ITINERARY

Tour of Gold Fields' South Deep Operations

INTRODUCTION

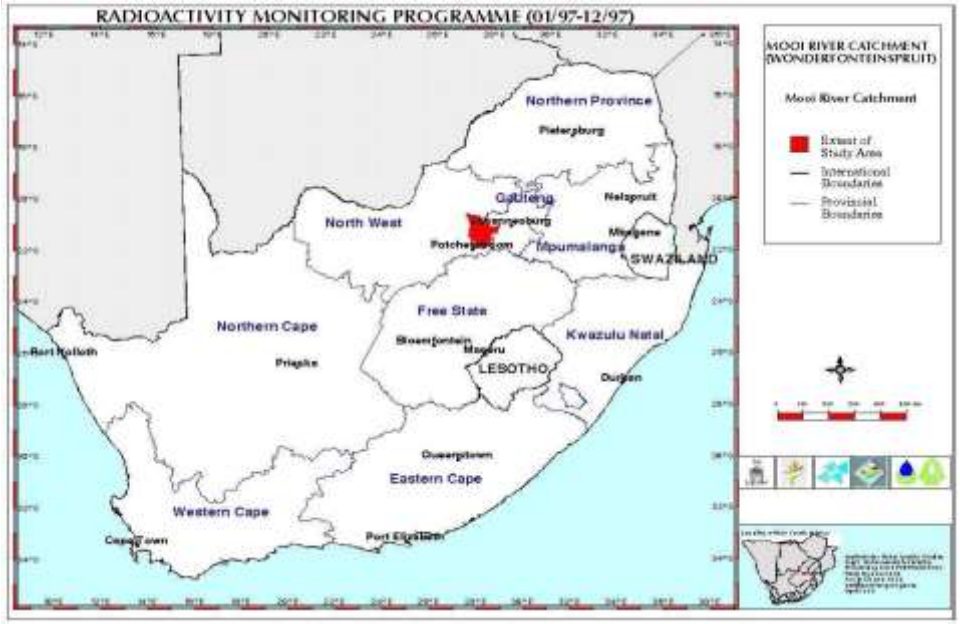
Gold Mining

- The **largest gold resources in the world** were found in the area of the Witwatersrand.
- South Africa is one of the **world leaders in gold mining**.
- Johannesburg's other name, "Egoli" means **City of Gold**.
- The gold-bearing stone is mined at considerable depth.
- Gold was discovered on a Transvaal farm, Langlaagte, on the Witwatersrand in **1886** by two prospectors.
- This discovery caused a turning point in South African history.
- It changed South Africa from an agricultural society to become the **largest gold producer in the world.**
- **With South Africa's economy built on gold mining, the sector is an important foreign exchange earner, with gold accounting for more than one-third of exports.** (2012)
- To date has produced over **2 billion ounces of gold**, which is about half of all the gold ever mined.
- It is estimated that as much gold remains underground albeit at greater depths which require greater effort, ingenuity capital and resolve to mine.

The Legacy of Gold Mining

As early as 1987, the US Environmental Protection Agency recognised that "*.....problems related to mining waste may be rated as second only to global warming and stratospheric ozone depletion in terms of ecological risk. The release to the environment of mining waste can result in profound, generally irreversible destruction of ecosystems.*[1]*"*

Gold-mining Areas of
the Witwatersrand Goldfields



Witwatersrand goldfields

[1] European Environmental Bureau (EEB). 2000. *The environmental performance of the mining industry and the action necessary to strengthen European legislation in the wake of the Tisza-Danube pollution*. EEB Document no 2000/016. 32 p

South Africa produced an estimated 468 million tons of mineral waste per annum (DWAF, 2001). Gold mining waste was estimated to account for 221 million tons or 47 % of all mineral waste produced in South Africa, making it the largest, single source of waste and pollution (DWAF, 2001).

There are more than 270 tailings dams in the Witwatersrand Basin, covering approximately 400 km2 in surface area (AngloGold Ashanti, 2004). These dams are mostly unlined and many are not vegetated, providing a source of extensive dust, as well as soil and water (surface and groundwater) pollution (AngloGold Ashanti, 2004).

The Witwatersrand has been mined for more than a century. It is the world's largest gold and uranium mining basin with the extraction, from more than 120 mines, of 43 500 tons of gold in one century and 73 000 tons of uranium between 1953 and 1995. The basin covers an area of 1600 km^2, and led to a legacy of some 400 km^2 of mine tailings dams (270 tailings dams, 380 radioactive mine residue deposits) containing 6 billion tons of pyrite tailings containing 600 000 t low-grade uranium. It is estimated that 6000 km^2 of soils are significantly impacted by gold mining on the Witwatersrand Basin alone.

The Witwatersrand goldfields are comprised of the West Rand Goldfield, the East Rand and Central Rand Goldfields, the Far West Rand Goldfield, the Free State Goldfield and the KOSH goldfield.

The environmental and social issues within the West Rand Goldfield are mirrored within the Central Rand-, East Rand, Far West Rand**,** Free State and KOSH goldfields.

These issues are:

- Interconnection of mining basins
- Acid Rock Drainage and Mine Drainage
- Large Salt Loads
- Decanting of Flooded Mines
- Physical Instability
- Dust Pollution
- Land Use Conflicts with Growing Urban Centers

- Radioactivity (Contamination) and Uranium[2]
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Sibanye-Stillwater

Sibanye is the third largest producer of palladium and the third largest producer of platinum in the world while remaining in the top ten global gold companies. Sibanye Gold Limited started trading as Sibanye-Stillwater on 30 August 2017. Simultaneously, the company has restructured itself by region – the Southern Africa and the United States region.

West Rand Tailings Retreatment Project (WRTRP)[3]

The WRTRP is the subject of a transaction between Sibanye-Stillwater and DRD Gold. Sibanye-Stillwater is awaiting the final approvals from the regulator.

Rand Uranium/Cooke Operations[4]

- Cooke 1-3 underground operations have been placed on Care and Maintenance.
- The surface operations:

  The surface operations have involved the hydraulic reclamation of Dump 20 and Lindum Dump Tailings Storage Facilities (TSFs), with the tailings material being transported via pipelines to Cooke Plant for processing. The residual tailings are deposited into open pits in the area, in line with its current Water Use License and Environmental authorizations. The deposition into the open pits is seen as a responsible closure solution for the region with a positive impact on the environment. The fact that Dump 20 and Lindum TSF's have largely been depleted without the pits having been backfilled, presents a challenge to the sustainable closure solution. Additional sources of material are therefore required to fill the pits.

[2] Department of Minerals and Energy. Regional Mine Closure Strategies for the Witwatersrand gold fields. 2008.

[3] https://www.sibanyestillwater.com/our-business/southern-africa/projects/wrtrp

[4] Integrated water and waste Management Plan in support of the WULA. Digby Wells Environmental. Prepared for Sibanye-Stillwater. December 2017. Comments received from Mr. Grant Stuart of Sibanye-Stillwater by e-mail, dated the 12th of February, 2018.

To ensure the sustainability of the surface operations, the Millsite complex (Dump 38) has been identified as a replacement resource. The Dump 20 reclamation station has been moved to the Millsite TSF adjacent to the Dump 20 site. Hydraulically reclaiming Millsite utilizes existing infrastructure, including the Dump 20 booster pump station, Cooke Plant and pipeline routes.

Given the risk of closure of the Rand Uranium Surface Operations and the need to preserve jobs, Sibanye-Stillwater has conducted an internal risk assessment. This included a detailed waste characterization of the Dump 38 material. It was compared to the waste characterization results of currently approved Dump 20's material and the impact on the water quality contained within the open pits. The analysis showed that the impact will be near identical, if not slightly improved. In addition, Digby Wells Environmental (DWE) was appointed to conduct specialist studies, where necessary, and investigate the impact that the Millsite reclamation project would have had on the local environment.

It is therefore Sibanye-Stillwater's considered understanding that the risks associated with not proceeding are greater than with proceeding.

Gold Fields has operated in South Africa since 1887, when Cecil John Rhodes and Charles Rudd formed Gold Fields of South Africa. In 1932, the company began mining the mineral-rich West Rand, where it discovered high-yielding gold deposits. A merger between Gold Fields of South Africa and Gencor in 1998 led to the formation of Gold Fields Limited.

Today, Gold Fields is a leading global gold mining company that has built on its South African reserves and resources to become a truly global miner, with eight leading mining operations across three continents.

According to Gold Fields Website[5]:

To Be The Global Leader In Sustainable Gold Mining

"The Global Leader"

- *We don't want to be the biggest, but we do want to be the best at everything we do*
- *We seek to create the greatest enduring value from gold mining for all of our stakeholders, including our employees, our communities, our shareholders and our host governments*
- *We are gold industry leaders in understanding our stakeholders' needs and responding to them*
- *Through living our values, we consistently deliver what we promise*

"Sustainable"

- *If we cannot mine safely, we will not mine*
- *We seek to enhance the environments in which we operate, and limit the impact that mining can cause*
- *We are committed to creating "shared value" for all our stakeholders. This is our legacy and we measure ourselves against this*

"Gold mining"

- *We are a gold miner – we produce gold (and by-products where they exist)*
- *We believe in our product and do not hedge gold*

[5] http://www.goldfields.com/the-gold-fields-dna.php

AREAS TO BE VISITED

SOUTH DEEP MINE

Location of South Deep Mine / Mining Right

- Located approximately 10 km south of Westonaria and
- Approximately 45 km southwest of Johannesburg in the West Rand of the Gauteng Province .
- The mine is situated partly over two farms namely, Modderfontein 345 IQ and Doornpoort 347 IQ, which lie within the Quaternary Catchment (C22J) of the Vaal Barrage Catchment.

Mining Right: Ref GP 30/5/1/2/2(220)MR

Air Quality Management

Air Quality Management

- Atmospheric Emission License (AEL) application was lodged in October 2015 and was issued in January 2017.
- Dust fallout monitoring is conducted on monthly basis and South Deep complies with emission standards for both industrial and residential limits.
- South Deep registered to National Atmospheric Emission Information System (NAEIS) and Reports emission data annually.

Location of the dust monitoring buckets

Air Quality Management Cont....

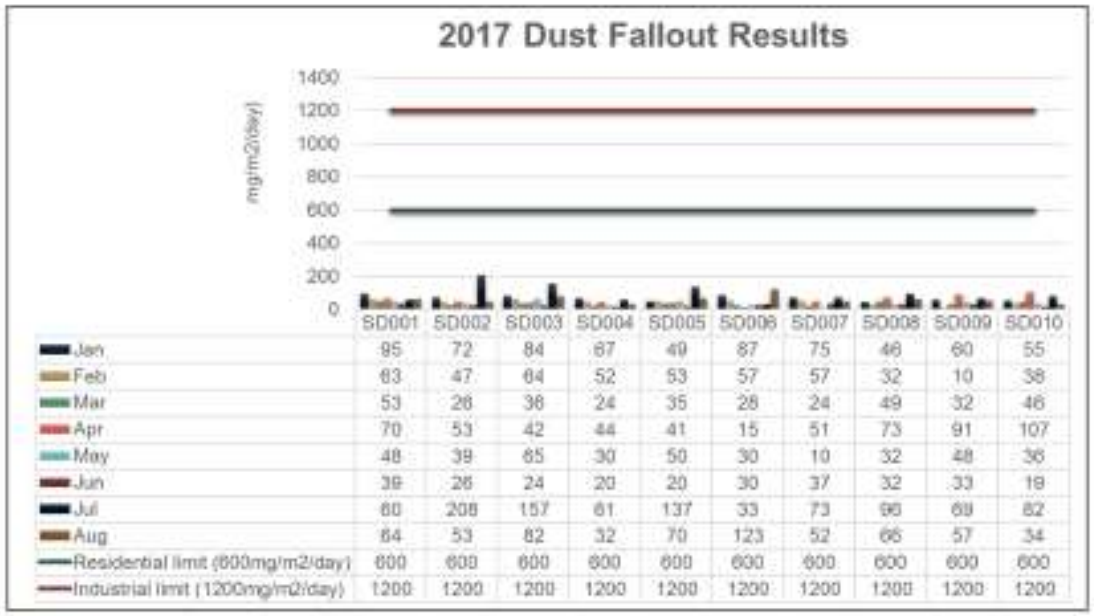
Old Tailings Dams Dust Management project

- Netting
- Water sprayers
- Vegetation of the old tailings storage facility
- Partial rock cladding

Doornport Tailings Dam Dust Management

- Slide slope hydro-seeded (vegetated)
- Concurrent rehabilitation beyond the starter-wall

Air Quality Management Cont....



	SD001	SD002	SD003	SD004	SD005	SD006	SD007	SD008	SD009	SD010
Jan	95	72	84	87	49	87	75	46	60	55
Feb	83	47	64	52	53	57	57	32	10	38
Mar	53	26	36	24	35	28	24	49	32	46
Apr	70	53	42	44	41	15	51	73	91	107
May	48	39	65	30	50	30	10	32	48	36
Jun	39	26	24	20	20	30	37	32	33	19
Jul	60	208	157	61	137	33	73	96	69	82
Aug	64	53	82	32	70	123	52	66	57	34
Residential limit (600mg/m2/day)	600	600	600	600	600	600	600	600	600	600
Industrial limit (1200mg/m2/day)	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200

- South Deep has ten dust fallout monitoring buckets.
- Dust fallout results are below the residential and non-residential limits.
- Residential limit is 600 mg/m2/day and Non residential limit is 1200 mg/m2/day

Water Management

Storm Water Control Infrastructure

Silt Trap

Concrete lined trench

Water gravitate from the sump to the old return water dam, where it is recycled back into the process

6

Water Management

Doompoort Lined Return Water Dam

Mine Closure Planning

Mine Closure Planning : South Shaft Waste Rock Dump Rehabilitation

- A total of 16 ha has been rehabilitated at the South Shaft waste rock dump.
- Removal of invader and alien species was in August 2014
- Removal of Waste Rock Dump completed in December 2015
- Concrete base and plinths demolition and removal completed in May 2016.
- Amelioration, Cross ripping, contouring, seeding and seeding is completed.

Stakeholder &Community Engagement

Participation in different environmental forums

Forum	Time frames	Coordinator
South Deep Community engagement forum	Monthly	South Deep
Far Western Basin Technical Working Group (FWBTWG)	Quarterly	DMR
Rietspruit catchment forum	Quarterly	DWS
West Rand district mining forum	Quarterly	West Rand district
Chamber of Mines (CoM)	Monthly	CoM

Stakeholder Engagement and Complaints

- Community grievances are handled by the community relations department.
- A community grievance procedure has been established and distributed to all host communities.
- Contact details, including direct lines, have been communicated to all stakeholders.
- An environmental complaint register has been developed.
- complaints were last reported in 2015, Two dust complains were recorded in 2015 prior to the completion of TSF rehab.

10

South Africa
South Deep Gold Mine

End