entirely on the quality and scarcity of the coals (price-demand binomial). If there is insufficient local supply – as in the case of coking coal and Anthracite – coal must be imported at much higher prices.

The above table gives a summary of the sales during 2008. The tonnages during 2009 will most likely be similar, with a probable increase for Eskom figures. Prices shown are an average of all 2008 prices and the variation between beginning and end of the year cannot be appreciated, unless the monthly tables are perused.

The table below presents the latest average prices, recorded recently:

| Period 2009:06 | | | |
|---|---|---|---|
| | Local Sales | | |
| **Commodity** | Mass (t) | Value (R) | Price |
| ***AGRICULTURE*** | | | |
| **BITUMINOUS STEAM** | 709 | 421 419 | 594 |
| ***BRICK AND TILE*** | | | |
| **COAL** | 26 095 | 2 113 439 | 81 |
| **ANTHRACITE** | 256 | 95 923 | 375 |
| **BITUMINOUS STEAM** | 25 839 | 2 017 516 | 78 |
| ***CEMENT AND LIME*** | | | |
| **BITUMINOUS STEAM** | 130 926 | 48 464 685 | 370 |
| ***CHEMICAL INDUSTRIES*** | | | |
| **BITUMINOUS STEAM** | 168 169 | 22 813 976 | 136 |
| ***ESKOM*** | | | |
| **BITUMINOUS STEAM** | 9 765 595 | 1 211 636 525 | 124 |
| ***GOLD AND URANIUM MINES*** | | | |
| **BITUMINOUS STEAM** | 2 381 | 1 120 718 | 471 |
| ***MITTAL STEEL*** | | | |
| **BITUMINOUS (TOTAL)** | 51 221 | 64 551 704 | 1 260 |
| **BITUMINOUS STEAM** | 30 185 | 13 937 891 | 462 |
| **BITUMINOUS COKING** | 21 036 | 50 613 813 | 2 406 |
| ***MERCHANTS AND DOMESTIC*** | | | |
| **COAL** | 478 411 | 183 261 495 | 383 |
| **ANTHRACITE** | 4 402 | 2 381 914 | 541 |
| **BITUMINOUS STEAM** | 474 009 | 180 879 581 | 382 |
| ***IRON AND STEEL*** | | | |
| **COAL** | 116 241 | 64 358 990 | 554 |
| **ANTHRACITE** | 6 374 | 5 204 790 | 817 |
| **BITUMINOUS STEAM** | 109 867 | 59 154 200 | 538 |
| ***ELECTRICITY*** | | | |
| **BITUMINOUS STEAM** | 26 836 | 7 436 765 | 277 |
| ***INDUSTRIES*** | | | |
| **BITUMINOUS STEAM** | 344 224 | 114 123 579 | 332 |
| ***MINING*** | | | |
| **BITUMINOUS STEAM** | 9 430 | 6 524 856 | 692 |
| ***METALLURGICAL*** | | | |
| **COAL** | 53 053 | 38 053 459 | 717 |
| **ANTHRACITE** | 44 845 | 33 608 849 | 749 |
| **BITUMINOUS STEAM** | 8 208 | 4 444 610 | 541 |
| ***SYNTHETIC FUELS*** | | | |
| **BITUMINOUS STEAM** | 2 491 471 | 474 133 466 | 190 |
| ***TRANSPORT*** | | | |
| **BITUMINOUS STEAM** | 5 498 | 3 298 590 | 600 |
| **Grand total** | 13 670 260 | 2 242 313 666 | |

This table was given (at that time) as the latest “local sales by user” now statistics covering the whole of 2009 are available, plus the first quarter of 2010

## APPENDIX II

### QUALITIES RANGE (SPECS) OF COAL PRODUCTS USED BY THE LOCAL INDUSTRY

| User | CV (MJ/kg) | H2O% | Ash% | VM% | FC% | S% |
|---|---|---|---|---|---|---|
| AGRICULTURE | 23.44-27.36 | 3.0-4.5 | 12.8-24.3 | 22.4-28.6 | 48.3-58.6 | 0.27-1.02 |
| BRICK AND TILE | 24.56-27.72 | 1.9-4.4 | 14.4-21.7 | 18.2-28.8 | 51.7-59.5 | 0.26-1.61 |
| CEMENT AND LIME | 25.18-29.23 | 2.4-4.4 | 12.4-18.8 | 22.1-25.8 | 54.4-61.5 | 0.26-2.28 |
| CHEMICAL INDUSTRIES | 18.91-25.98 | 1.4-7.7 | 13.7-26.4 | 23.9-27.0 | 42.0-54.2 | 0.49-0.90 |
| ELECTRICITY | 22.95-26.78 | 2.9-3.8 | 15.6-24.0 | 22.1-24.2 | 48.3-59.4 | 0.42-0.98 |
| ESKOM | 18.91-26.73 | 1.9-7.7 | 15.7-33.4 | 21.1-25.9 | 42.0-57.1 | 0.23-1.20 |
| GOLD AND URANIUM MINES | 26.53-28.72 | 2.2-4.7 | 12.5-14.7 | 21.2-25.0 | 59.4-60.3 | 0.35-0.55 |
| INDUSTRIES | 23.44-33.19 | 1.4-4.5 | 10.8-24.2 | 23.1-31.9 | 48.3-60.3 | 0.27-1.61 |
| IRON AND STEEL | 25.18-33.19 | 0.8-4.4 | 7.4-18.8 | 4.9-37.1 | 85.9-49.3 | 0.26-1.99 |
| MERCHANTS AND DOMESTIC | 23.44-30.36 | 2.1-5.1 | 8.1-23.9 | 8.5-36.1 | 43.0-76.7 | 0.32-2.25 |
| METALLURGICAL | 25.18-30.36 | 1.9-4.4 | 8.1-18.8 | 6.7-32.5 | 52.6-77.5 | 0.26-1.74 |
| MINING | 25.80-31.62 | 0.8-5.2 | 11.2-16.2 | 22.5-28.1 | 53.0-64.4 | 0.70-0.85 |
| SYNTHETIC FUELS | 21.01-21.76 | 3.6-4.5 | 24.8-27.4 | 21.5-23.6 | 44.6-48.0 | 0.63-1.00 |
| TRANSPORT | 21.64 | 3.6 | 25.6 | 22.8 | 48.0 | 0.63 |

The above table shows the range of some of the quality specifications. In certain users, it is rather wide, e.g. Chemical Industries, Eskom, Industries, all the Metallurgical users, Merchants and Mining. This can be explained by the fact that, in some cases, a wide variety of coal ranks or types, with different properties, are used for different applications (i.e. process dependent). A case in point is the Metallurgical industry that uses bituminous coal as a source of heat and as a reductant, as well as Anthracite and coke as prime reductants (supply of carbon).

Power generation (Eskom and Electricity) uses steam (bituminous) coal with qualities that comply with boiler specifications.

“Industries” is a generic term for an amalgamation of a wide number of small users (too small to be considered individually). Such industries are paper mills, breweries, sugar mills and a significant number of boilers used by processes generating their own steam, to dry or to process certain products. Therefore, depending on boiler type, the quality of the coal used can vary from so-called “good” quality (e.g. low ash, medium to high volatiles, high calorific value) to Inferior quality (lower calorific value, higher ash).

The group known as “Merchants and Domestic” is quite difficult to define. It refers to “middle men” and traders or intermediaries that source certain products on from producers and supply them to end-users and in the process make a profit. Typically, they buy the more expensive “niche” products, such as coking coal, anthracite and bituminous coal of export quality. They may also trade in lower quality coals (sometimes even discards), which are then

bagged, distributed and sold with a mark-up to townships, as heating and cooking coal.

**Client's Coal Products**

**Type 1**, almost fits the specs for Cement, Brick and Tile, Mines and Eskom, provided some blending is used to increase Volatiles slightly. It can also be used for Metallurgy, if contaminants are low. Further tests are required.

**Type 2**, as stated before, could be used as Met coal or charred to increase fixed Carbon content for the same industry. Without results of metallurgical tests, it is impossible to predict accurately if this will be the case. Blending would improve its marketability. This is a coal that can be used for power generation boilers, provided the boilers are designed to burn low-Volatiles coal. This does not occur in South Africa. An IPP, using this coal, would be very successful. This application could avoid the need for Type 3.1 and 3.2, increasing tonnages of reserves.

**Type 3.1** is coal suitable for PF boilers or PCI/metallurgical applications that would accommodate such volatiles (provided the levels of impurities are low) – and for a power generation IPP as well. This coal would be extremely suitable for its use in the local market as low-smoke household fuel.

**Type 3.2** is coal of the Merchant and Domestic type, (not necessarily for its use alone, but as a blend). Again, as in the case of Type 2 and 3.1, it is suitable for PFI, provided the boiler is designed for it (an IPP).

**Type 4** is a typical export product and any attempt to sell it locally would waste its revenue potential. If local market pricing becomes, as some predict, equivalent to that of the export market, then this coal can be sold locally as "A Grade". It is my opinion that this will only occur many years from now.

In closing it is mentioned that, in order to provide an accurate estimate of the use of all new products, further testing and information is necessary to verify that these products do indeed comply with the specs required for Metallurgical and other coal uses.

## APPENDIX III
## RBCT SPECIFICATIONS FOR TYPES OF EXPORT COAL AT THE BAY

The typical coal exported from South Africa falls into two categories:

### RB1

NCV (net calorific value) minimum 5850kcal/kg, with basis being 6000kcal/kg

Total moisture (as received basis) 12% max

Volatile matter (as received basis) 22% min

Ash (as received basis) 15% max

Sulphur (as received basis) 1% max

HGI 45 - 70 being the typical range. Not to be used for determining whether or not a shipment complies with the specifications)

Nominal top size: 50mm (nominal top size is the size over which no more than 5% of the coal will report)

Ash fusion temperature (initial deformation (IDT)) minimum 1250 degrees Celsius, in a reducing atmosphere

Calcium oxide in ash: Maximum 12% (dry basis)

### RB2

NCV (net calorific value) minimum 5850kcal/kg, with basis being 6000kcal/kg

Total moisture (as received basis) 12% max

Volatile matter (as received basis) 25% min

Ash (as received basis) 15% max

Sulphur (as received basis) 1% max

HGI 45 - 70 being the typical range. Not to be used for determining whether or not a shipment complies with the specifications)

Nominal top size: 50mm ( nominal top size is the size over which no more than 5% of the coal will report)

Ash fusion temperature (initial deformation (IDT)) minimum 1250 degrees Celsius, in a reducing atmosphere

Calcium oxide in ash: Maximum 12% (dry basis).

From the above list provided by RBCT, it is obvious that both products, RB1 and RB2 are similar, except for the volatile matter. It follows that there are only two types of RBCT coal exports, low and high volatiles, but in reality the terminal handles 34 grades, with approximately 100 stockpiles (between 2 and 6 stockpiles per grade). Phase V, shortly to be implemented, will increase the grades to 38.

Grades of the main exporting mines are as follows:

| COAL MINE | COAL QUALITY | | | | |
|---|---|---|---|---|---|
| | CV (kcal/kg) | % SULPHUR | % VM | % FC | % ASH |
| Arthur Taylor | 6650 | 0.69 | 27.9 | 55.9 | 13.2 |
| Bank (Low Ash) | 7380 | 0.62 | 31.0 | 59.6 | 7.2 |
| Eikeboom | 6790 | 0.41 | 24.5 | 61.1 | 11.1 |
| Forzando | 6825 | 0.87 | 31.6 | 52.8 | 11.9 |
| Goedehoop (Low Ash) | 7240 | 0.67 | 31.4 | 58.9 | 6.8 |
| Greenside | 6710 | 1.79 | 34.1 | 50.6 | 11.6 |
| Kleinkopje (Low Ash) | 7250 | 0.58 | 31.1 | 58.2 | 8.1 |
| Koornfontein | 6650 | 0.43 | 25.4 | 57.4 | 12.4 |
| Landau | 6930 | 0.61 | 27.1 | 59.0 | 14.6 |
| Middelburg | 6545 | 0.52 | 26.5 | 56.5 | 13.3 |
| New Clydesdale | 6930 | 0.70 | 26.9 | 58.5 | 12.2 |
| Tavistock | 6630 | 0.75 | 28.2 | 56.2 | 12.2 |
| Woestalleen | 6820 | 1.03 | 32.5 | 54.7 | 9.1 |
| Savmore | 6535 | 1.01 | 28.5 | 55.1 | 12.8 |
| Grootegeluk | 6835 | 0.68 | 25.9 | 59.0 | 12.9 |

To complicate this further, with the advent of Economic Empowerment and their request to join the RBCT exporting “cartel”, a group of 18 “junior” coal exporting companies were given a 4Mtpa allocation to the terminal by the RBCT Board. This group in itself has different grades not previously handled by RBCT. New stockpiling space had to be created by restructuring the existing stockpiles. To add more complexity, some of the new exporters are producing Anthracite, a coal never exported through RBCT before and in need of separate stockpiles.
Resulting from the new 91Mtpa expansion of RBCT, another new group of exporters will join the previous RBCT shareholders. Most likely, this will generate a need for further stockpile space. Since the nine new exporters will only join RBCT once Phase V is implemented, in May 2010, this problem will only take place then, if and when Transnet TFR provides enough rail capacity to move 91Mtpa.