Various Environmental Projects at Vanderbijlpark Works

December 2014
Several Air Quality Projects
Emission reduction projects

FMB DUST CONTROL INSTALLED SYSTEM

The dust control system at the FMB plant was installed in the early 90’s to control the dust generated during the emptying of the wagons offloading ore, limestone and other raw materials to the blending plant. There are two mechanisms for emptying the wagons; one involves the use of a mechanical tippler which rotates the wagons and empties the material in a hopper located underground and by releasing the bottom doors of the wagons and discharging the material into the hopper below.

The extraction system was designed to handle the dust generated from both operations individually. The dust generated during the emptying process is captured in hoods located in the roof on each side of the enclosure or tippler house. The captured dust laden air is conveyed in ductwork to a pulse jet bag filter where the dust is separated from the air stream. The cleaned air is discharged to the atmosphere via the extraction fan and discharge duct.

Recently a decision was made to separate the dust capturing systems in such a way that the dust generated during the bottom dumping from the wagons would be handled by the existing bag filter system and the dust generated during the wagon tippling operation would be suppressed using a chemical dust suppression system. This setup has achieved the desired outcome of more efficient dust suppression, as indicated in the photograph below.

POWER PLANT

In 2009, ArcelorMittal Vanderbijlpark Works commissioned a power plant with a 40MW/Hr capacity that was authorized by the Department of Agriculture and Rural Development in February 2007.

The project entails the use of two boilers to produce steam that is used to drive a 40MW turbine alternator. The steam is generated by utilizing waste heat from Direct Reduction (DR) kilns. The energy produced by the Power Plant replaces a portion of the electricity obtained from the national grid and therefore reduces ArcelorMittal Vanderbijlpark Work’s carbon footprint.
Emission reduction projects

NEW LANCING HOOD (2011)
Lancing is a process used for cutting large quantities of steel into smaller manageable fragments which can be reused in the steel making process using oxygen.

The process of lancing can increase the amount of fugitive dust from a specific site. Lancing currently takes place at the south western corner of the Vanderbijlpark works site.

In an effort to reduce the fugitive emissions from the Vanderbijlpark works site as well as comply with environmental legislation, a new lancing hood has been designed and installed for lancing of steel. The lancing hood is coupled to a newly refurbished bag house which eliminated emissions.

TIP STATION UPGRADE (2012)
The tip stations (Tip station A and B) forms part of the waste handling process. The areas is used for pre mixing of process waste prior to disposal at the waste site.

The area on which the waste material is mixed was lined with concrete to prevent contamination of ground water. The tip station required a larger surface area to ensure safe working environment. This prompted the Upgrade of tip station A and B. The concrete lining of the operating area was extended to minimize dust generation during operations. The tip station is equipped with overhead water sprayers which use industrial waste to reduce spray the waste material to ensure that dust generated during tipping is drastically reducing.
Emission reduction projects

- Stop dosing with Spent Pickling Liquor in 2006
- Intensify maintenance on all emission abatement equipment – 2009 to date
- Operation of bag house at Sinter Plant in 2012. A major reduction in particulate emissions
Remediation

Old Waste disposal site
Installation of Liner system phase 1/2/3
Old waste disposal site remediation
Capping - Phase 1/2/3 – old disposal site
Construction of storm water drain system – part of old waste disposal site remediation
Old Waste Disposal Site – Before and After Capping and Remediation Phase 1
Top view of remediated area. Old waste disposal site – cost to date R 86 million
New Metallurgical Lined Waste Site and H:H Leachate Collection Dam completed 2011
New Domestic Waste Disposal Site

- Construction of new domestic waste site completed in February 2012
- Strictly for disposal of general waste – operational in March 2012
Remediation of Dam 10
Remediation of old storage dams – Dam 10

- Commissioned in 1960
- Consist of 10 dams
- Waste water storage and evaporation
- 70 ha in size
- Use of the dam ceased in 2000

Dam 10 - 2001
Remediation challenges
• Due to the volume of water (2 million m$^3$) in dam 10 – timeframe to dry the dam
• Site preparation of 160 000m$^3$ of sediment for commencement of in situ remediation
• In situ remediation by applying unique methodology, researched and implemented by Vanderbijlpark Works
Before commencement of remediation
In situ bioremediation process
In situ bioremediation process
In situ bioremediation process – pH adjustment for sediment stabilisation
In situ bioremediation process – treated sediment (225 rows with an average length of 120 meters)

Remediation completed
Remediation completed. Site preparation for storm water management and hydroseeding.
Dam 10 remediation completed at a cost of R 27 million (2012)
Remediation of CETP dams
CETP dam 2
Before in situ remediation process
CETP dam 2
During remediation process – in situ bioremediation, methodology as applied in dam 10 was followed.
CETP dam 2 - remediation completed (2013) at a cost of R 15 million
Remediation of Maturation ponds
Maturation Ponds 1-3

- In operation since 1965 and consist of 3 dams
  - Dam 1 = 68 000 m²
  - Dam 2 = 70 000 m²
  - Dam 3 = 170 000 m²
- Taken out of operation March 2008

### Dam 2
Area dried
Remediation of sludge proposed similar as in Dam 10
Remediation completed. To be vegetated Jan 2015

### Dam 1
Waste water was treated with bacteria and introduced by means of a turbulator. Recycled water into process as water balance allows
Treat remaining sludge then as above
Currently busy with site preparation with remediation to commence 2015

### Dam 3
Remediation completed
Inorganic contaminated soil remediation as per soil scientist report (R 4.3M)
Maturation ponds Dam 3 before remediation
During remediation - soil stabilization in Dam 3
Dam 3 – remediation completed (2009)
Maturation pond 2 – during remediation process

Before

After

Remediation process
Maturation ponds 2 – current status quo. Busy with sloping for storm water management and hydroseeding
Maturation pond 1 – in situ water remediation by mixing microorganisms by means of turbulator (completed 2013)
Maturation pond 1 – site preparation to commence with sediment remediation during 2015 – cost to date R11 million