

https://dspace.org/

Energy consumption standards and costs in South African gold and platinum mines

Tshisekedi, Jean Rene Ngalamulume

2009-06-24T12:10:03Z
http://hdl.handle.net/10539/7043

Downloaded from a DSpace repository. https://dspace.org/

UMECS - B2: GOLD FIELDS

1 – What is the current mining depth level of the mine (Driefontein, Beatrix, Kloof and South Deep)?

2307m, 705-1962m, 2665m and 2031-2550m…….

2 - Which mining method is currently applied?

Dries, Beatrix and Kloof - Conventional narrow stopes with longwalls and or closely spaced dip pillars.

South Deep – trackless mechanised 70%, conventional 30%

3 – What is the degree of mechanization? (High, medium, Low)

Low, low, low, high +low

4 – Describe the operational chain of production? (Circuit and specific operation tasks)

Drill, blast, clean, transport to shaft orepasses in hopper on rails, transport to loading boxes in shaft orepass system, hoist vertically in skips driven by rock winders, transport to plant on conveyor, crush, mill, leach, and smelt gold, pump tailings to tailings dams.

5 – Average production per shift, day, month, and year? F2006 (July 2005 to June 2006) Driefontein – 3867000 tons reef, Beatrix – 3551000 tons reef, Kloof – 3206000 tons reef, South Deep – 1256633 tons reef

6 – Average energy bought (paid) daily, monthly and annually?

Electricity make up 98% of energy used in Driefontein, Beatrix and Kloof. Annual consumptions Driefontein 1910100 MWh, Beatrix 931533 MWh, Kloof 1887032 MWh, South Deep 550000MWh

7 – Energy source type used by each mining operation activity if possible (Electricity, Diesel, Hydropower)?

Approximately 98% Electricity, 1.8% diesel and 0.2% Petrol and LPG Some hydropower at Kloof 4# and Beatrix3#

8 – The peak (amount and period) achieved in energy consumption daily, and monthly per source type?

Peak electrical demand Driefontein 325 MVA, Beatrix 131 MVA, Kloof 305 MVA and South Deep 85 MVA

9- Global annual 2006 figures showing the amount of energy consumed per mining operational unit including:

Dries,	Beatrix,	Kloof	
14%,	5%,	7%	- Production (loaders, loco, conveyor or haulage…)
(Included above),	10%	10%	- Hoisting (main skips)
20%,	21%	21%	- Compressors
27%,	26%	18%	- Pumping
13%,	11%	24%	- Ventilation
7%,	9%	11%	- Refrigeration

~~Auxiliary services (pumping, ventilation fans, Refrigeration, lighting etc~~

13%,	12%	7%	- Gold Plant

~~Concentrator (crusher, mills, grinders…)~~

~~Smelting~~

~~Refining~~

3%,	6%	3%	Other general including lighting, offices, hostels etc.

10 – What is the energy intensive areas and activities?

Compressors, pumping and ventilation contribute to 60% of power use

11 – What is the load (charge) allocated in auxiliary services?

Need to define "Auxiliary services". Power not allocated to Compressors, Pumping, Ventilation, Refrigeration, Minig, Hoisting and Plants is called General and accounts for approximately 5% of power use.

12 - What is the power factor used for electricity in the mine and average price per KWh of electricity?

Power factor >0.96, Unit cost average F2006 R0.153/kWh

13 – Average material handled (ore, waste) per shift, day and month?

See question 5 above for reef, waste varies from 20 to 25%

14 – Average ore grade per tonne produced?

Driefontein 8.1g/t, Beatrix 5.2g/t, Kloof 8.7g/t and South Deep 7.03g/t

15 – Is processing undertaken on mine site or far away and at which distance?

On mine site at one, two or three gold plants