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Grootegeluk Mine Geology

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Grootegeluk Mine, a wholly owned subsidiary of Exxaro Resources Ltd, is a surface coal mining operation on a shallow portion of the Waterberg Coalfield. (Figure 1.) Since the commissioning of Grootegeluk Mine in 1980, it has remained the only operating coal mine in the Waterberg Coalfield. The mine was originally developed to produce low-ash semi-soft coking coal from the upper vitrinite-rich Volksrust Formation which was utilized as a reductant in Iscor's steel production process. The Eskom-owned Matimba power station was later built in close proximity to the mine to utilize the "middling coal" or medium quality coal for power generation. As the mine continued to operate, the lower coal seams of the Vryheid Formation became progressively exposed. Metallurgical coal products and power

station coal are produced from these coal seams.



Figure 1: Location of Exxaro's Grootegeluk Mine

GROOTEGELUK MINE SCHEMATIC REPRESENTATION OF LITHOLOGY AND BENCH DEFINITIONS (2011)						
COAL ZONES / SAMPLES	AVERAGE THICKNESS	% COAL	LITHOLOGY	BENCH HEIGHT	BENCH RD	
Overburden Samp 1A	22.0m		Sand and topsoil (±1m), with scattered ferrirete and calcareous nodules, mudstone yellow-brown, weathered in upper half, massive, light-grey mudstone in lower half.	22.0m	BENCH 1 RD = 2.40g/cc	
Zone 11 Samp 1B-D	7.5m	38.33	Bright coal intercalated with grey mudstone, carbonate lenses. No siderite.	15.4m	BENCH 2 RD = 1.77g/cc	
ZONE 10 Samp 2-6	9.4m	53.86	Bright coal intercalated with carbonaceous shale/mudstone, minor siderite, carbonate lenses, thick coal bands in lower half.	16.0m	BENCH 3 RD = 1.87g/cc	
ZONE 9 Samp 7-9	6.5m	48.34	Bright coal with prominent siderite occurrences at base, intercalated with carbonaceous shale/mudstone. Thick coal band in lower half.	16.9m	BENCH 4 RD = 1.88g/cc	
ZONE 8 Samp 10-14	9.0m	42.82	Bright coal with prominent siderite occurrences at base, intercalated with carbonaceous shale/mudstone. Thick coal band at base.	16.8m	BENCH 5 RD = 1.91g/cc	
ZONE 7 Samp 15-18	10.2m	39.94	Bright coal, very sideritic throughout, intercalated with numerous thin bands with carbonaceous shale/mudstone. Prominent siderite at base.	4.1m	BENCH 6 RD = 1.86g/cc	
ZONE 6 Samp 19-21	6.5m	32.17	Bright coal, very sideritic in lower half, intercalated as numerous thin bands with carbonaceous shale/mudstone.	5.9m	BENCH 7A RD = 2.18g/cc	
ZONE 5 Samp 22A-E	14.5m	21.97	Carbonaceous shale/mudstone with thin coal bands in lower two-thirds, siderite less prominent. 2.5m carbonaceous mudstone to coaly shale at base.	1.5m	BENCH 7B RD = 1.82g/cc	
Samp 22FS	2.3m		Carbonaceous shale to coaly shale	3.8m	BENCH 8 RD = 2.45g/cc	
ZONE 4 Samp 23A-C	4.1m	99.13	Heavy dull coal, some bright coal laminae in lower half, few thin shale bands. Yields slight coking fracture.	7.8m	BENCH 9A RD = 1.65g/cc	
Interburden Samp 24A & B	5.9m		Mudstone, dark grey to black. Fossiliferous siltstone at base.	3.8m	BENCH 9B RD = 1.54g/cc	
ZONE 4A (C6)	1.5m	96.37	Dull coal, few bright stringers with thin shale bands.	4.1m	BENCH 10 RD = 2.02g/cc	
Interburden Samp 24S	3.8m		Mudstone, dark grey.	4.1m	BENCH 11 RD = 1.52g/cc	
ZONE 3 Samp 25-29	7.8m	96.41	Dull coal, bright laminae in lower 1.6m yielding low ash, slight coking abilities, few thin shale bands.	13.3m	BENCH 12 RD = 2.50g/cc	
Interburden	3.8m		Sandstone, medium to coarse grained, few thin shale bands, thin coal bands near top.	1.5m	BENCH 13 RD = 1.52g/cc	
ZONE 2 Samp 30-31	4.1m	98.22	Dull coal, bright laminae in lower 2m yielding low ash, slight coking abilities, few thin shale bands.			
Interburden	13.3m		Sandstone, medium to coarse grained, few thin shale bands, thin coal bands near top.			
ZONE 1 (32)	1.5m	98.34	Dull coal, with very few bright coal laminae and thin shale bands.			

Figure 2: Stratigraphic Sequence of the Waterberg Coalfield

This paper will focus on the geology and stratigraphy (Figure 2), coal occurrences, mining and products of the Grootegeluk Coal Mine in the Waterberg Coalfield.

