



ETHEKWINI AIR QUALITY MONITORING NETWORK

ANNUAL REPORT

2009

**POLLUTION CONTROL SUPPORT SECTION
(ETHEKWINI HEALTH DEPARTMENT)**

EXECUTIVE SUMMARY

eThekwini Municipality commissioned the continuous air quality monitoring network in December 2003, as one of the major elements of its Air Quality Management System. The network is composed of instrumentation owned and operated by eThekwini Municipality. The primary objectives of the network are to quantify the quality of air in South Durban in particular and eThekwini in general, measure compliance with air quality standards and provide a means of verification for dispersion models. The network consists of twelve air monitoring stations, three of which are background stations, and five meteorological stations. The network instruments continuously measure the priority pollutants sulphur dioxide (SO₂), oxides of nitrogen (NO_x), particulate matter with an aerodynamic diameter less than 10 microns (PM₁₀), particulate matter less than 2.5 microns (PM_{2.5}), ozone (O₃) and carbon monoxide (CO). In addition, measurements of total reduced sulphur (TRS) are also conducted. All analysers are designated under USEPA regulations as equivalent methods. The Grosvenor meteorological station was temporarily decommissioned due to technical problems.

The operation of the network and the management of data are aligned to internationally prescribed quality control standards and guidelines. Incorporated into the operation of the network are weekly span and zero checks and calibration audits. Two multipoint calibrations were conducted during 2009. The raw five minute real-time data generated by the network is subject to technical and logical quality control.

The network achieved an overall data capture rate of 87% for pollutant data. The overall data capture for meteorological data for 2009 was 90%. This meteorological data capture compares favourably with the target data capture of 90%.

All analysers were serviced during March 2009 by the Pollution Control Support technical team. The results of the multi point calibration audit shows excessive span drifts for NO_x monitors. The span drifts for SO₂ analysers at all stations were within range, except for Grosvenor which was slightly high. A major improvement in the quality of the data at Prospecton was noted for 2009 when compared to 2008. This was due to the effective maintenance and service that is undertaken. Low concentration gases and permeation tubes are being used to verify data for quality control purposes.

Air quality compliance was assessed by comparing the results of the monitoring with the limit values contained in SANS 1929. All stations recorded SO₂ annual averages below the guideline value of 19 ppb. The results highlighted industries as the major source of SO₂ in South Durban. This is further qualified by the pollution roses in Figures 4.17 – 4.21. This is evident at Southern Works (7 ppb), Settlers (7.5 ppb), Wentworth (8 ppb) and Jacobs Balfour (6 ppb). There is a notable downward trend over a five year period (as indicated in Figure 4.1) at all stations. There was a drastic reduction in the total number of 10-min SO₂ exceedances at all stations (17) in 2009 when compared to (67) 2008. There were no 10-min SO₂ exceedances at Southern Works. There was a significant reduction in the number of 10 minute SO₂ exceedances at Settlers and Wentworth when compared to the previous year. Two of the six exceedances recorded at Settlers were attributed to Engen and three were attributed to Sapref. No 24-hour exceedances were recorded for 2009.

TRS, though not classified as a priority pollutant, is being measured at Settlers and Southern Works. Southern Works recorded 1264 exceedances in 2009 and Settlers recorded 466 exceedances. Both stations have recorded an increase in the number of TRS exceedances. Southern Works once again proving to be the TRS hotspot in South Durban.

The monitoring results suggest that stations that are situated near high volume traffic area coupled with the regional aspects of particulate matter contribute significantly towards PM₁₀ and PM_{2.5} emissions. The Ganges station, located along the Chief Albert Luthuli Freeway recorded an annual average of 39.8 µg/m³ which is marginally below the annual limit value of 40 µg/m³. Southern Works PM_{2.5} annual average is 17.1 µg/m³ (guideline value is 25.0 µg/m³). The annual average at all stations confirms that PM₁₀ is at its threshold level in respect to health guidelines and therefore warrant ongoing interventions.

The behaviour of the NO₂ data closely resembled that of PM₁₀ in that traffic stations again recorded the highest values. This was evident at Ganges which recorded the highest annual averages (above the annual GLV) of 29.4 ppb. The other stations also recorded high values, although below the annual limit value of 21 ppb. CO, a known traffic pollutant was measured at the Warwick station. Although annual limit values for CO do not exist, 1-hour (26 ppm) and 8-hour (8.7 ppm) limit values do exist. No 1-hour and 8-hour exceedances were observed for 2009.

The other pollutant measured was O₃, which is classified as a secondary priority pollutant. O₃ is an indicator of photochemical reactions. Ozone has no annual limit value. However, based on the target values in Appendix 3, no 1-hour and eight 8-hour exceedances were recorded at Alverstone. The O₃ analyser at Wentworth was decommissioned during 2009 due to continued technical problems.

The measurements at the meteorological stations include a range of parameters such as wind speed, wind direction, ambient temperature, relative humidity, barometric pressure and net radiation. The wind roses confirm the north-easterly and south-westerly directions as being the dominant wind directions in the South Durban Basin.

Pollution roses for the year were constructed to indicate which prevailing sources are dominant. An analysis of the roses indicated that the highest SO₂ concentrations measured at Southern Works was from the direction of Mondi and Sapref. Similarly, the highest SO₂ concentrations measured at Settlers was from the direction of Engen and some contribution from the Jacobs area and Sapref. An analysis of the pollution rose at Wentworth indicates high concentrations from the SDB, Island View and the Jacobs area. Ganges and Prospecton shows high concentrations coming from the SDB and Jacobs area. This verifies that the industries from the SDB are the major source of SO₂ emissions.

The PM_{2.5} pollution rose at Southern Works indicate high concentrations from the direction of major roads, especially the Albert Luthuli Highway (M4). The Wentworth and Ganges PM₁₀ pollution roses show similar trends where high concentrations are from traffic sources and the Jacobs area. Traffic hotspots were the major contributors to high levels recorded at these stations. In addition the regional aspects of PM₁₀ and possible impact of sea salt on PM₁₀ levels must be taken into consideration when analysing these concentrations. Long-range transport of particles from other major cities and countries contribute to the particulate matter in eThekweni as well.

Industrial pollution is currently being addressed by issuing polluting industries with permits that set reduction targets to drive down emission levels. The schedule trade permitting process is a robust process and is certain to result in an improvement in overall air quality. The first phase in addressing traffic pollution is in progress where vehicle emissions testing will be undertaken via the Vehicle Emissions Testing project. Several municipal vehicles have been tested as a pilot project. Currently the bylaws are being developed by the eThekweni legal department. In addition, voluntary testing of fleet vehicles is being encouraged.



**REPORT TO COMMUNITY AND EMERGENCY
SERVICES COMMITTEE**

**AIR QUALITY MANAGEMENT WITHIN THE
ETHEKWINI MUNICIPAL AREA**

QUARTER

1 OCTOBER 2013 TO 31 DECEMBER 2013

ETHEKWINI MUNICIPALITY

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REPORT TO COMMUNITY AND EMERGENCY SERVICES COMMITTEE

AIR QUALITY MANAGEMENT WITHIN THE ETHEKWINI MUNICIPAL AREA FOR THE QUARTER 1 OCTOBER 2013 TO 31 DECEMBER 2013

Executive Summary

The purpose of this Report is to appraise the Community and Emergency Services Committee on Air Quality Management related matters within the eThekweni Municipal Area for the period 1 October 2013 to 31 December 2013.

The legislative mandate in terms of the Constitution and the National Environmental Management Air Quality Act, assigns the responsibility of:

- Ambient Air Quality Monitoring
- Implementation of Air Quality Management Plan
- Implementation of Atmospheric Emission Licensing
- To undertake Compliance Monitoring and Enforcement to the local municipality

The Health Unit has established a Monitoring network for the priority pollutants which consists of

- Continuous Air Monitoring Network
- Non Continuous Air Monitoring Network and
- Discrete Monitoring

Continuous Air Monitoring Network

The results for the continuous monitoring network for the quarter in question indicates that there is a downward trend for SO₂ emissions, however, five 10minute exceedances (526 ten minute SO₂ exceedances permitted) and two 1hour exceedances (88 one hour SO₂ exceedances are permitted) were recorded at 1 monitoring station (Settlers) for the period under review.

PM concentrations at all stations where found to be in compliance with the National Air Quality Standards (NAAQS).

Ozone concentrations were in compliance.

Oxides of Nitrogen (NO_x), no exceedances were recorded during this period.

Carbon Dioxide (CO), no exceedances of the NAAQS were recorded.

Benzene Monitoring no exceedances noted.

Non - Continuous Air Monitoring Network

The Bubbler Network, SO₂ concentrations recorded slightly elevated levels at South Bluff, Wentworth and Pinetown Civic Centre Sites, but still within compliance levels.

PM₁₀, all stations were in compliance within 24 hour limit values.

Discrete Monitoring

Dust fallout monitoring was undertaken in Phoenix Industrial Park. The dust fallout concentrations were significant when compared to the non-residential South African Standard value of 1200ug/m³ per 30 days.

Atmospheric Emission Licensing

In terms of the Legal mandate (NEM; AQA) the Health Unit received a total of 84 applications and a total of 46 licences were issued by 31 December 2013.

Air Quality Management Planning

The current AQMP is under review and the tender is expected to be awarded during April 2014.

Projects and Challenges

a. Expansion of the existing Ambient Monitoring Network

2 additional monitoring stations have been acquired and a further 2 will be purchased during the 2014/15 financial year. This will ensure that the Health Unit is monitoring ambient air comprehensively across the EMA.

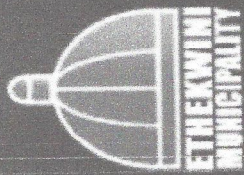
b. Environmental Management Inspectors (EMI's)

City officials have been trained as EMIs however the staff members concerned are still waiting for official designation as EMI's by the MEC.

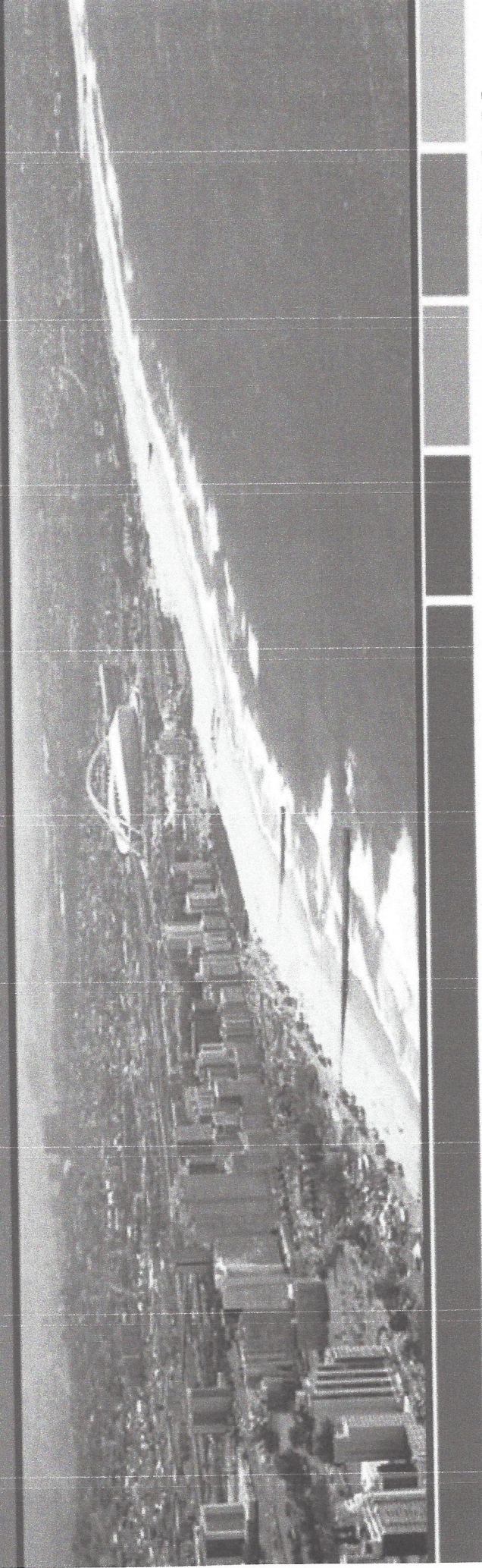
The Enforcement /Compliance Monitoring of AEL will thus remain as a challenge until the designation process is completed.

There is a current drive to expand the Continuous Monitoring Network throughout the EMA and it is envisaged that the passive monitoring network for VOC's, SO₂, and NO_x and dust fallout will be conservatively increased by 50% in the 2014/15 financial year.

Generally the Air Quality within the EMA for the quarter under review can be regarded as good.



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most caring and liveable city



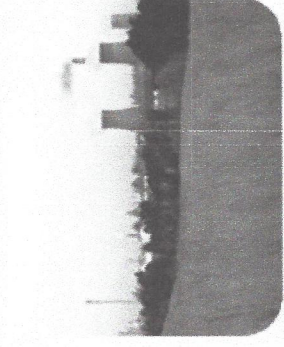
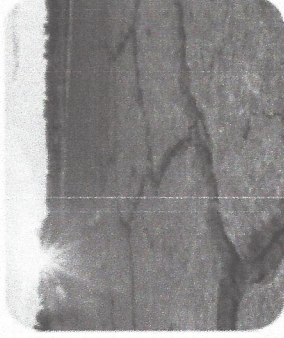
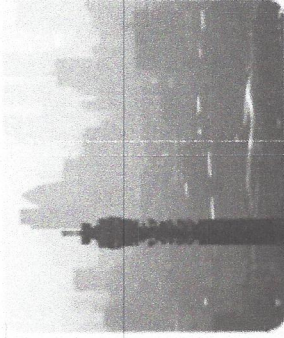
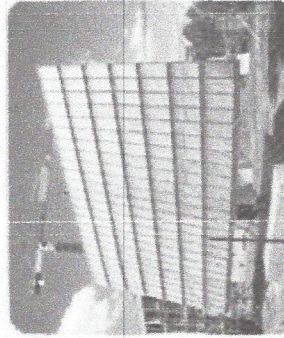
CURRENT STATE OF AIR QUALITY IN SOUTH DURBAN BASIN

Bruce Dale

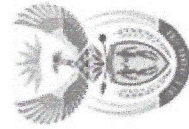
**STAKEHOLDER ENGAGEMENT, 19 September 2014
ENCHANTED GARDEN, CLAIRWOOD RACECOURSE**

2014 State of Air Report and National Air Quality Indicator

9th Annual Air Quality Governance
Lekgotla



Climate Change and Air Quality

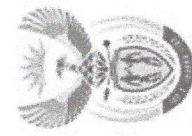
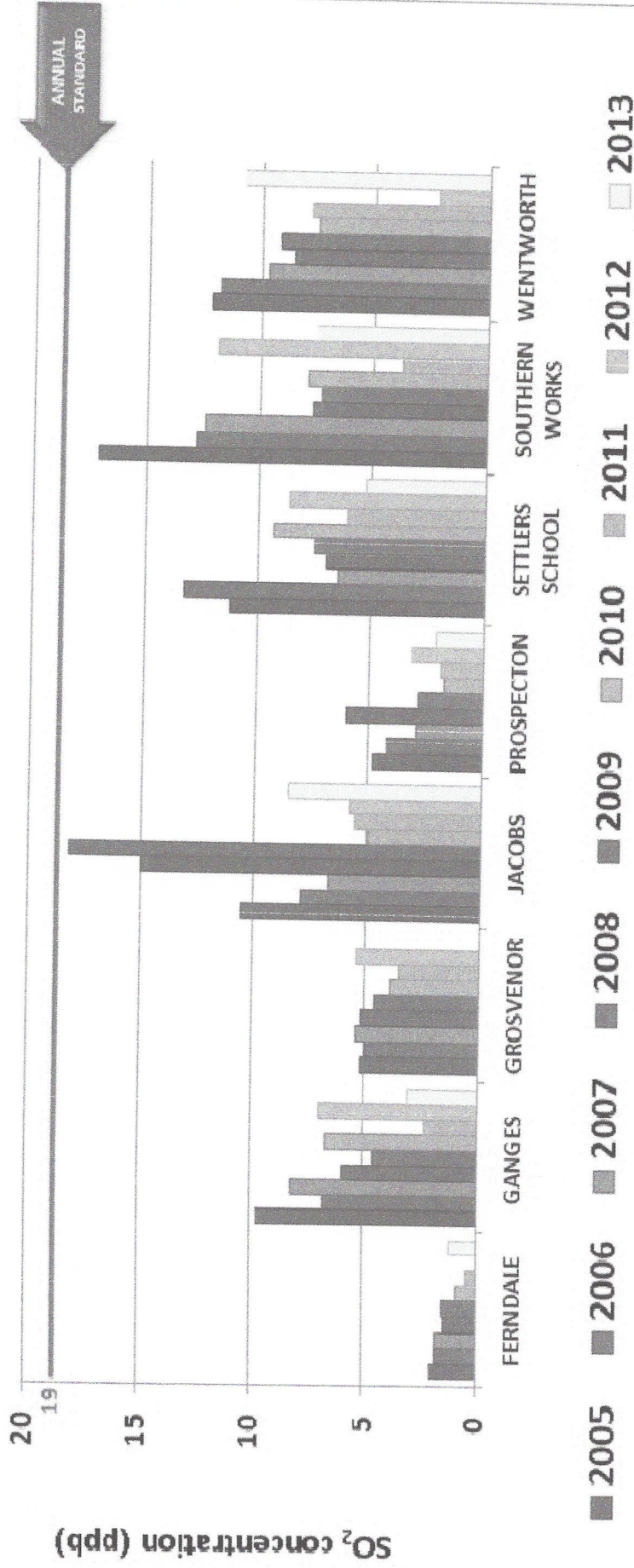


environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA



eThekweni

SO₂- 9 YEAR TREND



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