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Emissions monitoring reporting : a Licensing Authorities perspective

CITY HEALTH-AIR QUALITY MANGEMENT

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Making progress possible. **Together.**

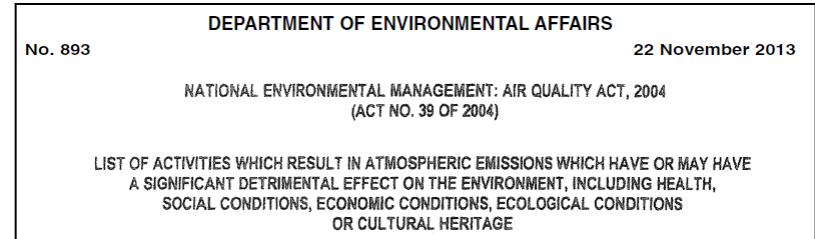
It's fair to say that Stack Emission Reporting has come a long way in a few short years



REQUIREMENTS FOR THE REPORTING OF EMISSION MEASUREMENTS TO THE LICENSING AUTHORITY IN TERMS OF SECTION

1. NEMAQA S21 Listed Activities (Government Notice No.893 dated 22 November 2013)

- I. Applicability of the notice
- II. Averaging period
- III. Emissions measurement
- IV. Compliance timeframes
- V. Compliance monitoring
- VI. Reporting requirements
 - I. Annual reporting
 - II. Stack emissions report
- VII. Failure to report



Part 2: General

APPLICABILITY OF THE NOTICE

- (1) MES are applicable to both **permanently and experimental** (pilot) **plants** with a **design capacity** equivalent to the one of a listed activity.
- (2) MES are applicable under **normal** operating conditions.

AVERAGING PERIOD

- (4) MES are expressed on a daily average basis, under normal conditions of **273 K, 101.3 kPa, specific oxygen percentage and dry gas.**

Part 2: General.... EMISSION MEASUREMENT

(5) **Measurements shall be** carried out in accordance with the standard sampling and analysis **methods listed in Annexure A of the Notice.**

i.e. ISO or British Standards or US EPA Methods

(6) Methods **other** than those contained in Annexure A may be used with the written **consent** of the National Air Quality Officer (NAQO).

(7) In seeking consent an **applicant** must **provide** the NAQO with any information **that supports** the **equivalence** of the method other than that contained in Annexure A

E.g. NIOSH or Passive survey monitoring cannot be used as a replacement method

Part 2: General.... COMPLIANCE TIME FRAMES AND POSTPONEMENT OF COMPLIANCE TIME FRAMES

COMPLIANCE TIME FRAMES

(8) **New plant** must comply with the **new plant** minimum emission standards as contained in Part 3 from **01 April 2010**.

(9) **Existing plant had to** comply with minimum emission standards for **existing plant** as contained in Part 3 by **01 April 2015**, unless where specified.

(10) **Existing plant** must comply with minimum emission standards for **new plant** as contained in Part 3 by **01 April 2020**, unless where specified.

POSTPONEMENT OF COMPLIANCE TIME FRAMES

(11) The National Framework for Air Quality Management states postponement applications can be made to NAQO...

The period for application for postponement from compliance with the existing plant standards has now lapsed.

Postponements from compliance with the NEW PLANT standards must be submitted 1 year before Standard comes into effect i.e. by 31 March 2019

Part 2: General.... COMPLIANCE MONITORING

COMPLIANCE MONITORING

Continuous emission monitoring:

Where required for a listed activity -

(a) the **averaging period** for compliance monitoring shall be expressed on a **daily average basis** or as prescribed in the Atmospheric Emission License.

(b) the system must **yield a minimum of 80% valid hourly average** values during the reporting period.

(c) the **system must be maintained and calibrated** as per the original equipment manufacturers' specifications.

(d) The **systems must be audited by a SANAS** accredited laboratory at least once **every two (2) years**.

COMPLIANCE MONITORING continued

Periodic emission monitoring for a listed activity -

(a) the **averaging period** for the purposes of compliance monitoring shall be expressed on a **hourly average basis** or as prescribed in the Atmospheric Emission Licence.

(b) emission measurement will be conducted in accordance with the prescribed methods in Annexure A of the Notice

(c) **measurements shall take place on**, at least, an **annual basis** unless otherwise prescribed in the Atmospheric Emission Licence.

(d) **sampling** will take place under **normal operating conditions** using the permitted feed-stock or raw material.

(e) **all tests** will be conducted by **SANAS accredited laboratories** or laboratories accredited by similar foreign authorities.

Valid Accreditation Certificates must be submitted with Monitoring report to Licensing authority

PART 2: GENERAL.... REPORTING REQUIREMENTS

Reporting Requirements

Legal Requirement:

(17) The Atmospheric Emission Licence holder shall submit an **emission report** in the form specified by the National Air Quality Officer to the Licensing Authority -

(a) **within one (1) year** of the date of publication

and

(b) **annually thereafter** unless otherwise more frequently prescribed in the Atmospheric Emission Licence.

(18) The report contemplated in paragraph (17) shall include-

(a) The **name, description** and license **reference number** of the plant as reflected in the Atmospheric Emission Licence.

PART 2: GENERAL.... REPORTING REQUIREMENTS continued

The Report must contain:

- The **name and address** of the **accredited measurement service-provider** that carried out or verified the emission test, including the test report produced by the accredited measurement service-provider; **This is the desired state of affairs – we are not there yet!**
- the **date and time (duration of sample runs)** on which the emission test was carried out; **i.e. the start and finish time of each sample run**
- a **signed declaration** by the Atmospheric Emission **Licence holder** to the effect that **normal operating** conditions were maintained during the emission tests;

REPORTING REQUIREMENTS continued

- the **total volumetric flow of gas**, expressed in normal cubic meters (**Nm³**) per **unit time and mass flow** (kg per unit time) being emitted during the emission test, **as the average of at least three (3) measurements per point source**;
- the **concentration or mass of pollutant** specified in the MES **as the average of at least three (3) measurements**; each measured over a **minimum** sample period of **60 minutes** and a **maximum** of **8 hours** to obtain a representative sample, and
- The report to specify and preferably give a short description of the method or combination of methods used for determining the flow rate and concentration.
- Specify the inherent uncertainty in the method and instrumentation

PART 2: GENERAL... CEM REPORTING REQUIREMENTS

Reports for CEMS shall further include -

- (i) **results of the spot measurements or correlation tests** carried out to verify the **accuracy** of the continuous emission measurements;
- (ii) the most recent correlation tests; and
- (iii) the **availability of the system** - i.e. the **number of full hours per annum** that valid results were obtained.

The Report must:

- explain all instances **where minimum emission standards were exceeded**
- **remediation measures to address non-compliances** and
- associated **implementation plans** aimed at ensuring that the **exceedances do not re-occur**.

A good working relationship is thus required between the testing house and the Licence holder.

Any other relevant information as required by the National Air Quality Officer from time to time.

Stack emission reporting: What Authorities want to see in practise:

- ✓ Report title page
- ✓ Client name and address and AEL Ref Number
- ✓ Testing house name, credentials and contact details
- ✓ Dated
- ✓ Table of Contents
- ✓ Executive Summary
- ✓ Compliance with MES or otherwise - No misleading please
- ✓ Listed Activity being operated
- ✓ Applicable MES
- ✓ Pollutants measured
- ✓ Sampling methods used as per Annexure A of Notice
- ✓ A description of the sampling equipment train; sample point location and compliance with prescribed methods
- ✓ For isokinetic sampling the percentage Isokinetic achieved i.e. to be less than 10% deviation under or over 100%

In practise we want to see:

- ✓ Deviations and reasons for such deviations
- ✓ Any process upsets during the sample runs
- ✓ Averaging period
- ✓ Signed statement by licence holder regarding Normal operating conditions raw materials and feedstock – **This report is a legal document!**
- ✓ Use unique Stack ID as quoted in AEL
- ✓ Emissions Testing results in tabular form
- ✓ Quote start and end time for each sample run for each point source
- ✓ Duct Parameters –
 - ✓ STP
 - ✓ Oxygen %
 - ✓ Gas Velocity (m/s)
 - ✓ Gas flow (m³/hr)
 - ✓ Gas Temperature
 - ✓ Moisture Content

In practise we want to see:

- ✓ Detailed findings
- ✓ Recommendations
- ✓ Plan of action and timeframes for rectifying non-compliances and re-sampling – **signed off by the licence holder – this could be an annexure to the report**
- ✓ Conclusions
- ✓ Annexures
- ✓ Calibration certificates of equipment
- ✓ SANAS Accreditation CC of Lab used

- ✓ Test Data – Average actual;
 - ✓ Average Dry STP,
 - ✓ Average Dry, STP, corrected O₂ %
- ✓ Volumetric flow (Nm³) & mass flow (Kg/unit of time)

CEMS Reporting

- Reporting requirements spelt out generally in S21 but also for the specific listed activity.
- AEL's will usually specify the reporting requirements and frequency for submission of CEMS reports
- The spot measurements report would need to comply with the basic principles spelt out for periodic emissions monitoring
- CEMS data should ideally be presented in graphical format showing daily compliance
- Calibration test results plotted graphically
- Supporting raw data should be made available on request

What can you expect from the Licensing Authority upon submission of a monitoring report

- An acknowledgement of receipt
- A commitment to assess, review and provide feedback

- Upon receipt we will:
 - As Technocrats charged with assessing compliance, we will firstly assess for compliance with the S21 reporting requirements
 - Assess all the methods used for correctness
 - Assess activities specified are as per the Listed activities spelt out in the AEL
 - Assess compliance with MES
 - Review against method uncertainties
 - Check to see that the results are normalised and corrected as required
 - Assess isokinetic % - as this influences sample results

What can you expect from the Licensing Authority upon submission of a monitoring report cont....

- Where your plant is not in compliance:
- You are in contravention of the S21 Notice and are thus legally compromised
- This would need to be urgently addressed
- If you have a Provisional AEL: this has big implications for the status of your licence which is only valid for a period of 1 year from the date of issue/commissioning.
- For PAEL's the Act prescribes that your plant must be in compliance for a minimum of 6 months
- If in compliance with MES and general compliance with your AEL conditions – your PAEL will be converted to a final AEL
- If not in compliance you have some challenges that will cost you financially
- A Licensing authority cannot issue your AEL
- You will need to apply to renew your PAEL in terms of S47 of NEMAQA

What can you expect from the Licensing Authority upon submission of a monitoring report cont....

- Where your plant is not in compliance:
- You may well then be subject to a EMI compliance inspection and subject to Administrative or criminal enforcement
- Its thus important to present a remediation plan and programme that is time bound.
- Spell out proposed plant changes / mitigation measures you wish to implement
- Make every effort to engage with Licensing Authority and get their buy-in on the plan
- Some aspects may trigger the need for a Variation of your AEL ! And require a BAR
- Once approved, stick to this plan.



CURRENT CHALLENGES FACING THE SOURCE MONITORING INDUSTRY

- Shortage of human resources
- Shortage of technical expertise
- Lack of training and certification facilities in the country
- Lack of infrastructure, e.g.. SANAS accredited laboratories (air samples), calibration facilities, etc.
- Lack of knowledge by industry with regards to source sampling requirements e.g.. proper sampling locations, necessity of process info /control parameters.
- Cost of equipment



AEL Holders must Plan sampling programme carefully

- Effectively there are a limited number of testing houses operating Nationally
- There are over a 1000 listed activities operating in the Country
- There are a limited number of SANAS accredited Labs
- **Secure an appointment and commission a testing house well before your AEL reporting dates are due – as it's a time consuming process**
- This is essential if you need to have a PAEL converted to an AEL

Or

- If you are to maintain compliance

STACK EMISSIONS REPORTING OF MEASUREMENTS – SOME EXPERIENCES TO DATE

Measurement reports required i.t.o AEL :

- Normal working conditions not stipulated
- Averaging period of measurements not as stipulated
- Measurements not in accordance with Schedule A methods
- Use of other methods not approved
- Incorrect pollutants measured for Listed activity being operated
- Reports not dated
- Reports not signed
- Late submissions after compliance deadline due dates
- Incorrect placement of sample ports
- Only a single sample port

A sample from a Listed Activity -Category 5 Report

- Incorrect or non-compliant instrumentation used for sampling method:
Eg Use of Dräger 150 MSI
- Use of sample trains for isokinetic sampling that do not comply with prescribed methodology
- Instruments used not stated in report

6.0. TEST METHODOLOGY

Emission measurements for criteria pollutants were carried out according to requirements of Schedule A of Section 21 (3)(a)(ii) of the Environmental Management Air Quality Act no. 39 of 2004.

Measurements were conducted according to the following methodology.

- | | | |
|------------------------------|---|--------------------|
| • Particulates | : | EPA Method No. 5 |
| • Sulphur Dioxide | : | EPA Method No. 6C |
| • Hydrogen Fluoride (HF) | : | EPA Method No. 13B |
| • Nitrogen Oxides | : | EPA Method No. 7E |
| • Total Hydrocarbons | : | EPA Method No. 18 |
| • Hydrogen Sulphide | : | Colorimetric |
| • Ammonia (NH ₃) | : | Colorimetric |
| • Velocity | : | EPA Method No. 2 |
| • Carbon Dioxide, Oxygen | : | EPA Method No. 3A |



From the same report...

5.0. AVERAGING PERIOD FOR MEASUREMENTS

The results of emission monitoring are expressed as a daily average and normal conditions of 273.15k, 101.3 kPa, dry gas

A snapshot from a Report for an Asphalt Plant:

- Quoted as a Controlled Emitter as opposed to a licensed Listed Activity

5. GENERAL CONCERN INFORMATION

5.1 Locality.

The plant is situated on Portland quarry outside Durbanville in the Western Cape, South Africa.

5.2 Concern activities

The concern is an asphalt operation and is administered under the Occupational Health and Safety Act 85 of 1993 with regards to health & safety.

The National Environmental Management - Air Quality Act No. 39 of 2004 is applicable on this factory – with specific reference to:

- Section 23(1) of The National Environmental Management Act: Air Quality Act, 2004;
- Government Gazette – Dated 28 March 2014 – Declaration of temporary asphalt plants as a controlled emitter and establishment of emission standards;

6. STANDARDS

Survey was done taking into account the National Environmental Management - Air Quality Act No. 39 of 2004 as stipulated above.

Point source Emission - The results of this survey was evaluated against the standards set by the Department of the Environment Affairs in legislation - Air Quality Act of 2004 as per Part 3(1) of the Government Gazette – Dated 28 March 2014 – Declaration of temporary asphalt plants as a controlled emitter and establishment of emission standards.

From the same report..

Table 2 – Emission results

Locality and pollutants	Sampling Time in Seconds	Stack Velocity (m/s)	Stack Pressure (Pa)	Stack Temp (°C)	Emission rate	Methodology Standard used
Stack no. 1						
Particulate matter	900	13.4	137.9	118.0	113.3mg/Nm ³	USEPA Method 5
Oxygen (O ₂)	-			-	-	-
Carbon Monoxide (CO)	-			-	-	-
Nitrogen Oxide (NO)	-			-	-	-
Nitrous Oxides (NO _x)	-			-	-	-
Sulphur Dioxide (SO ₂)	900			118.0	197ppm	EN 50379-1
Sampling date: 2017/10/30						
Sampling time: 07:15 to 10:31						
Observations: Normal operation						

Cat 4: Metallurgical Industry Report: dioxins & furans

First Sample Run (10h48 – 12h54)			Second Sample Run (14h06 – 16h12)			Daily Average	Emission Limit (ng I-TEQ/Nm ³) (10% O ₂)			
Concentration			Concentration					Mass Flow (mg/h)	Concentration	
(ng/Am ³)	(ng/Nm ³)	(ng/Nm ³) (10% O ₂)	(ng/Am ³)	(ng/Nm ³)	(ng/Nm ³) (10% O ₂)		(ng/Am ³)		(ng/Nm ³)	(ng I-TEQ/Nm ³) (10% O ₂)
0.80	0.90	20.67	0.70	0.79	18.14	0.002	0.31	0.35	8.09*	0.1

* Indicates concentration above minimum emission standards, Section 21 of the Air Quality Act, 2004, Subcategory 4.21 Metal Recovery.

Table 1: Emission results for dioxins and furans

Parameter	Units	Test 1	Test 2	Test 3	Average	
PCDD/PCDF	Actual	ng/m ³	0.022	0.026	0.027	0.025
	Actual Wet	ng/m ³	0.023	0.027	0.028	0.026
	NTP wet	ng/Nm ³	0.019	0.023	0.023	0.022
	NTP dry	ng/Nm ³	0.019	0.023	0.024	0.022 (0.1)
Total Emission Rate	ng/h	0.391	0.300	0.713	0.468	

OFFENCES

Offences (Section 51 of NEMAQA):

- (1) A person is guilty of an offence if that person—
- (e) contravenes or fails to comply with a condition or requirement of an atmospheric emission licence;
 - (f) supplies false or misleading information in any application for an atmospheric emission licence, or for the transfer, variation or renewal of such a licence;
 - (g) supplies false or misleading information to an air quality officer;**

NB If your stack emission testing reports are misleading the AQO it could have dire consequences!!

(3) A person performing a listed activity is guilty of an offence if air pollutants at concentrations above the emission limits, specified in an atmospheric emission licence, are emitted as a result of that activity.

PENALTIES

Penalties(Section 52 of NEMAQA):

(1) A person convicted of an offence referred to in section 51 is liable to a fine not exceeding **five million rand**, or to imprisonment for a period not exceeding **five years** and in the case of a **second or subsequent conviction**, to a fine not exceeding **R10 million** rand or imprisonment for a period not exceeding **10 years** or in both instances to **both** a fine and such imprisonment.

Conclusions

- Stack Testing reports have generally come a long way since 2010
- Some Testing houses are however still non-compliant with equipment used, methodology and reporting requirements
- AEL Licence holders must take ownership of these Stack emissions reports – You have paid good money for them and your ongoing operation as a listed activity depends on demonstrating compliance.
- Our Local/ Provincial Authority staff continue to developed knowledge and skill sets and errors that slipped through in the past are now being picked.
- Parliament has its eye on compliance monitoring of Industry and are directly holding authorities accountable for implementation of this function
- Ultimately our main task is to protect the receiving environment and ensure everyone's Constitutional rights are protected



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Thank You

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