



natref

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National Petroleum Refiners of South Africa (Pty) Ltd. (NATREF)

Annual Emission Report

July 2013 – June 2014

Prepared for

Fezile Dabi District Municipality

DECLARATION

Unless otherwise specified in this report, Natref certifies that the sampling campaigns for periodic emissions monitoring were conducted during normal plant operating conditions.

15-10-2014

Date

 P. CEBEKHULU
Specialist SHE: Environment

17/10/2014

Date


SHERQ Manager:

EXECUTIVE SUMMARY

The content of this report is in alignment with the requirements of section 7.7 of Natref's Atmospheric Emission Licence (AEL), which include the following:

- Pollutant emissions trends¹
- Greenhouse gas emissions
- Compliance audit reports
- Major upgrades projects (i.e. abatement equipment or process equipment)

The information pertaining to these items above are addressed in the relevant subsection in this report.

REFERENCE	FDDM-MET-2013-17
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¹ Please note that there are no pollutant emissions trends available for the initial report.

REPORT TITLE	Annual Emission Report
DATE SUBMITTED:	15 October 2014
PREPARED FOR:	Fezile Dabi District Municipality Free State Province (Licencing Authority)
PREPARED BY:	National Petroleum Refiners of South Africa: Jan Haak Road Sasolburg PO Box 234, Sasolburg 1947 Tel: +27 16 940 9111 E-mail: patrick.cebekhulu@natref.com
DESCRIPTION OF SITE (Erf)	Industrial zone, Sasolburg Northern Industries
INDUSTRY SECTOR	Petroleum Refinery
SITE COORDINATES	S26°48' 21.46" E027°51' 26.87"

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ACRONYMS

The following abbreviations appear in this report:

AEL	Atmospheric Emission License
APPA	Atmospheric Pollution Prevention Act
CO	Carbon monoxide
FDDM	Fezile Dabi District Municipality
GHG	Greenhouse gas
LDAR	Leak Detection and Repair
MES	Minimum Emission Standards (NEMAQA Section 21)
NO _x	Oxides of Nitrogen
NO	Nitrogen monoxide
NO ₂	Nitrogen dioxide
PM	Particulate Matter
SO ₂	Sulphur dioxides
SO ₂	Carbon dioxides
SRU	Sulphur Recovery Unit
US EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

1 INTRODUCTION

Based on the conditions stipulated within Natref's Atmospheric Emission License as well as the condition stipulated within Section 17 of the Minimum Emission Standards, Natref hereby submits its annual compliance monitoring report.

As per regulatory requirements, Natref's annual compliance monitoring program entails taking gas samples at its Main Stack bi-annually. Natref has also started monitoring the six small local stacks. VOC and isokinetic, together with inorganic gas emissions monitoring were conducted by independent service providers. The current service providers are not accredited since the accreditation system for stack sampling is not in place. These service providers however have expressed their desire to be accredited as soon as the accreditation system has been established.

A comparison with license conditions will be made as given in Tables 3.1.1 – 3.2.1 to demonstrate compliance with Natref's emission limits as specified within its Atmospheric Emission License.

2 SERVICE PROVIDERS

In accordance with Section 21 (GN 893:2013), C&M Consulting Engineers and LEVEGO were the independent companies who have been appointed by Natref to conduct the necessary emissions survey upon which this report is based. The results from the sampling campaign are presented in the relevant section of the report (results section).

2.1 C&M Consulting Engineers

The services provided by C&M for source emission testing are as follows:

- Basic stack emission testing
- Automatic Isokinetic stack sampling for compliance, commissioning, process control and efficiency testing
- Fugitive and area specific emission assessments
- Vent emission testing
- Reports based on analysis of dust, SO₂, NO₂, metals, VOCs, SVOCs, and H₂S.

Their contact details appear in Table 2.1.1 below

Table 2.1.1:

C & M CONSULTING ENGINEERS Contact details:	
Physical address	170 Watermeyer Street, Meyerspark
Postal address	PO BOX 74936 LYNNWOOD RIDGE PRETORIA 0040 South Africa
Telephone No:	+27 12 803 5124/5
Fax No	+27 12 803 5126
Email	carlo@airpolguys.com

2.2 LEVEGO

Levego specialise in the consulting and provision of stationary source, air quality and process off-gas measurements and supply of specialised source monitoring equipment.

Their main drive is to provide a service which meet customer requirements by utilising recognised international standards (such as ISO, B.S, EN and EPA).

Levego's members have over forty-five years combined experience in the field of air pollution monitoring and industrial pollution control.

Table 2.2.1: LEVEGO Contact details

LEVEGO Contact details	
Physical address	Building R6, Pinelands Site Ardeer Road, Modderfontein 1645
Postal address	PO Box 422, Modderfontein 1645
Telephone No:	+27 11 608 4148
Fax No	+27 011 608 2621
Email	info@levego.co.za

3 RESULTS

3.1 Pollutant emissions results:

Table 3.1.1: Total Particulates emissions results reported at NTP dry.

	Point source	Volumetric flow rate (Nm ³ /h)	Pollutant	Emission Rate (kg/h)	Concentration (mg/Nm ³)	Limit value on AEL (mg/Nm ³)	Sampling method	Date of Sampling
1	Main Stack	581 000	PM	59.5	108	120	USEPA Method 17	12&13 February 2014
2	B14001 Heater	7170	PM	0.051	8.10	120	USEPA Method 17	12 February 2014
3	B14002 Heater	4270	PM	0.018	4.45	120	USEPA Method 17	13 February 2014
4	B14005 Heater	23 600	PM	0.046	2.31	120	USEPA Method 17	14 February 2014
5	B14006 Heater	6700	PM	0.0061	0.956	120	USEPA Method 17	14 February 2014
6	B17004	Not measured as sample point was still to be installed. Results will be included in the next reporting cycle.						
7	B25001	Not measured as sample point was still to be installed. Results will be included in the next reporting cycle.						
8	FCC	Specialized task due to high temperature and pressure. Natref still sourcing a competent service provider.						

Table 3.1.2: Sulphur Dioxide emissions results reported at NTP dry.

	Point source	Volumetric flow rate (Nm ³ /h)	Pollutant	Acid Dew Point (°C)	Concentration (mg/Nm ³)	Limit value on AEL (mg/Nm ³)	Sampling method	Date of Sampling
1	Main Stack	581 000	SO ₂	149	902	1700	USEPA Method 8	12&13 February 2014
2	B14001 Heater	7170	SO ₂	119	18.3	1700	USEPA Method 8	12 February 2014
3	B14002 Heater	4270	SO ₂	83	0.209	1700	USEPA Method 8	13 February 2014
4	B14005 Heater	23 600	SO ₂	121	<0.145	1700	USEPA Method 8	14 February 2014
5	B14006 Heater	6700	SO ₂	99	1.26	1700	USEPA Method 8	14 February 2014
6	B17004	Not measured as sample point was still to be installed. Results will be included in the next reporting cycle.						
7	B25001	Not measured as sample point was still to be installed. Results will be included in the next reporting cycle.						
8	FCC	Specialized task due to high temperature and pressure. Natref still sourcing a competent service provider.						

Table 3.1.3: Oxides of Nitrogen (NOx as NO₂) emissions results reported at NTP dry.

	Point source	Volumetric flow rate (Nm ³ /h)	Pollutant	Concentration (mg/Nm ³)	Limit value on AEL (mg/Nm ³)	Sampling method	Date of Sampling
1	Main Stack	581 000	NO ₂	134	1700	Teledyne PEM9004 portable gas analyser	12&13 February 2014
2	B14001 Heater	7170	NO ₂	209	1700	Teledyne PEM9004 portable gas analyser	12 February 2014
3	B14002 Heater	4270	NO ₂	39.4	1700	Teledyne PEM9004 portable gas analyser	13 February 2014
4	B14005 Heater	23 600	NO ₂	123	1700	Teledyne PEM9004 portable gas analyser	14 February 2014
5	B14006 Heater	6700	NO ₂	133	1700	Teledyne PEM9004 portable gas analyser	14 February 2014
6	B17004	Not measured as sample point was still to be installed. Results will be included in the next reporting cycle.					
7	B25001	Not measured as sample point was still to be installed. Results will be included in the next reporting cycle.					
8	FCC	Specialized task due to high temperature and pressure. Natref still sourcing a competent service provider.					

3.2 Greenhouse gas emissions

Table 3.2.1: Greenhouse Gas (as CO₂) emissions results reported at NTP dry.

	Point source	Volumetric flow rate (Nm ³ /h)	Pollutant	Concentration (%)	Limit value on AEL	Sampling method	Date of Sampling
1	Main Stack	581 000	CO ₂	4.37	N/A	Isokinetic sampling of gas and GC/MS analyses	12&13 February 2014
2	B14001 Heater	7170	CO ₂	5.74	N/A	Isokinetic sampling of gas and GC/MS analyses	12 February 2014
3	B14002 Heater	4270	CO ₂	1.40	N/A	Isokinetic sampling of gas and GC/MS analyses	13 February 2014
4	B14005 Heater	23 600	CO ₂	6.38	N/A	Isokinetic sampling of gas and GC/MS analyses	14 February 2014
5	B14006 Heater	6700	CO ₂	5.09	N/A	Isokinetic sampling of gas and GC/MS analyses	14 February 2014
6	B17004	Not measured as sample point was still to be installed. Results will be included in the next reporting cycle.					
7	B25001	Not measured as sample point was still to be installed. Results will be included in the next reporting cycle.					
8	FCC	Specialized task due to high temperature and pressure. Natref still sourcing a competent service provider.					

Total Direct CO _{2eq} emissions as calculated	859 kton
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3.3 Compliance audit reports

The table below reflects findings from the compliance audit conducted by Shepstone & Wylie as per report dated 28 January 2013.

	Audit finding	Corrective action taken	Status
1.	Validity of Natref's provisional certificates firstly, the validity of the certificates under APPA prior to AQA coming into effect, and secondly, the validity of the certificates in terms of the transitional arrangements under AQA.	Natref's AEL application was pending at the time of the audit. The AEL replaces all provisional certificates as from 1 April 2012.	Natref received its AEL on the 31 st March 2014.
2	Non-compliance to MES 2010 regulations by 2015 and 2020.	Natref to engage with Authorities in the process of reviewing these emissions standards as it would be difficult to meet compliance within a short space of time (2013 – 2015).	The amended MES regulations were gazetted in November 2013 and Natref is seeking postponement of compliance due to insufficient time available to be able to comply by 1 st April 2015.
3	Leak detection and repair (LDAR) program approved by licensing authority to be instituted, within two (2) years following the date of publication of this Notice according to MES 2010.	During the time of the audit, the draft MES amendments referred to 1 January 2014 as the due date for LDAR approval even though the 2010 MES indicated 1 April 2012. Natref therefore did not meet the 1 April 2012 deadline. Natref has however sent the approval request to FDDM's Air Quality Officer and is waiting for response.	. Application lodged and decision pending.
4.	Submission of Annual Report according to AEL requirements.	Natref was submitting monthly reports and quarterly reports to Authorities and in the	This is the first Annual Report after the issuance of AEL in March 2014.

		absence of annual report due to AEL unavailability.	
5.	Non-compliance to VTAPA commitments of installing a high efficiency SRU and procurement of low sulphur crudes.	Natref shareholders have been procuring low sulphur crudes since 2009 as part of the required refinery crude mix notwithstanding the refinery design to upgrade heavy crude oils.	Natref's commitment to install a high efficiency SRU was aligned with the new clean fuels specification as the new SRU would have to be designed from the new Sulphur load from the new plants. Promulgation of the new fuel specification was however delayed and Natref had to postpone its SRU.
6.	Fezile Dabi District Municipality Municipal Health Services Bylaws 2009 requires that no person may conduct an offensive trade in or on any premises, except in terms of a permit authorising such trade. The offensive trade relevant to Natref's operations is "the refining or processing of petrol, oil or their products".	Natref is investigating this requirement.	Under investigation. The Municipality indicated that they will advise Natref of requirements once the Bylaws are implemented.
	The bylaws also prohibit any person from installing, altering, extending or replacing any fuel-burning equipment without prior written authorisation from the Council, which may only be given after consideration of the relevant plans and specifications.	The AEL has been issued by Fezile Dabi District Municipality which has to be aligned with the bylaws. Natref is investigating this requirement.	Under investigation. The Municipality indicated that they will advise Natref of requirements once the Bylaws are implemented.

	Fuel-burning is defined in the bylaws as any furnace, boiler, incinerator or other equipment, including a chimney: • designated to burn or capable or burning liquid, gas or solid fuel; • used to dispose of any material or waste by burning; • used to subject liquid, gas or solid fuel to any process involving the application of heat.		
	In response to odour emanating from its solar evaporation ponds, Natref has at times commissioned off-site disposal of spent caustic at registered landfill wastes able to receive hazardous waste to mitigate odour complaints originating from the solar evaporation ponds.	• Natref started investigating odour reduction options including odour masking. • Natref also installed enhanced evaporation system to assist in management of solar pond streams. • There is more focus from Operations on ensuring that incidents upstream do not impact API and downstream activities.	Programme in place

3.4 Major upgrades projects

Project description	Planned completion date	Status
Natref Clean Fuels II project entails improving the fuel specification by removing and reducing sulphur, aromatics and benzene during refining of petroleum products.	End of 2019	Project on hold pending Government decision.
New final product loading gantry. The aim of this project was to improve safety of employees, improve turnaround of transporter vehicles and minimize VOC's from the loading activities.	Natref commissioned its new loading gantry during the past two years.	Completed.

4 NON COMPLIANCE

Non-compliance description	Action to be implemented	Completion date	Status
None			

5 CONCLUSIONS

The results obtained from the periodic sampling represent a typical stable plant operation but could change with alterations in the process, raw material and operating conditions. Natref has its own challenges when considering the new 2013 MES requirements for Petroleum Industry.

- The overall isokinetic sampling efficiencies of all the measured stacks at Natref are within the specified limits of the prescribed methods of measurements.
- Natref still has to sample B17004 and B25001 stacks pending installation of sampling ports. These sample ports were installed during May/June 2014 DHC Block Turnaround and Inspection shutdown.
- Natref will report its FCC emissions by difference at the Main Stack if the local service providers cannot conduct this specialized sampling requirement.
- Natref is also investigating other sample points which need to be installed to meet future compliance to MES requirements.