



# THE MINERAL CORPORATION

ADVISORS TO THE MINERAL BUSINESS

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Dear Mr Farrell

## SUMMARY OF THE RESOURCES OF THE VELE, MOOIPLAATS AND MAKHADO PROJECTS

### 1 INTRODUCTION

Coal of Africa Limited (CoAL) holds beneficial interests in three coal projects in the Limpopo and Mpumalanga Provinces of South Africa through 100% wholly owned South African registered companies. The assets under consideration comprise the Vele Project, located in the Limpopo Province and bordering Zimbabwe, the Mooiplaats Project, located in the Mpumalanga Province near the town of Ermelo, and the Makhado Project located in the Limpopo Province, between the towns of Musina and Makhado.

CoAL is presently listed on the JSE Ltd, the Australian Stock Exchange (ASX) and the Alternative Investment Market (AIM) of the London Stock Exchange (LSE).

The Mineral Corporation Consultancy (Pty) Limited (The Mineral Corporation) has been mandated by the Directors of CoAL to prepare a Mineral Expert's Report (MER) addressing the above coal projects. The MER is currently in preparation and will be completed on receipt of the results of analyses and specialised testwork conducted on a number of bulk samples obtained from large diameter boreholes drilled on the Makhado Project. The laboratory expects this information to be made available in July 2010.

This report summarises the findings documented in the MER. The Mineral Corporation is of the opinion that the results of any testwork currently in progress will not materially affect the resource quantity and quality estimates stated here.

### 2 SCOPE OF WORK

The Mineral Corporation has reviewed project data supplied by CoAL in accordance with the scope of work and reporting has been based on the following:

- Appraisal of the exploration and resource estimation methodologies employed by CoAL and other parties;
- Verification, to the extent possible, of the reliability of data used in the assessments;

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- Geological and resource modelling undertaken by The Mineral Corporation using data supplied by CoAL;
- Review of previous geological interpretations and Coal Resource estimates;
- Inspection visits to the properties under consideration;
- Liaison with CoAL personnel and independent consultants acting on behalf of CoAL, and;
- Instructions from CoAL to The Mineral Corporation to limit the MER to the level of Coal Resource estimation only.

### **3 OVERVIEW OF THE MINERAL CORPORATION AND INDEPENDENCE**

The Mineral Corporation operates as an independent technical advisor and consultant, providing mineral resource evaluation, mining engineering and mine valuation services to the mining industry.

The technical personnel of the Company are registered with various professional organisations including the Southern African Institute of Mining and Metallurgy, the Geological Society of London, the Society of Economic Geology, the Geological Society of South Africa, the Australian Institute of Mining and Metallurgy, the Institute of Quarrying, and the South African Council for Natural Scientific Professions.

The Mineral Corporation has extensive experience in the evaluation of coal projects and in particular the preparation of Competent Person's Reports, due diligence studies and fatal flaw analyses.

The Mineral Corporation will be paid a professional fee for the preparation of the MER in accordance with normal professional consulting practices. Neither The Mineral Corporation nor its directors, employees or associates who contributed to the MER has any material interest in CoAL or the assets reviewed.

### **4 REPORT QUALIFICATIONS**

The Mineral Corporation places reliance on the Directors and the consultants of CoAL that all technical information supplied to The Mineral Corporation is valid. Although this data has been verified to the extent possible, The Mineral Corporation does not accept any responsibility for information used which, unknown to The Mineral Corporation, was factually incorrect or inaccurate, or for any actions that may arise as a consequence thereof. The Mineral Corporation also places reliance on CoAL that information relating to the legal aspects of CoAL and the status of corporate transactions and prospecting, mining and surface rights are accurate at the time of compilation of this report.



## **VELE PROJECT**

### **1 SUMMARY**

The Mineral Corporation has estimated total gross tonnage in situ (GTIS) resources of 813Mt, of which 171Mt are measured and 453Mt indicated. Targeted opencast and underground GTIS resources amount to 333Mt and 212Mt respectively in all categories.

Analysis of slim core samples indicates an overall average theoretical yield of 16.7% for a 12% ash coking coal product in the targeted mining areas. The results of analysis conducted on large diameter (LD) core samples indicate that product yields in the practical mining situation are likely to be significantly higher than those indicated by slim core testwork, in some cases by more than 90%. In particular, LD samples from the better quality Middle and Bottom Lower Seams have achieved yields of over 40%.

Free Swelling Indices determined on a 12% ash product derived from LD bulk samples are relatively high, ranging from 7.5 to 8.5, while Gray King and Roga Indices are similarly high, ranging from G8 to G11 and 84 to 90 respectively.

On the basis of bulk sampling testwork, the Vele product could be classed as a high volatile, soft (blend) coking coal.

### **2 INTRODUCTION**

The exploration work currently being conducted by CoAL is aimed at confirming sufficient Coal Resources to support an initial open-cast mine producing approximately one million tonnes per annum (Mtpa) of coking coal, ramping up to 5Mtpa with the subsequent development of an underground mine.

### **3 LOCATION**

The Vele Project is located 40km west of the town of Musina in the Limpopo Province of South Africa. The project area is bounded in the north by the Limpopo River which defines the international frontier with Zimbabwe. The Project is well situated with respect to the major infrastructural aspects of rail, road and power.

### **4 MINERAL RIGHTS**

A New Order Mining Right (NOMR) has been granted over the greater part of the Vele Project area in the name of Limpopo Coal Company (Pty) Ltd, a wholly owned subsidiary of CoAL. The remainder of the Project area is held under a New Order Prospecting Right (NOPR) granted to CoAL.

### **5 GEOLOGY**

The Vele Project is located in the Limpopo Coalfield which comprises the southern portion of the greater Tuli Coalfield that extends northwards from South Africa into Zimbabwe and Botswana.

Within the Vele Project area, the Main Coal Zone averages about 16.5m in thickness and comprises interlaminated carbonaceous shales, mudstones and coal in varying proportions. Three principal coal units have been recognised within the Main Coal Zone and named from the base upwards: Bottom Seam, Middle Seam and Top Seam. The Top and Bottom Seams



can be further differentiated into sub-seams, these being; Bottom Lower, Bottom Upper, Top Lower, Top Middle and Top Upper. The latter two coal seams are not considered economic. The average thicknesses of seams targeted for extraction are listed below.

- Top Lower Seam 1.52m
- Middle Seam 1.05m
- Bottom Upper Seam 1.98m
- Bottom Lower Seam 3.68m

The dip of the coal seams is generally between 1° and 2° but can increase to 10° in the vicinity of faults, a number of which have been identified. A series of dolerite dykes trend east-west across the Project area and coal occurring in proximity to the intrusions is invariably devolatilised.

## **6 EXPLORATION**

Southern Sphere Mining and Development Company Limited undertook exploration in the area during the late 1970s and early 1980s through a programme of cored and percussion drilling, down-hole geophysical investigations and airborne magnetic and gravity surveys.

CoAL commenced exploration in January 2008 and to date a total of 188 slim core boreholes and 28 large diameter boreholes have been completed. Aerial magnetic and radiometric surveys have also been undertaken.

## **7 ENVIRONMENTAL**

Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) reports for the Vele Project were completed in May 2009. The NOMR, including approval of the EMP, became effective in March 2010. The Vele Project is located in close proximity to the Mapungubwe National Park and World Heritage Site. An appeal has been lodged by a number of environmental and conservation pressure groups against the granting of the NOMR, however, the Directors of CoAL believe that the EMP has sufficiently addressed mitigation measures to deal with any possible impacts on the environment.

## **8 RESOURCE LIMITS AND DISCOUNT FACTORS**

The following criteria were by applied by The Mineral Corporation to define the GTIS resources:

- Prospecting or Mining Rights boundaries
- Seam sub-outcrop
- Minimum seam thickness cut-off of 0.5m
- Resource extrapolation limits
- Limit of oxidation

Geological and modelling losses were applied to the GTIS resources to arrive at mineable tonnage in situ (MTIS) resource estimates. The discount allows for loss of coal due to dykes, faults, burnt coal zones and seam washouts. Losses of 10%, 15% and 20% respectively were applied to measured, indicated and inferred resources.

No allowance was made for possible sterilisation of resources by physical, geographical or statutory constraints.



## **9 RESOURCE CATEGORIES**

Resource categories have been defined in accordance with the JORC Code and The Australian Guidelines for the Estimating and Reporting of Coal, Coal Resources and Coal Reserves (the Australian Coal Guidelines).

Only Points of Observation with seam quality data were used to define resource categories. Resources have been classed separately for each seam on the basis of the following criteria:

- The Measured Resource limit was set at a maximum of 500m between Points of Observation with the proviso that Measured Resources cannot be extrapolated more than 250m beyond the limit of Points of Observation data for any seam.
- The Indicated Resource limit was set at a maximum of 1 000m between Points of Observation with the proviso that Indicated Resources cannot be extrapolated more than 500m beyond the limit of Points of Observation data for any seam.
- The Inferred Resource limit was set at a maximum of 4 000m between Points of Observation. For any seam, the resource limits were extrapolated no more than 500m beyond the last line of Points of Observation.

## **10 RESOURCE ESTIMATES – THE MINERAL CORPORATION**

GTIS resources have been estimated for the Top Lower, Middle, Bottom Upper, and Bottom Lower Seams. The Top Middle and Top Upper Seams are not considered economic and have been excluded from the resource base. The GTIS resources have been divided into potential opencast and underground sectors on the basis of a study conducted by MRM Mining Services (Pty) Limited (MRM).

All boreholes with seam intersection data were used to generate the seam physical models on which the estimates of seam volumes were based. Average raw coal relative densities were weighted by volume while average raw coal qualities were weighted by GTIS. Estimates of yields and qualities were also generated for a washed product with a theoretical ash content of 12% (adb). Average product yields were weighted by GTIS while average product qualities were weighted by GTIS and yield.

The Mineral Corporation has estimated that the Vele Project contains total GTIS and MTIS resources of 813t and 690Mt respectively. The deposit is considered to be amenable to exploitation by opencast and underground mining methods. The potential opencast GTIS resources in all four targeted seams total 333Mt. Only the Bottom Lower, with a GTIS resource of 212Mt, is currently targeted for underground extraction.

Table 1 presents the estimated in situ tonnages, raw coal qualities, and theoretical yields and qualities for a washed coal product with an ash content of 12%. Resources have been categorised as measured, indicated or inferred according to JORC Code guidelines and all tonnages and qualities are quoted on an uncontaminated, air-dried basis (adb). The resources have also been sub-divided into proposed underground and opencast sectors.



**Table 1: Coal Resource Statement - The Mineral Corporation**

SEAM		RESOURCES				IN SITU COAL QUALITIES (uncontaminated adb)								PRODUCT YIELDS AND QUALITIES (adb)							
NAME	THICK m	CATEGORY (JORC)	AREA ha	GTIS Mt	MTIS Mt	RD	M %	ASH %	VM %	FC %	CV MJ/kg	S %	YIELD %	M %	ASH %	VM %	FC %	CV MJ/kg	S %		
RESOURCES - OPENCAST SECTOR																					
Top Lower	1.67	Measured	337	10.574	9.517	1.89	1.9	59.1	17.8	21.1	11.71	2.07	10.2	1.9	12.0	35.6	56.0	31.46	1.14		
	1.62	Indicated	1,078	32.520	27.642	1.92	2.0	61.4	16.7	19.9	10.79	2.06	8.7	2.0	12.0	34.9	56.8	31.26	1.30		
	1.45	Inferred	729	16.876	13.501	1.90	2.0	60.2	17.4	20.6	11.22	2.27	9.1	2.0	12.0	35.4	56.9	31.22	1.30		
sub-total			2,145	59.970	50.660	1.91	2.0	60.7	17.1	20.3	11.07	2.12	9.1	2.0	12.0	35.2	56.7	31.29	1.27		
Middle	1.14	Measured	508	9.677	8.710	1.68	1.7	42.0	24.4	31.9	18.24	2.80	25.3	1.8	12.0	35.9	54.1	30.91	1.09		
	1.01	Indicated	1,178	20.271	17.230	1.73	1.7	44.6	23.3	30.3	17.13	2.53	21.1	1.8	12.0	34.9	56.3	31.29	1.18		
	0.91	Inferred	554	8.640	6.912	1.73	1.8	46.2	22.6	29.4	16.23	1.88	21.7	2.0	12.0	34.6	54.0	30.17	1.22		
sub-total			2,239	38.588	32.852	1.72	1.7	44.3	23.4	30.5	17.21	2.45	22.3	1.8	12.0	35.1	55.2	30.94	1.16		
Bottom Upper	2.09	Measured	768	28.910	26.019	1.81	1.7	52.2	20.1	26.1	14.02	1.57	14.6	1.8	12.0	34.9	52.8	30.04	1.17		
	1.95	Indicated	1,216	41.906	35.620	1.79	1.6	49.3	21.4	27.7	15.13	1.60	14.7	1.7	12.0	34.8	54.5	30.56	1.26		
	1.76	Inferred	358	11.072	8.857	1.79	1.6	48.4	21.9	28.0	15.34	1.59	13.6	1.7	12.0	36.0	55.4	31.13	1.30		
sub-total			2,342	81.888	70.496	1.80	1.6	50.2	21.0	27.2	14.77	1.59	14.5	1.7	12.0	35.0	54.0	30.45	1.23		
Bottom Lower	3.95	Measured	833	56.597	50.937	1.73	1.6	45.4	22.3	30.8	16.49	1.60	20.8	1.7	12.0	34.8	53.9	30.38	1.00		
	3.59	Indicated	1,319	82.169	69.843	1.74	1.5	46.7	22.0	29.8	16.06	1.43	19.4	1.7	12.0	34.0	55.5	30.61	1.06		
	3.46	Inferred	228	13.555	10.844	1.73	1.5	45.1	22.7	30.7	16.66	1.47	19.5	1.7	12.0	34.7	54.6	30.43	1.03		
sub-total			2,380	152.321	131.625	1.74	1.5	46.0	22.2	30.2	16.27	1.50	19.9	1.7	12.0	34.4	54.8	30.51	1.03		
All Seams		Measured	2,446	105.759	95.183	1.76	1.7	48.3	21.4	28.6	15.50	1.75	18.5	1.8	12.0	35.0	53.8	30.43	1.06		
		Indicated	4,790	176.865	150.335	1.78	1.6	49.8	21.1	27.5	14.99	1.71	16.5	1.7	12.0	34.4	55.5	30.76	1.14		
		Inferred	1,869	50.144	40.115	1.80	1.7	51.1	20.7	26.5	14.46	1.84	15.1	1.8	12.0	35.1	55.1	30.67	1.19		
TOTAL OPENCAST SECTOR			9,105	332.767	285.633	1.78	1.7	49.5	21.1	27.7	15.07	1.74	16.9	1.8	12.0	34.7	54.9	30.63	1.12		
RESOURCES - UNDERGROUND SECTOR																					
Top Lower	1.57	Measured	275	8.029	7.226	1.86	2.1	57.8	18.0	22.2	12.39	1.92	9.7	1.9	12.0	37.2	58.7	32.59	1.14		
	1.59	Indicated	1,419	42.449	36.082	1.89	2.0	59.4	17.4	21.3	11.75	2.06	10.0	1.7	12.0	32.1	58.2	30.91	1.17		
	1.39	Inferred	1,595	41.441	33.153	1.90	2.1	61.0	17.1	19.8	11.16	2.30	9.9	1.8	12.0	33.7	53.5	29.73	1.27		
sub-total			3,289	91.919	76.461	1.89	2.0	60.0	17.3	20.7	11.54	2.16	9.9	1.8	12.0	33.3	56.1	30.52	1.21		
Middle	1.09	Measured	349	6.463	5.817	1.70	1.7	42.6	22.7	33.1	18.06	2.92	24.2	1.7	12.0	34.1	59.0	31.90	1.12		
	1.11	Indicated	1,517	28.873	24.542	1.72	1.8	44.1	22.9	31.2	17.47	2.94	21.5	1.8	12.0	35.5	56.7	31.50	1.14		
	1.05	Inferred	1,408	24.957	19.966	1.70	1.8	44.6	23.4	30.3	17.25	2.18	24.5	1.8	12.0	34.8	53.3	29.94	1.39		
sub-total			3,273	60.293	50.324	1.71	1.8	44.1	23.1	31.0	17.44	2.62	23.0	1.8	12.0	35.0	55.4	30.86	1.25		
Bottom Upper	2.27	Measured	386	15.643	14.078	1.79	1.7	52.7	20.2	25.3	14.08	1.64	12.8	1.7	12.0	36.7	55.3	31.45	1.17		
	2.01	Indicated	1,852	66.067	56.157	1.78	1.7	51.1	21.0	26.1	14.54	1.71	14.9	1.8	12.0	35.6	54.1	30.73	1.25		
	1.86	Inferred	1,050	34.290	27.432	1.76	1.7	51.5	21.1	25.7	14.37	1.74	14.1	1.8	12.0	35.4	51.9	29.95	1.23		
sub-total			3,289	116.000	97.668	1.78	1.7	51.4	20.9	25.9	14.43	1.71	14.4	1.8	12.0	35.7	53.6	30.59	1.23		
Bottom Lower	3.96	Measured	523	35.530	31.977	1.72	1.5	46.1	22.4	30.0	16.39	1.68	15.4	1.7	12.0	36.9	56.1	31.72	1.08		
	3.66	Indicated	2,170	138.680	117.878	1.76	1.5	48.6	21.5	28.4	15.38	1.61	16.8	1.7	12.0	35.8	54.3	30.69	1.12		
	3.42	Inferred	636	38.279	30.623	1.77	1.5	50.3	21.0	27.3	14.66	1.71	15.9	1.7	12.0	35.5	53.5	30.33	1.12		
sub-total			3,329	212.489	180.478	1.75	1.5	48.5	21.6	28.5	15.42	1.64	16.4	1.7	12.0	35.9	54.4	30.79	1.11		
All Seams		Measured	1,533	65.665	59.099	1.75	1.6	48.8	21.4	28.3	15.51	1.82	14.9	1.7	12.0	36.4	56.6	31.76	1.11		
		Indicated	6,957	276.069	234.658	1.78	1.7	50.4	20.9	27.1	14.84	1.84	15.8	1.7	12.0	35.4	55.0	30.84	1.16		
		Inferred	4,689	138.967	111.173	1.79	1.8	52.7	20.3	25.2	14.01	1.98	15.2	1.8	12.0	34.9	53.1	30.01	1.25		
TOTAL UNDERGROUND SECTOR			13,180	480.701	404.931	1.78	1.7	50.8	20.8	26.7	14.69	1.88	15.5	1.7	12.0	35.4	54.6	30.73	1.18		
TOTAL RESOURCES BY SEAM																					
Total Top Lower Seam			5,433	151.890	127.120	1.90	2.0	60.2	17.2	20.5	11.36	2.14	9.6	1.9	12.0	34.0	56.3	30.81	1.23		
Total Middle Seam			5,513	98.881	83.176	1.71	1.8	44.2	23.2	30.8	17.35	2.56	22.7	1.8	12.0	35.1	55.3	30.89	1.22		
Total Bottom Upper Seam			5,630	197.888	168.164	1.78	1.7	50.9	21.0	26.4	14.57	1.66	14.4	1.8	12.0	35.4	53.8	30.53	1.23		
Total Bottom Lower Seam			5,709	364.810	312.103	1.75	1.5	47.4	21.8	29.2	15.78	1.58	17.9	1.7	12.0	35.2	54.6	30.65	1.07		
RESOURCES - TOTAL OPENCAST AND UNDERGROUND SECTORS																					
All Seams		Measured	3,979	171.4	154.3	1.8	1.6	48.5	21.4	28.5	15.50	1.78	17.1	1.7	12.0	35.9	55.6	31.31	1.09		
		Indicated	11,748	452.9	385.0	1.8	1.7	50.1	21.0	27.2	14.90	1.79	16.1	1.7	12.0	35.2	55.0	30.83	1.15		
		Inferred	6,558	189.1	151.3	1.8	1.7	52.3	20.4	25.6	14.13	1.94	15.2	1.8	12.0	34.9	53.2	30.07	1.25		
TOTAL RESOURCES			22,285	813.468	690.563	1.8	1.7	50.3	20.9	27.1	14.85	1.82	16.1	1.7	12.0	35.3	54.7	30.71	1.17		
RESOURCES - TOTAL OPENCAST SECTOR AND SELECTED UNDERGROUND (BOTTOM LOWER SEAM ONLY)																					
Total Opencast Sector			9,105	332.767	285.633	1.78	1.7	49.5	21.1	27.7	15.07	1.74	16.9	1.8	12.0	34.7	54.9	30.63	1.12		
Selected Underground			3,329	212.489	180.478	1.75	1.5	48.5	21.6	28.5	15.42	1.64	16.4	1.7	12.0	35.9	54.4	30.79	1.11		
TOTAL SELECTED RESOURCES			12,434	545.256	466.111	1.77	1.6	49.1	21.3	28.0	15.21	1.70	16.7	1.7	12.0	35.6	54.6	30.74	1.12		

RD – relative density, M – moisture in sample, VM – volatile matter, FC – fixed carbon, CV – calorific value, S – sulphur



## 11 PREVIOUS RESOURCE ESTIMATES

A resource upgrade statement was released by CoAL on 18 June 2008. It listed GTIS resources in measured, indicated and inferred categories of 133.8Mt, 76.6Mt and 131.5Mt respectively. According to information from CoAL, the estimates were based solely on information from historical boreholes drilled by Southern Sphere and limited to an area comprising two conceptual open cuts. No potential underground-mineable resources were included.

On 30 September 2008, CoAL released a Consolidated Resource Statement which listed a total resource of 720.8Mt comprising measured, indicated, inferred and reconnaissance resources of 177.4Mt, 417.0Mt, 62.2Mt and 64.3Mt respectively. According to information from CoAL, these revised estimates were based on information from historical boreholes, plus a number of new boreholes drilled by CoAL. The estimates also reflected a change in mining strategy which took into account a revision of the stripping ratio limits and the inclusion of underground-mineable resources.

The current estimate of 813.5Mt generated by The Mineral Corporation shows an increase in the GTIS tonnage of approximately 93Mt from the previous CoAL estimate of 720.8Mt. Additional exploration drilling since September 2008 has allowed resources previously classed by CoAL as reconnaissance to be elevated to inferred or indicated categories.

The difference between measured resource estimates generated by The Mineral Corporation (171.4Mt) and CoAL (177.4Mt) is attributable to the additional drill information and the application of differing criteria used to define resource categories, i.e. the SAMREC Code versus the JORC Code.

## 12 COAL QUALITIES AND PROPERTIES

It is generally accepted that reliable estimates of coking coal product yields are often not achievable from laboratory testing of slim core samples and that results obtained from large diameter (LD) core samples are considered more realistic. Table 2 below compares average product yields for each seam, based on the analysis of samples from LD and slim core boreholes.

**Table 2: Comparison of product yields for LD and slim core samples**

SAMPLE SOURCE	COAL SEAM			
	Top Lower	Middle	Bottom Upper	Bottom Lower
East - LD Bulk	15.8	43.2	25.1	34.7
Central - LD Bulk	16.5	38.1	33.9	25.8
West - LD Bulk	12.0	32.8	18.9	42.0
Average - LD Bulk	14.8	38.0	25.9	34.2
Average - Slim core	9.6	22.7	14.4	17.9
Difference	54%	68%	80%	91%

The Middle and Bottom Lower Seams exhibit superior qualities with theoretical yields of over 40% achievable from LD core. It can be seen that, although the yields from the LD borehole samples are variable within and between seams, they are in all cases significantly higher than the slim core equivalent; in some cases over 90% greater. This strongly suggests that actual yields achieved in the production situation will be much higher than those indicated by the





results of slim core testwork. On the basis of the information currently available, it is difficult to reliably predict the practical yields that will be obtained but it is expected that this will be quantified through processing of a mined bulk sample in a pilot plant.

Table 3 shows selected coal qualities and coking properties for the LD bulk samples. The category designated 'Upper Seams' comprises a composite of coal from the Top Lower, Middle and Bottom Upper Seams. The Bottom Lower Seam has been treated separately as it is the only seam targeted for underground extraction but will also be mined during opencast operations.

**Table 3: CoAL LD bulk sample properties**

COAL QUALITIES AND COKING PROPERTIES	UNIT	BOTTOM LOWER SEAM			UPPER SEAMS		
		WEST	CENTRAL	EAST	WEST	CENTRAL	EAST
Inherent Moisture (ad)	%	1.1	1.6	1.8	1.7	1.8	1.9
Ash (ad)	%	12.8	11.7	11.5	14.6	11.8	11.4
Volatile Matter (db)	%	36.5	36.0	35.6	36.3	37.2	36.0
Sulphur (db)	%	0.98	0.88	0.92	1.28	1.11	1.04
Phosphorus*	%	0.008	0.012	0.006	0.044	0.017	0.021
FSI		8.5	7.5	8.5	8.0	8.0	8.0
Roga		87	87	90	84	86	87
Gray King Index		G11	G8	G9	G11	G9	G8
Fluidity (max)	ddpm	6515	3925	1189	5241	2417	566
Fluidity (solidification)	°C	468	467	460	465	463	461
Dilatation (max)	%	112	64	54	89	79	56
Dilatation (max contraction)	%	37	34	35	29	34	34
Vitrinite	%	83.4	84.7	86.3	83.9	85.4	88.4
RoV max	%	0.77	0.79	0.80	0.78	0.77	0.79
Total Inerts	%	13.3	12.3	10.5	12.2	11.2	8.7
CRI Index	%	36.0	47.9	50.6	43.1	45.6	51.0
CSR Index	%	35.1	20.5	16.4	18.2	21.1	16.4

\* Derived from phosphorus in ash

The product has low moisture, high volatile matter and moderate sulphur contents. Internationally traded coking coals typically have an ash content of around 10% or less. However, the 12% ash content of the Vele product is considered acceptable by South African consumers.

The Free Swelling Indices (FSI) determined on LD bulk samples are relatively high, ranging from 7.5 to 8.5. However, FSI measurements on slim core material may exhibit lower values which could be attributable to oxidation of samples acquired during the earlier phases of exploration, prior to the introduction of refrigerated storage.

Bulk sample analyses indicate Gray King and Roga Indices in the upper ranges of G8 to G11 and 84 to 90 respectively. The high average vitrinite content of about 85% is attractive as a commercial premium is often placed on coking coals with an elevated vitrinite percentage.

The Coke Strength after Reaction (CSR) measurements are relatively low but are commensurate with the average RoV<sub>max</sub> of 0.78%. As there is an inverse relationship between CSR and Coke Reactivity Index (CRI), the latter values are correspondingly high.





Examination of values for maximum Fluidity, maximum Dilatation, CRI and CSR values suggests that there is a propensity for the coking properties in all seams to increase from east to west across the property. However, the relatively consistent volatile matter content suggests that this phenomenon is not an effect of coal rank.

On the basis of bulk sampling testwork, the Vele product could be classed as a high volatile, soft (blend) coking coal. This was also the opinion of coal consultants, Wood Mackenzie, in a report prepared for CoAL in April 2009.



## **MOOIPLAATS PROJECT**

### **1 SUMMARY**

The Mineral Corporation has estimated total GTIS and MTIS resources for the B Upper Seam of 56.3Mt and 53.3Mt respectively, of which more than 95% are classed as measured. A seam thickness cut-off of 1.4m was used to define potentially mineable resources as this is considered the minimum underground mining height from practical and economic aspects.

An MTIS resource estimate of 74.5Mt was previously generated by SRK Consultants, based on a 1.0m seam thickness cut-off. Employing the same minimum seam thickness parameters, The Mineral Corporation has estimated a comparable MTIS resource of 79.4Mt.

Based on a 1.4m seam thickness limit, average theoretical yields of 61% and 47% respectively are indicated for bituminous and lean coal products with a calorific value of 27.5MJ/kg.

### **2 INTRODUCTION**

The Mooiplaats Project is an operating underground coal mine exploiting the B Upper Seam. Production commenced in November 2008 and a wash plant was commissioned in May 2009. The first coal shipment was loaded during January 2010 and by the end of March 2010 the company had exported 132Kt of thermal coal.

### **3 LOCATION**

The Project area is located approximately 17km south of the town of Ermelo in the Mpumalanga Province of South Africa. The mine property, which is adjacent to Camden Power Station, lies 2km west of the N2 National road and is traversed by a railway. Power is supplied to the mine from the Eskom grid and water is sourced from boreholes.

### **4 MINERAL RIGHTS**

A NOMR over Portions 1 and 9 of Mooiplaats 290 IT was granted in September 2007 in the name of Langcarel (Pty) Limited, a wholly owned subsidiary of CoAL. The NOMR is valid for a period of thirty years. An application for an extension to the NOMR to allow for development of the Mooiplaats South Project was lodged in March 2009 over Portions 2, 3 and the Remaining Extent of Klipbank 295 IT and Portions 1, 2 and Remaining Extent of Adrianople 296 IT. NOPRs over the latter properties are also held by Langcarel (Pty) Limited.

### **5 GEOLOGY**

The Mooiplaats Project is located in the Ermelo Coalfield which typically hosts five major coal seams within an 80 to 90m thick stratigraphic interval. The seams are labelled from the base upwards, E, D, C, B and A. Coal seam distribution and thickness was controlled by pre-Karoo palaeo-topography as well as syn- and post-depositional events. In late Jurassic times, the Karoo strata were invaded by dolerite dykes and sills which resulted in seam displacement and devolatilisation of coal over extensive areas.

All five major coal seams are present at Mooiplaats but the A, C, D and E Seams are not considered to be of economic significance for reasons of either limited thickness or unattractive quality. The B Upper Seam, averaging 1.5m in thickness, represents the primary mining target and comprises interbanded dull and bright coal with occasional shaley partings.



A number of dolerite sills are present and coal seams occurring in proximity to the intrusions are invariably devolatilised. Depending on the spatial relationships of the seams to the sill, the effects of heat may produce coals with rank characteristics ranging from lean, through anthracitic, to burnt.

## **6 EXPLORATION**

In the general area, major exploration programmes were conducted in the 1970s and 1980s by Goldfields Mining and Development Limited and Ingwe Coal Corporation Limited. CoAL commenced drill investigations in 2007 and to date over 500 cored and percussed boreholes have been completed. The drill programme is ongoing.

## **7 ENVIRONMENTAL**

Mooiplaats is an operational coal mine with an EMP approved by the South African Department of Mineral Resources (DMR). An amendment EIA and EMP was submitted to the DMR in September 2009 for the Mooiplaats South Project, which is an extension to the existing NOMR, and approval is awaited. Mooiplaats Mine has a temporary water use licence with water currently being sourced from boreholes. The application process for an Integrated Water Use Licence for the Mooiplaats South Project is underway.

Financial guarantees regarding provisions for closure and rehabilitation liabilities of current mining operations were lodged in September 2007. An EMP amendment, submitted to the DMR, allocated R4.2 million (excluding taxes) for closure and rehabilitation of the Mooiplaats South Project.

## **8 RESOURCE LIMITS AND DISCOUNT FACTORS**

At the request of CoAL, resource estimates were restricted to the B Upper Seam contained within the Mining and Prospecting Rights holdings on the farms Mooiplaats, Klipbank and Adrianople.

In certain areas, the heat effects of igneous intrusions have resulted in either destruction of the coal by burning, a reduction in the volatile content to lean coal, or an enhancement of the coal rank to anthracite. The coals have been differentiated into three rank types on the basis of raw volatile matter (VM) content (adb):

- Anthracite VM <10%
- Lean coal VM 10 - 20%
- Bituminous coal VM >20%

The following criteria were applied to define GTIS resources:

- Prospecting or Mining Rights boundaries
- Minimum seam thickness cut-offs of 1.0m and 1.4m
- Dolerite intrusions and burnt coal zones were excluded

In order to arrive at MTIS resource estimates, geological losses of 5%, 10% and 15% respectively were applied to measured, indicated and inferred GTIS resource tonnages. These figures include modelling losses.

Resources were firstly estimated for a 1.0m seam thickness cut-off in order to compare the results with previous resource estimates based on the same thickness parameter. Estimates



were then generated using a thickness cut-off of 1.4m which is considered an appropriate minimum underground mining height from practical and economic aspects.

No allowance was made for possible sterilisation of resources by physical, geographical or statutory constraints.

## 9 RESOURCE CATEGORIES

Resource categories have been based on the South African Code for Reporting of Mineral Resources and Mineral Reserves (the SAMREC Code, 2007) prepared by the South African Mineral Resource Committee (SAMREC), under the auspices of the South African Institute of Mining and Metallurgy (2007), with particular reference to South African National Standard SANS 10320:2004 (the South African Guide to the Systematic Evaluation of Coal Resources and Coal Reserves). The SAMREC Code and SANS 10320:2004 Guidelines satisfy the reporting requirements of, and are in accordance with, with the JORC Code and the Australian Coal Guidelines.

In terms of SANS 10320:2004 Guidelines, the coal resources at Mooiplaats can be classified as a multiple seam type deposit. Resource categories were based on the number of boreholes per unit area for which quality data are available, these being 8 boreholes per 100 hectares (ha) for measured, 4 boreholes per 100ha for inferred and 1 borehole per 100ha for inferred.

## 10 RESOURCE ESTIMATES – THE MINERAL CORPORATION

The full thickness of the B Upper Seam was modelled as no selective mining is anticipated. The B Upper Seam resources were divided into two blocks which are separated by a zone of dolerite intrusions and burnt coal. These are:

- North Block – contained on the farm Mooiplaats 290 IT where mining is currently taking place.
- South Block – contained on the farms Klipbank 295 IT and Adrianople 296 IT which represent the Mooiplaats South Extension

GTIS resources were further subdivided into anthracitic, lean and bituminous coal on the basis of the volatile matter content of the raw coal.

The GTIS resources in all categories for the B Upper Seam with a minimum thickness of 1.0m amount to 84.5Mt (Table 4)

**Table 4: In situ Coal Resources (minimum BU Seam thickness of 1.0m)**

PROPERTY	RESOURCE CATEGORY			GTIS total Mt	MTIS total Mt
	Measured Mt	Indicated Mt	Inferred Mt		
<b>Mooiplaats</b>	21.1	-	-	21.1	20.1
<b>Klipbank</b>	40.9	1.0	1.6	43.5	41.1
<b>Adrianople</b>	12.1	1.5	6.3	19.9	18.2
<b>Totals</b>	<b>74.2</b>	<b>2.5</b>	<b>7.9</b>	<b>84.5</b>	<b>79.4</b>

The GTIS and MTIS resource estimates for B Upper Seam with a minimum thickness of 1.4m thickness are presented in Table 5. Also shown are estimates of qualities for raw coal and a



washed product with a calorific value of 27.5MJ/kg. All tonnages and qualities are on an air-dried basis and no allowance has been made for contamination or dilution.

**Table 5: Coal Resource estimate (minimum BU Seam thickness of 1.4m)**

COAL TYPE	RESOURCES					IN SITU COAL QUALITIES (uncontaminated adb)								PRODUCT YIELDS AND QUALITIES (adb)							
	CATEGORY (JORC)	SEAM m	AREA ha	GTIS Mt	MTIS Mt	RD	M %	ASH %	VM %	FC %	CV MJ/kg	S %	YIELD %	M %	ASH %	VM %	FC %	CV MJ/kg	S %		
NORTH BLOCK																					
Bituminous	Measured	2.08	361.4	11.049	10.497	1.47	3.6	17.5	26.0	52.7	25.48	1.94	67.3	3.8	11.9	27.9	56.4	27.54	1.44		
Lean	Measured	1.76	231.5	6.153	5.846	1.51	3.3	21.4	14.3	60.9	24.66	2.11	56.0	3.5	14.1	16.2	66.3	27.53	1.64		
Anthracitic	Measured	1.61	60.6	1.541	1.464	1.57	3.3	26.7	8.3	61.8	22.45	2.12	21.9	3.7	13.4	13.8	69.1	27.49	1.58		
TOTAL NORTH BLOCK			653.5	18.743	17.806																
SOUTH BLOCK																					
	Measured	1.75	539.6	14.166	13.458	1.50	3.5	19.6	23.9	53.1	24.86	2.26	55.8	3.7	12.7	24.8	58.9	27.55	1.51		
Bituminous	Indicated	1.73	30.0	0.765	0.689	1.48	3.6	18.0	27.5	51.0	25.33	2.29	62.6	3.8	12.3	30.0	54.0	27.50	1.72		
	Inferred	1.63	51.8	1.251	1.064	1.48	3.6	18.2	27.1	51.2	25.38	2.32	65.1	3.8	12.6	29.2	54.4	27.50	1.77		
Bituminous sub-total			621.5	16.182	15.210	1.50	3.6	18.1	27.2	51.1	25.36	2.31	56.8	3.7	12.6	25.4	58.2	27.54	1.54		
	Measured	1.63	733.1	18.784	17.845	1.57	3.2	25.7	16.5	54.6	22.94	2.68	44.2	3.6	14.1	17.3	65.0	27.52	1.60		
Lean	Indicated	1.46	0.9	0.021	0.019	1.61	3.2	28.7	16.8	51.1	21.94	2.58	18.7	3.7	13.8	19.9	62.7	27.50	1.69		
	Inferred	1.43	0.2	0.004	0.003	1.58	3.3	26.3	19.0	51.3	22.82	2.53	33.0	3.7	13.9	21.4	61.1	27.50	1.76		
Lean sub-total			734.1	18.808	17.867	1.57	3.2	28.4	17.2	51.1	22.08	2.57	44.1	3.6	14.1	17.3	65.0	27.52	1.60		
Anthracitic	Measured	1.58	99.3	2.516	2.390	1.60	3.2	29.1	8.6	59.2	22.82	2.87	56.2	3.7	16.1	11.2	69.0	27.50	2.08		
TOTAL SOUTH BLOCK			1454.9	37.507	35.466																
NORTH AND SOUTH BLOCKS																					
TOTAL BITUMINOUS				27.232	25.707	1.49	3.6	17.9	26.7	51.7	25.41	2.16	61.1	3.8	12.3	26.5	57.4	27.54	1.50		
TOTAL LEAN				24.962	23.712	1.55	3.2	26.6	16.4	53.5	22.72	2.46	47.1	3.6	14.1	17.0	65.4	27.52	1.61		
TOTAL ANTHRACITIC				4.056	3.854	1.59	3.2	28.2	8.5	60.2	22.68	2.58	43.2	3.7	15.6	11.7	69.0	27.50	1.98		
TOTAL MEASURED				54.209	51.498																
TOTAL INDICATED				0.786	0.707																
TOTAL INFERRED				1.255	1.067																
TOTAL IN SITU RESOURCES				56.250	53.273																

RD – relative density, M – moisture in sample, VM – volatile matter, FC – fixed carbon, CV – calorific value, S - sulphur

It can be seen from the above tables that reducing the minimum seam thickness from 1.0m to 1.4m results in a decrease in the GTIS from 84.5Mt to 56.3Mt. Most of the coal excluded from resources based on the 1.4m cut-off is lean or anthracitic as devolatilisation has resulted in shrinkage of the seam thickness to less than 1.4m.

Resources in all categories in the North Block are measured while approximately 95% of resources in the South Block fall into the measured category.

## 11 PREVIOUS RESOURCE ESTIMATES

Table 6 shows resource estimates generated by SRK Consulting (SRK) and presented in a document prepared for CoAL entitled 'Note for the Record - Mooiplaats Update as of 6 March 2008'. The GTIS estimates were reproduced by CoAL in a Consolidated Resource Statement released on 30 September 2008.



**Table 6: Coal Resource estimate – SRK, March 2008**

PROPERTY	RESOURCE CATEGORY			GTIS total Mt	MTIS total Mt
	Measured Mt	Indicated Mt	Inferred Mt		
<b>Mooiplaats</b>	25.3	-	-	25.3	23.0
<b>Klipbank</b>	49.0	-	-	49.0	42.3
<b>Adrianople</b>	13.9	-	13.9	27.8	9.2
<b>Buhrmansvallei</b>	-	-	11.1	11.1	-
<b>Totals</b>	<b>88.2</b>		<b>25.0</b>	<b>113.2</b>	<b>74.5</b>

The SRK estimate included resources on the farm Buhrmansvallei however, at the request of CoAL, The Mineral Corporation did not generate resource estimates for coal deposits on this farm as the B Upper Seam thickness in the area does not achieve the minimum mining height of 1.4m.

For resources contained only on the farms Mooiplaats, Klipbank and Adrianople, and using similar resource limits and the same 1.0m seam thickness cut-off, The Mineral Corporation and SRK generated comparable total MTIS resource estimates of 79.4Mt and 74.5Mt respectively. Differences in the GTIS estimates can be attributed mainly to the exclusion by The Mineral Corporation of burnt coal zones and the use of additional borehole information gained since 2008.

## **12 COAL QUALITIES**

A theoretical yield of 61% can be achieved for a bituminous product with an 'A Grade' calorific value of 27.5MJ/kg. The average theoretical yield for a lean coal product with an equivalent calorific value is somewhat lower at 47%. Average sulphur contents for both coal types are moderate to relatively high, ranging from about 1.4% to 1.8% for the washed product.

The raw quality of combined uncontaminated bituminous and lean coal comfortably satisfies typical Eskom minimum specifications of 20% volatile matter content and 20MJ/kg calorific value.



## **MAKHADO PROJECT**

### **1 SUMMARY**

CoAL and the Rio Tinto Group (Rio Tinto) are in the process of undertaking a 'Farm Swap' in order to better consolidate the Mineral Right holdings of each company.

The Mineral Corporation has estimated a total unconstrained GTIS resource of 947Mt for the coal deposits contained on the contiguous farms Tanga, Fripp, Salaita and Telema (held by CoAL) and Windhoek and Lukin (held by Rio Tinto). The opencastable GTIS resources, to a maximum depth of 140m, total 311.5Mt and comprise 244.4Mt measured and 27.1Mt indicated.

The results of analyses for slim core samples from CoAL boreholes indicate an overall average yield of 19.5% for a coking coal product with an ash content of 12%. However, average product yields from LD bulk samples are higher.

The product has low inherent moisture content and moderate sulphur content of 1.1%. Based on the initial results received from LD bulk sample testwork, the product exhibits high Free Swelling and Roga Indices of 9 and 89 respectively while the vitrinite content ranges from 79% to 88% with an average vitrinite reflectance of  $RoV_{max} 1.0$ . Maximum fluidities of over 14 000 ddpm have been recorded.

The vitrinite reflectance, FSI and volatile matter contents suggest that the Makhado product could be classed as a medium volatile, semi-hard, coking coal. This is expected to be confirmed when further results of specialised testwork are received.

### **2 INTRODUCTION**

CoAL is in the process of consolidating their coal holdings in the Makhado Project area. A programme of exploration and evaluation is ongoing and CoAL plan to develop an opencast mine with a targeted production of 5Mtpa of coking coal product.

### **3 LOCATION**

The Project is located between the towns of Makhado and Musina in the Limpopo Province of South Africa. The area is traversed by major roads, power lines and a railway.

### **4 MINERAL RIGHTS**

CoAL and Rio Tinto have submitted a joint application, under Section 102 of the Mineral and Petroleum Resources Development Act 2002, to give effect to an exchange of NOPRs pursuant to a 'Farm Swap' agreement. In terms of Section 102 applications, properties incorporated into NOPRs held by CoAL and its subsidiaries will be "abandoned" and simultaneously incorporated into existing NOPRs held by Rio Tinto subsidiaries. At the same time certain other properties incorporated into NOPRs held by Rio Tinto subsidiaries will be "abandoned" and simultaneously incorporated into existing NOPRs held by CoAL and its subsidiaries.

CoAL's current NOPRs include the farms Fripp 645 MS, Tanga 648 MS, Salaita 188 MS and Telema 190 MS, on which the Coal Resources have been extensively drill-defined.





## **5 GEOLOGY**

The Project area is located in the Mopane Sector of the Soutspansberg Coalfield. Within the area targeted for opencast mining, six potentially mineable seams have been identified within a 30 to 40m thick carbonaceous zone of the Madzaringwe Formation and named from the top downwards; Upper Seam, Middle Upper Seam, Middle Lower Seam, Bottom Upper Seam, Bottom Middle Seam and Bottom Lower Seam. The Bottom Middle Seam usually comprises predominantly mudstone and for this reason it has not been included in the resource base but, in certain areas, it is sufficiently coaly to be considered a potential mining target.

The seams comprise interbanded carbonaceous mudstones and coal. The coal component is usually bright and brittle and contains a high proportion of vitrinite. Dips average 12° and a number of major faults have been identified.

Drilling indicates that a dolerite sill, up to 50m in thickness, transgresses from a position above the Coal Zone to a stratigraphic level below the Coal Zone. Coal in proximity to the sill has been devolatilised and, where the sill cuts through the Coal Zone, the coal has been burnt.

## **6 EXPLORATION**

The Soutspansberg Coalfield was extensively explored by the South African Iron and Steel Industrial Corporation (ISCOR) in the 1970s and 1980s. The ISCOR dataset, containing information from 1 250 boreholes, was purchased by CoAL in 2007 and data from 23 boreholes drilled by Rio Tinto were provided to CoAL as part of the 'Farm Swap' agreement.

Exploration drilling by CoAL began in 2007 on the farm Fripp 645 MS. By May 2010 a total of 185 drillholes had been completed, including 24 large diameter (LD) boreholes for bulk sampling purposes.

## **7 ENVIRONMENTAL**

A draft environmental scoping study was completed in November 2008 and in April 2010, the DMR granted permission to mine a bulk sample on the farm Tanga 648 MS.

Current environmental liabilities are limited to historical mining and exploration activities, which include an old box-cut and overburden dumps as well as a rehabilitated excavation used for extraction of road-building material.

## **8 RESOURCE LIMITS AND DISCOUNT FACTORS**

CoAL is currently targeting only opencast resources for the Makhado Project. CoAL envisage a final pit depth of about 140m, based on a strip ratio of 7 to 1 (BCM waste : tonnes coal), although this depth may be exceeded in places. This however does not preclude the future underground exploitation of additional resources.

A number of resource estimates were generated, using differing cut-off criteria, in order to compare current and previous resource estimates and the results are discussed in the following section. However, on the basis of recommendations from CoAL and MRM, the following parameters were applied to delimit potentially mineable resources:

- Prospecting Rights boundaries
- Faulting which defines resource limits along strike
- Limit of oxidation



- Maximum depth of 140m
- Minimum seam thickness of 0.5m
- Minimum product volatile matter content of 20%

The application of a minimum volatile matter content cut-off was introduced by The Mineral Corporation as it was recognised that the coking properties of coal in proximity to the transgressive dolerite sill may be deleteriously affected. A minimum volatile matter content of 20% for the washed product was adopted as it is evident that coal with lesser volatiles exhibits swell indices that are too low to be considered suitable for coking usage.

Geological losses of 10% and 15% respectively were applied to the GTIS resources in measured and indicated categories to arrive at estimates of the MTIS resources. The discount allows for coal losses due to dolerite intrusions, faults, burnt coal zones and seam washouts and includes modelling losses. No allowance was made for possible sterilisation of resources by physical, geographical or statutory constraints.

## **9 RESOURCE CATEGORIES**

Resource categories have been defined in accordance with the JORC Code and The Australian Coal Guidelines. Only Points of Observation with seam quality data were used to define resource categories. After due consideration, the Mineral Corporation is of the opinion that, although the quality data contained in the historical ISCOR dataset is in certain respects limited, it satisfies the requirements of the JORC Code in that sampled and analysed seam intersections can be regarded as Points of Observation for coal quality. Resources have been classed separately for each seam on the basis of the following criteria:

- The Measured Resource limit was set at a maximum of 500m between Points of Observation with the proviso that Measured Resources cannot be extrapolated more than 250m beyond the limit of Points of Observation data for any seam.
- The Indicated Resource limit was set at a maximum of 1 000m between Points of Observation with the proviso that Indicated Resources cannot be extrapolated more than 500m beyond the limit of Points of Observation data for any seam.
- The Inferred Resource limit was set at a maximum of 4 000m between Points of Observation.

## **10 RESOURCE ESTIMATES – THE MINERAL CORPORATION**

Resources have been estimated for the coal deposits contained on the farms Tanga 648 MS, Fripp 645 MS, Salaita 188 MT and Telema 190 MT (held by CoAL) and Windhoek 649 MS and Lukin 643 MS (held by Rio Tinto).

GTIS and MTIS resources have been estimated for the full seam thicknesses subject to the cut-off parameters previously stated. The Mineral Corporation considers that deficiencies in the data sourced from ISCOR do not allow in situ raw coal qualities over the entire resource area to be estimated at this time.

Theoretical yields and volatile matter contents have been estimated for a 12% ash product. It is considered that deficiencies in the ISCOR data do not allow other product quality parameters such as calorific value and total sulphur to be reliably estimated over the entire resource area.



Table 7 presents the estimated in situ tonnages to 140m depth, and the theoretical yields and qualities for a washed coal product with an ash content of 12%. It is based on data from historical boreholes drilled by ISCOR, representing 80% of the total boreholes with quality data, and new boreholes completed by CoAL which comprise 20% of the total. However, attention is drawn to the discussion of product yields in Section 12 which suggests that, due to the dominant influence of ISCOR data, the yields tabulated below may be underestimated. Tonnages and qualities are on an uncontaminated air-dried basis and average qualities are weighted by GTIS. All resources are either measured or indicated.

**Table 7: Coal Resource estimate to 140m depth – The Mineral Corporation**

FARM NAME & (NOPR HOLDER)	SEAM		IN SITU RESOURCES					PRODUCT	
	NAME	THICK m	CATEGORY (JORC)	AREA ha	GTIS Mt	MTIS Mt	RD	YIELD %	VM %
FRIPP (CoAL)	UPPER	3.11	Measured	130	7.655	6.8899	1.92	11.0	30.7
		3.21	Indicated	37	2.270	1.9298	2.03	10.3	29.0
	MIDDLE UPPER	4.30	Measured	152	11.387	10.2483	1.76	15.3	30.0
		4.27	Indicated	17	1.097	0.9320	1.76	15.0	29.3
	MIDDLE LOWER	2.52	Measured	172	7.896	7.1068	1.88	17.3	29.6
		2.60	Indicated	6	0.265	0.2249	1.85	19.1	30.1
	BOTTOM UPPER	4.01	Measured	181	12.446	11.2015	1.80	18.6	28.9
		3.89	Indicated	6	0.391	0.3325	1.88	16.3	29.3
	BOTTOM LOWER	4.73	Measured	184	15.532	13.9788	1.89	14.6	28.8
		5.09	Indicated	8	0.674	0.5732	2.00	16.8	30.0
Sub-Total Measured				820	54.917	49.425	1.84	15.5	29.4
Sub-Total Indicated				75	4.697	3.993	1.93	13.3	29.4
Total Measured and Indicated				895	59.614	53.418	1.85	15.4	29.4
LUKIN (Rio Tinto)	UPPER	2.62	Measured	212	10.824	9.7413	1.98	8.6	29.2
		2.38	Indicated	54	2.605	2.2143	2.18	9.8	29.3
	MIDDLE UPPER	3.89	Measured	294	19.717	17.7457	1.77	14.5	29.4
		3.99	Indicated	11	0.716	0.6085	1.81	11.8	29.9
	MIDDLE LOWER	2.20	Measured	284	11.465	10.3187	1.88	17.4	28.8
		1.79	Indicated	12	0.394	0.3347	1.96	16.5	26.7
	BOTTOM UPPER	3.36	Measured	299	17.284	15.5554	1.77	23.0	28.3
		2.91	Indicated	14	0.621	0.5275	1.76	23.0	29.4
	BOTTOM LOWER	3.78	Measured	306	21.220	19.0978	1.88	14.7	28.3
		3.41	Indicated	15	0.838	0.7122	1.87	16.2	29.1
Sub-Total Measured				1,396	80.510	72.459	1.84	16.0	28.7
Sub-Total Indicated				106	5.173	4.397	2.00	13.2	29.1
Total Measured and Indicated				1,502	85.683	76.856	1.85	15.9	28.7
SALAITA (CoAL)	UPPER	2.45	Measured	103	4.934	4.4408	1.98	6.7	29.9
		2.16	Indicated	36	1.480	1.2579	1.99	7.1	31.2
	MIDDLE UPPER	3.76	Measured	156	10.186	9.1678	1.80	12.4	29.4
		3.70	Indicated	5	0.298	0.2534	1.81	11.8	29.5
	MIDDLE LOWER	2.19	Measured	144	5.903	5.3130	1.91	13.3	28.8
		2.25	Indicated	12	0.488	0.4151	1.98	10.5	26.4
	BOTTOM UPPER	3.97	Measured	173	12.033	10.8297	1.79	20.6	29.4
		5.01	Indicated	18	1.517	1.2894	1.94	10.9	30.2
	BOTTOM LOWER	3.58	Measured	178	11.950	10.7552	1.92	14.3	29.3
		4.14	Indicated	25	1.947	1.6551	2.05	7.7	29.4
Sub-Total Measured				755	45.007	40.506	1.86	14.6	29.3
Sub-Total Indicated				97	5.730	4.871	1.99	8.8	29.7
Total Measured and Indicated				851	50.738	45.377	1.87	13.9	29.4

(Table continued on next page)



FARM NAME & (NOPR HOLDER)	SEAM		IN SITU RESOURCES					PRODUCT	
	NAME	THICK m	CATEGORY (JORC)	AREA ha	GTIS Mt	MTIS Mt	RD	YIELD %	VM %
TANGA (CoAL)	UPPER	3.34	Measured	81	4.909	4.4179	1.86	10.6	29.4
		2.03	Indicated	18	0.650	0.5521	1.94	9.9	26.8
	MIDDLE UPPER	4.17	Measured	108	7.795	7.0157	1.78	12.5	30.1
		1.79	Indicated	5	0.149	0.1264	1.83	10.3	25.8
	MIDDLE LOWER	1.70	Measured	108	3.475	3.1277	1.93	15.9	30.2
		1.04	Indicated	3	0.054	0.0456	1.87	17.6	27.0
	BOTTOM UPPER	3.15	Measured	129	7.074	6.3664	1.78	21.0	29.0
		1.91	Indicated	4	0.113	0.0963	1.80	18.8	25.5
	BOTTOM LOWER	3.59	Measured	126	8.461	7.6148	1.90	11.5	29.5
		2.00	Indicated	6	0.237	0.2014	1.90	12.2	27.2
Sub-Total Measured				552	31.714	28.543	1.84	14.2	29.5
Sub-Total Indicated				36	1.202	1.022	1.90	11.6	26.6
Total Measured and Indicated				588	32.916	29.564	1.84	14.1	29.4
TELEMA (CoAL)	UPPER	1.85	Measured	73	2.677	2.4091	2.02	5.7	29.2
		2.03	Indicated	47	2.078	1.7661	2.18	4.4	29.2
	MIDDLE UPPER	4.32	Measured	112	8.641	7.7769	1.80	11.0	29.1
		4.25	Indicated	25	1.798	1.5281	1.80	11.1	29.2
	MIDDLE LOWER	2.25	Measured	131	5.234	4.7104	1.79	16.9	28.0
		2.26	Indicated	16	0.599	0.5090	1.77	16.1	27.0
	BOTTOM UPPER	5.00	Measured	132	11.397	10.2576	1.75	23.6	27.6
		4.87	Indicated	22	1.700	1.4452	1.76	20.1	26.6
	BOTTOM LOWER	4.40	Measured	129	11.020	9.9177	1.96	16.2	28.5
		4.41	Indicated	34	2.915	2.4775	2.00	16.5	28.8
Sub-Total Measured				578	38.969	35.072	1.84	16.6	28.2
Sub-Total Indicated				144	9.089	7.726	1.93	13.3	28.1
Total Measured and Indicated				722	48.058	42.798	1.86	15.9	28.2
WINDHOEK (Rio Tinto)	UPPER	3.18	Measured	99	5.655	5.0893	1.81	12.7	31.3
		3.17	Indicated	9	0.546	0.4642	1.98	10.8	30.3
	MIDDLE UPPER	4.49	Measured	103	8.071	7.2642	1.78	14.0	31.2
		4.39	Indicated	4	0.285	0.2422	1.83	11.7	27.8
	MIDDLE LOWER	2.42	Measured	107	4.700	4.2298	1.84	20.9	31.8
		2.11	Indicated	2	0.098	0.0834	1.94	18.2	30.9
	BOTTOM UPPER	3.54	Measured	110	6.567	5.9106	1.72	22.5	30.5
		3.57	Indicated	2	0.140	0.1191	1.75	15.1	26.5
	BOTTOM LOWER	4.22	Measured	111	8.289	7.4598	1.86	13.0	30.8
		4.14	Indicated	2	0.136	0.1157	1.89	11.2	28.6
Sub-Total Measured				530	33.282	29.954	1.80	16.2	31.0
Sub-Total Indicated				19	1.205	1.025	1.90	12.1	29.1
Total Measured and Indicated				549	34.487	30.978	1.80	16.0	31.0
Total Measured				4,630	284.399	255.959	1.84	15.6	29.2
Total Indicated				477	27.098	23.033	1.95	12.2	28.8
Total Measured and Indicated				5,107	311.496	278.992	1.85	15.3	29.2

RD – relative density, M – moisture in sample, VM – volatile matter, FC – fixed carbon, CV – calorific value, S - sulphur

The Mineral Corporation has also reviewed ISCOR data for the block comprising the farms Mount Stewart 153 MT, Terblanche 155 MT and Septimus 156 MT and is of the opinion that the integrity of the database at the present time does not support modelling and therefore an estimation of resources has not been conducted. However, it is clear that coal does exist on the farms and that following further investigations, a resource estimate could be generated in due course.



A significant number of ISCOR boreholes were completed on the farm Voorburg 503 MS. CoAL is currently drilling on the property to confirm the ISCOR data but the analytical results are not yet available.

## 11 PREVIOUS RESOURCE STATEMENTS

In a Resource Upgrade Statement released on 22 July 2008, which was also reported in a Consolidated Resource Statement dated 30 September 2008, CoAL declared a JORC-compliant in situ resource of 1 035 Mt (excluding resources in the reconnaissance category). The upgrade was based on information from 402 historical boreholes drilled by ISCOR plus additional data from the results of drilling conducted by CoAL. The resource upgrade involved the modelling of five coal-rich horizons as opposed to the three broader coal horizons that were previously modelled.

**Table 8: Coal Resource estimate - CoAL, September 2008**

RESOURCE CATEGORY	In situ Resource Mt	Tonnage proportion %	Opencast Resource Mt	Tonnage proportion %
Measured	230.06	17.23	208.36	37.85
Indicated	548.64	41.09	201.79	36.69
Inferred	250.69	18.78	25.45	4.61
Reconnaissance	305.66	22.89	114.77	20.85
<b>Totals</b>	<b>1 335.06</b>	<b>100.00</b>	<b>550.37</b>	<b>100.00</b>

CoAL estimated that a 19.9% yield could be achieved for a primary coking coal product with 12% ash content, a FSI of >8 and a sulphur content of 0.97%. A yield of 33.7% was estimated for a secondary middlings thermal coal product with a 35% ash content, calorific value of 21.03MJ/kg and volatile matter content of 21.5% (adb).

Coal contained within a surficial weathered zone extending to a depth of 18m below surface was excluded from the resources by CoAL. The in situ resources, as defined by CoAL, represent coal contained in seams occurring in the zone between the depth of weathering and the property boundaries. At the property boundaries the Coal Zone may occur at depths of over 550m and is consequently uneconomic to mine by opencast methods. Therefore the opencastable resources were limited to a depth of 140m below surface.

The Mineral Corporation, on the basis of new analytical data, determined that oxidised coal often exists below the weathered zone although the coal physically appears fresh. Thus a limit of oxidation extending 30m below surface was applied. New exploration drilling and downhole geophysical data has also allowed a complete reassessment of the seam intervals and an extensive regeneration of seam physical and quality models. The Mineral Corporation also applied a volatile matter content cut-off of 20% to discount devolatilised coal and a minimum seam thickness cut-off of 0.5m which is considered to be the thinnest cut that could be selectively mined in the kind of large scale opencast operation envisaged. A depth limit of 140m was applied to define opencastable resources.



The introduction by The Mineral Corporation of additional cut-offs, and revisions to the geological models, do not allow direct comparison between current and previous resource estimates. However, The Mineral Corporation has estimated, using the same modelling methodology as CoAL, a total GTIS resource of 947Mt which is within 10% of the 1 035Mt previously estimated by CoAL.

The Mineral Corporation considers that the resource tonnage estimates generated by CoAL in 2008 were reasonable given the limited amount of data available at that time.

## 12 COAL QUALITIES AND PROPERTIES

In view of the ISCOR data deficiencies mentioned previously, Table 10 below shows the average product qualities based only on results from 81 CoAL boreholes which amount to less than 20% of the total boreholes for which quality data is available. While the results may not be representative of the resource as a whole, they can be considered indicative. It should be noted that the farm Telema 190 MT was excluded as CoAL have yet to drill on this property.

**Table 10: Product qualities based on CoAL borehole data (adb)**

SEAM	YIELD %	M %	ASH %	VM %	FC %	CV MJ/kg	S %
Upper	13.2	1.6	12.0	32.4	54.7	30.25	1.16
Middle	16.1	1.5	12.0	29.2	57.3	30.50	1.43
Middle Lower	21.0	1.3	12.0	29.8	56.9	30.73	1.39
Bottom Upper	28.5	1.3	12.0	28.8	57.9	30.55	1.01
Bottom Lower	17.9	1.2	12.0	28.8	58.1	30.88	1.00
<b>Totals</b>	<b>19.5</b>	<b>1.4</b>	<b>12.0</b>	<b>29.4</b>	<b>57.3</b>	<b>30.61</b>	<b>1.16</b>

It is significant that, on the basis of analytical data from the ISCOR boreholes only, an overall average theoretical yield of 15% is indicated as opposed to 19.5% for the CoAL boreholes. It is considered that the CoAL yield figures are more reliable than the ISCOR results as the CoAL exploration programmes utilised modern wireline, triple-tube drilling techniques to obtain HQ and PQ size core whereas ISCOR are likely to have historically employed conventional and less efficient drill techniques to obtain core of smaller diameter NQ or NX size. This would probably have resulted in ISCOR achieving lesser core recoveries with a greater preferential loss of the brittle, vitrinitic, coking coal component of the seams. As the ISCOR data represents over 80% of the total slim core quality information currently available, the yield figures shown in Table 7 are probably underestimated.

CoAL has received the initial results of testwork conducted on the first batch of 10 LD boreholes. Table 11 compares average seam yields and qualities (weighted by thickness) for a 12% ash washed product from LD borehole samples and the equivalent values for samples from the slim core pilot borehole around which the LD boreholes were clustered.



**Table 11: Comparison of LD and slim core product yields and qualities (adb)**

SEAM	YIELD %	M %	VM %	FC %	CV MJ/kg	S %
<b>LARGE DIAMETER BOREHOLES</b>						
Upper	12.8	1.1	18.5	68.4	30.69	1.10
Middle Upper	16.5	0.9	28.8	58.3	30.92	1.55
Middle Lower	36.9	0.7	30.7	56.5	31.35	1.24
Bottom Upper	31.5	0.8	30.4	56.8	31.05	0.84
Bottom Lower	24.4	0.7	31.4	55.8	31.33	0.95
<b>Average</b>	<b>22.7</b>	<b>0.9</b>	<b>27.5</b>	<b>59.6</b>	<b>31.01</b>	<b>1.17</b>
<b>SLIM CORE BOREHOLE</b>						
Upper	11.5	1.3	17.7	68.9	30.64	1.08
Middle Upper	13.4	1.0	28.6	58.3	30.98	1.51
Middle Lower	18.5	0.9	31.5	55.5	31.01	1.31
Bottom Upper	30.9	1.0	30.7	56.3	31.14	0.86
Bottom Lower	26.6	0.7	31.4	55.8	31.33	0.95
<b>Average</b>	<b>18.8</b>	<b>0.9</b>	<b>27.0</b>	<b>58.0</b>	<b>31.00</b>	<b>1.14</b>

It can be seen that the average product yield obtained from LD borehole samples is greater than that achieved from the slim core.

Table 12 below shows, on a seam-by-seam basis, qualities and coking properties for a 12% ash washed product derived from LD bulk samples. The results of testwork on the Upper Seam have not yet been received.

**Table 12: CoAL LD boreholes - Product qualities and properties**

COAL QUALITIES AND COKING PROPERTIES	UNIT	SEAM			
		Bottom Lower	Bottom Upper	Middle Lower	Middle Upper
Calorific Value	MJ/kg	31.06	30.81	31.09	30.55
Inherent Moisture (ad)	%	0.8	1.5	0.9	1.2
Ash (ad)	%	12.3	11.9	12.1	12.1
Volatile Matter (ad)	%	30.3	29.2	30.3	28.4
Fixed Carbon (ad)	%	56.6	57.4	56.7	58.3
Sulphur (ad)	%	0.92	0.83	1.24	1.56
FSI		9	9	9	9
Roga		90	89	91	86
Fluidity (softening)	°C	391	396	398	418
Fluidity (max fluid)	°C	454	450	450	452
Fluidity (max)	ddpm	493	485	488	483
Fluidity (solidification)	°C	10,109	5,493	14,277	150
Dilatation (softening)	°C	365	362	368	387
Dilatation (max contraction)	°C	406	411	408	432
Dilatation (max dilatation)	°C	490	490	502	476
Dilatation (max contraction)	%	32	37	34	38
Dilatation (max dilatation)	%	281	237	268	66
Vitrinite	%	79.3	77.9	82.6	88.1
RoV max	%	0.98	1.01	1.01	1.03
Total Inerts	%	17.3	17.2	13.6	23.5

It can be seen from the above table that the inherent moisture content is low and the arithmetic average sulphur content of 1.1% is moderate. The arithmetic average Roga and





Free Swelling Indices are high at 9 and 89 respectively and these values concur with equivalent results from ISCOR and Rio Tinto boreholes.

The above table also indicates that a 12% ash coking product exhibits a vitrinite content ranging from 79% to 88% with an average vitrinite reflectance of  $RoV_{max}1.0$ . Testwork conducted by Rio Tinto on a 10% ash product indicated identical average reflectance values with vitrinite content generally in the range 88% to 95%.

With the exception of the Middle Upper Seam, maximum fluidities determined on CoAL samples ranged from 5 493 to 14 277 ddpm while Rio Tinto testwork recorded maximum fluidities of up to 13 000 ddpm. The lower fluidity values recorded for the Middle Upper Seam possibly relate to the lower volatile matter content suggesting that the coal has been partially affected by heat. It is significant that in this area the overlying Upper Seam is devolatilised by a dolerite sill located above the Coal Zone.

The vitrinite reflectance, FSI and volatile matter contents suggest that the Makhado product could be classed as a medium volatile, semi-hard coking coal. This is expected to be confirmed when further results of specialised testwork are received.