



## DUST CONTROL FOR A HEALTHIER ENVIRONMENT

### FACT SHEET

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**Control of dust from tailings storage facilities (TSFs) is a key focus at Sibanye. Particular attention is paid to those facilities where the volume of wind-borne dust has reached higher-than-normal levels during the year.**

“It is very important for us to know the size of the dust particles, which can be harmful to human health, and especially to the respiratory system,” says Danny Ramsuchit, Unit Manager: Sustainable Development at Sibanye.

In August 2013, Danny conducted and completed a 12-month study in the residential West Village at Driefontein on the impact particulate matter with an aerodynamic diameter of less than 10 micrometres (PM10) can have on health.

He identified operating TSFs as the most significant contributor of PM10 emissions. Despite the identified risk, the average PM10 concentration of  $11.2\mu\text{g}/\text{m}^3$  recorded at West Village during the year was well below the current South African annual average limit of  $40\mu\text{g}/\text{m}^3$ , as well as the World Health Organization’s guideline of an average of  $20\mu\text{g}/\text{m}^3$  in a year. The study involved the collection of data from July 2011 to June 2012.

The volume of dust is higher when slurry or tailings deposition abates and the top surface is drier than normal. For this reason, Danny points out, Sibanye investigated effective contingency plans to control wind-borne dust during periods of reduced new tailings deposition on operating tailings dams, whether planned or unplanned (during strike action, for example), which could potentially result in adverse health effects.

Various options for the control of dust from operational TSFs were investigated. A decision was taken to use water spray systems on the Driefontein mining operation’s TSFs. Water spray systems assist in keeping portions of the side slopes damp. The sprays and damp areas created by them trap dust particles. The damp side slopes also provide an environment more conducive to the establishment of natural vegetation. Vegetation on side slopes in turn stabilises the side slopes, preventing erosion and also assisting in slowing wind velocities, thereby reducing dust liberation. The source of water used for the side slope sprays is from the TSFs return water dams. This helps with the water balance at the gold plant and minimises overtopping incidences during unusually high rainfall periods. During 2016, water spray systems were commissioned at the Driefontein 1 and 2 TSFs.

Multi-directional dustfall buckets are used to determine the levels of dustfall. The results from these measurements are used to ascertain the effectiveness of existing controls and identify areas where additional intervention may be required.

Danny used a network of nine multi-directional Dustwatch dustfall buckets to determine the sources of dust. The multi-directional dustfall method differs from the ASTM international method in that four buckets are used to collect dust from the four directions of the compass. The ASTM method results in dustfall from all directions being deposited into a single bucket and, therefore, does not determine the original direction of the dust. Mines and other industries are required to comply with the legislated National Dust Control Regulations of the NEM: Air Quality Act in terms of the ASTM D1739 method.

Sibanye has initiated a study at its Driefontein and Beatrix operations in conjunction with the University of Pretoria and service provider, Dustwatch, to compare the different dustfall monitoring techniques. The preliminary results from the study were presented at a joint workshop with the National Association for Clean Air and Department of Environmental Affairs during 2016. The Department of Environmental Affairs subsequently undertook to review and revise dustfall legislation, taking into consideration the latest scientific data. The review process is expected to be completed by April 2017.



*ASTM: American Society for Testing and Materials, an international standards organisation that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services*