

ESKOM KUSILE POWER STATION



DUST FALL-OUT MONITORING REPORT

JULY 2024

DOCUMENT CONTROL

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Client	Eskom Kusile Power Station
Site	Eskom Kusile Power Station R545 KENDAL/BALMORAL ROAD HAARTEBEEESFONTEIN FARM WITBANK 1035
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Distribution	1 x Eskom – Kusile Power Station

TABLE OF CONTENTS

EXECUTIVE SUMMARY	6
1. Dust Fall-out Survey	8
1.1. Introduction	8
1.2. General Overview	8
1.3. Survey Methodology and Instrumentation.....	8
1.4. Risk Assessment	11
1.4.1. Atmospheric dust sources.....	11
1.4.2. Dispersion pathways	12
1.4.3. Sensitive receptors.....	12
1.5. Fall-Out Dust Standards	12
2. Dust Fall-out Results	14
2.1 Results and Findings.....	14
2.1.1 Gravimetric dust fall-out results	14
2.2 Meteorological Conditions.....	22
3. Conclusions and Recommendations.....	23
3.1 Dust Monitoring Results	23
3.2 Weather Conditions for Monitoring Period:.....	23
3.3 Evaluation of the dust-fall results against statutory requirements:.....	23
3.4 Recommendations	24
4. Glossary and References	26
4.1 Glossary.....	26
4.2 References	26
5. ANNEXURE A	27
6. ANNEXURE B	32

STATEMENT OF LIMITATION

I, ILSE BOTHA, compiled this Dust Fall-out Monitoring Report for Eskom Kusile. The information contained in this document and any contained sub-documents herein, were compiled to represent the current information specific to the situation as measured, evaluated, and reported on at Kusile Power Station. As per agreement between Dakas Trading and Eskom, the layout of the document is done in the same manner as developed by Eskom Kusile Power Station with various consultants, and as received by Dakas Trading from Eskom Kusile Power Station for reporting purposes.

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ILSE BOTHA (*Pr. Sci. Nat.*)

Prepared by Report Author

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ISSUE Date: August 2024

PREMISES AND PURPOSE

PREMISES

The survey was initiated as part of the Scope of Work initiated by Eskom Kusile Power Station, authorised by:

MR. LESIBA KGOBE
ENVIRONMENTAL MANAGER
ESKOM – KUSILE POWER STATION
R545 KENDAL/BALMORAL ROAD
HAARTESBEEFONTEIN FARM
WITBANK
1035

PURPOSE

The purpose of the survey was to:

- Report on monitored dust deposition results with regards to dust generated from ESKOM Kusile production and / or construction activities with respect to environmental conditions;
- Provide an early warning of possible adverse impacts;
- Provide a measure of effectiveness of control measures;
- Provide independent verification that applicable legal standards and guidelines are being met;
- Recommend control measure(s) where necessary

EXECUTIVE SUMMARY

ENVIRONMENTAL DUST FALL-OUT MONITORING REPORT FOR ESKOM KUSILE POWER STATION

JULY 2024

The Dust fallout Monitoring was conducted during the period of 18th of June 2024 to the 16th of July 2024 at existing sampling monitoring network on the premises of Eskom's Kusile Power Station. This was done as part of the monthly dust fallout monitoring for Eskom Kusile Power Station.

The purpose of the dust fall-out monitoring survey is to report on the monitoring results regarding dust generated from Eskom's Kusile Power Station's production activities and the impact this dust has on the surrounding environment and sensitive receptors.

From the results of the dust fall-out monitoring conducted in the month of July 2024 for Eskom Kusile, it may be concluded that:

Gravimetric Results:

- Refer to **Section 2.1.1** for the detailed results.
- Of the 32 dust monitoring sampling points, 30 were sampled and analysed during the month of July 2024. The other two monitoring point that were not sampled was EK 06 (Ash Dump) and EK 24 (Construction Site - Point D) due to the buckets missing or damage. These missing buckets have been installed and monitoring to commence in the month of August 2024.
- Dust deposition concentrations at most of the sampling sites conform to the Eskom Kusile CEMP SES limit as well as the non-residential limit when evaluated against the dust deposition criteria stipulated by the NDCR, 2013, SANS 1929:2011 and SANS 1137:2012.
- The exception was the monitoring point EK15 (Coal Stockpile North) that exceeded the non-residential limit of the NDCR.
- The trends for the dust fall-out levels were measured from the 18th of June 2024 to the 16th of July 2024 period.
- It is also important to note that Regulation 7 of the NDCR, 2013, states that PM10 monitoring may be required if the dust-fall out standards has been exceeded.

Analytical Results:

- Refer to **Sections 2.1.2**.
- Chemical analyses (insoluble trace elements) were conducted for the July 2024 sampling run.
- No standards exist for trace elements in fall-out dust locally and abroad, however, extensive standards exist for trace elements for PM10 sampling.
- Trace elements of interest are the soluble component of arsenic, boron, barium, cadmium, chromium, lanthanum, manganese, molybdenum, lead and antimony, since these elements or their compounds are the most likely to be absorbed through inhalation (Gijima, 2023). Of these elements, only chromium and manganese were analysed for May.
- The data for the trace elements analyses is included in **Table 8**.

Meteorological Conditions

The dominant wind directions during daytime were south-east, south-south-east and north-west. During the night, the most frequent directions were east, east-south-east and south. Winds from all other directions were infrequent during day and night and wind speed remained low.

Recommendations

- Actions recommended to limit / reduce dust include the following:
 - Increased volume and frequency of dust suppression on unpaved roads.
 - Increase volume/duration and frequency of dust suppression on the ash dump and coal stockyard.
 - Reduced vehicle speeds on dry, unpaved roads.
 - All loads on coal vehicles should be covered or not to be overfilled.
 - Increase cleaning of haulage vehicles.
 - Dust suppression at open and exposed areas around the ash dump.
- Actions required in terms of dust monitoring:
 - Keep a register of the required monthly sampling localities to ensure all required localities are reported on.
 - Names of sampling localities should be kept constant and cannot change.
 - Find the points that have not been found, or alternatively, if stolen, replace these points. If theft remains a problem, it should be considered to remove these from the monitoring plan.
 - Dust fall-out monitoring should continue as scheduled to determine trends in future.
 - Exact dates of sampling should be noted in the field report.
 - Sources of likely fugitive dust generation and emission sources should be identified, and dust suppression should be done at known dust sources (where possible).
 - Any dust and air quality complaints should be recorded, including the date and time, weather information at the time of the complaint and the area of the complaint.
 - Update the monitoring plans / figures for the reports to indicate all new points, and to remove discontinued points (if applicable).
- Ensure that all trace elements of interest, especially those that are likely to be absorbed through inhalation, are analysed for as part of the trace elements analyses.

1. DUST FALL-OUT SURVEY

1.1. Introduction

Dakas Trading (Pty) Ltd ("Dakas") was appointed by Eskom Kusile Power Station to conduct monthly dust fall-out and noise monitoring and reporting. Reports need to be compiled monthly, after which an annual report concluding the year's results should also be compiled.

The purpose of the dust fall-out monitoring survey is to report on the monitoring results with regard to dust generated from Eskom's Kusile Power Station's production activities and the impact this dust has on the surrounding environment and sensitive receptors.

Samples were taken at the preselected sampling sites as provided by Eskom on and nearby the premises of Kusile Power Station.

This report now serves as the report for July 2024 for the sampling conducted by Dakas at Eskom Kusile Power Station, with the timeframe stretching from the 18th of June until the 16th of July 2024. This sampling period constituted 30 ±2 days, from the last bucket placed by the service provider, Dakas, in June 2024 until the dust monitoring survey bucket removal / change was conducted by Dakas in July 2024 as part of the monthly dust fall-out survey for Eskom's Kusile Power Station.

1.2. General Overview

Refer to the *Fall-out Dust Monitoring Survey Report No. 19404* (October 2014) for the following:

- Statutory Requirements
- Glossary & References

1.3. Survey Methodology and Instrumentation

Fall-out dust samples were collected at strategic pre-selected sampling sites of Eskom Kusile Power Station, as well as several new sites that were established in March 2024. Refer to **Annexure A** for Google Earth images showing sampling locations as provided by Eskom.

The American Society for Testing and Materials (ASTM) Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter), Reference No. ASTM D 1739 – 98 (2010) was used for the purpose of this survey.

Equipment and procedure:

Dustfall is to be measured using the standard dust bucket method (Aquatico, 2024). The dust bucket method comprises the use of a bucket and a bucket-stand, which is set up in priority dustfall areas.

Single bucket fall-out dust sampling units were used to collect fall-out dust (> 30µm to < 100 µm) samples from the ambient environment. Each sampling station consists of the following items:

- 5 litre plastic bucket (with lid)
- Bucket container
- Windshield for bucket container
- Collapsible supporting stand of approximately 2 metres in height
- Safety pin
- Stand base secured with rocks or bricks on the ground

The standard sampling procedure is usually performed over a period of approximately 30 ± 2 days.

As listed above, the stand, for the container, which will hold the top of the container, is at a height of 2m above ground. It also includes a wind shield constructed in accordance with **Figure 1**. Experiments indicate that much better precision is obtained when this simple aerodynamic shield is provided, and that there is a wide variability in the concentration of particles subject to settling at heights of less than 2m (Aquatico, 2024).

Regarding the container, an open-topped cylinder not less than 150mm [6in] in diameter with height not less than twice its diameter (Aquatico, 2024). Containers should be made of stainless steel or weatherproof plastic. They shall be capable of accepting legible, weatherproof, identification markings. A tight-fitting lid is needed for each container.

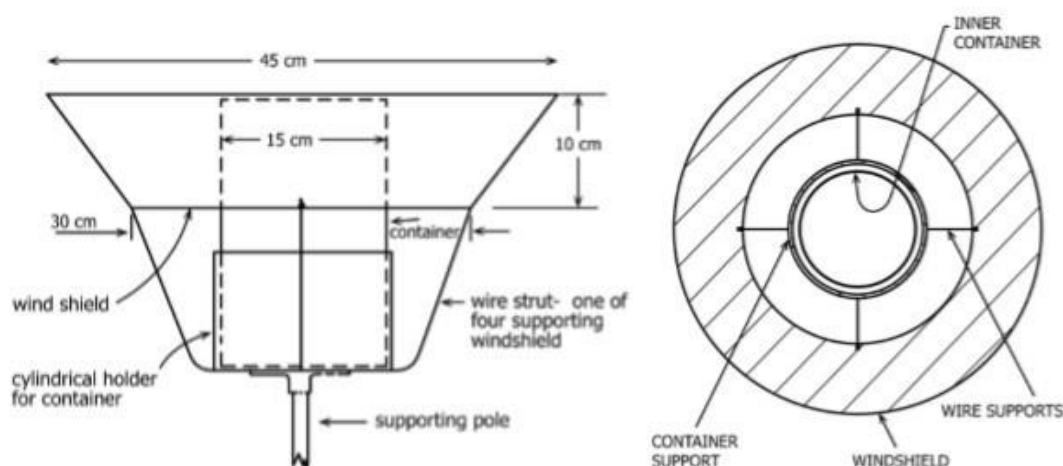


Figure 1: Dust stand specifications according to ASTM -D1739 – 1998 (2017) (as cited IN Aquatico, 2024).

The bucket is left exposed in the field for one calendar month to environmental conditions (30 ± 2 days).

Sample Analysis:

Buckets that have been exposed to field conditions for the monitoring period are returned to the laboratory and the buckets are rinsed with deionised water to remove residue from the sides of the bucket. The bucket contents, including the rinsed water, are filtered through a coarse (>1 mm) screen to remove insects and other coarse organic detritus. The sample is then filtered through a pre-weighed paper membrane to remove the insoluble fraction, or dustfall. The residue and filter are dried, and gravimetrically analysed to determine the insoluble fraction (dustfall) (Aquatico, 2024).

The dustfall results for the monitoring period (usually 30 ± 2 days) are divided by the amount of sampling days for that period and in this way, the average dustfall per day is expressed in mg^2/day (Aquatico, 2024).

Samples for the month of July 2024 were analysed by Yanka Laboratories. Results were obtained from this SANAS accredited Testing laboratory, No. T0647.

Gravimetric Analysis:

The gravimetric weighing technique was used to determine the total dust concentration of samples. Gravimetric weighing was performed by means of an electronic balance scale, which indicates numerical values up to the fifth decimal of a gram.

Dust monitors that are subject to the dustfall limits set out by the National Dust Control Regulations of 2013, can be either of the following:

1. Residential monitors- means any dust monitor situated within an area classified for residential use as per the local town planning scheme.
2. Non-Residential monitors - means any dust monitor situated within an area not classified for residential use as per the local town planning scheme.

A valid calibration certificate can be obtained for evaluation purposes from Yanka Laboratories.

Chemical Analysis:

Dust fall-out samples including the dissolved and undissolved trace element content are analysed by ICP MS in accordance with EPA method 6010C, NIOSH Method 7303 and OSHA Method ID-125G (Gijima, 2024).

For the July 2024 sampling period, these analyses were performed on the dust samples collected and results are included in this report.

1.4. Risk Assessment

1.4.1. Atmospheric dust sources

Sources of atmospheric dust emission associated with the construction and operational phases of Kusile Power Station (as cited IN Gijima, 2023) include:

- Stack Emissions (Fly Ash) from the generation units.
- Fly ash and dust from the ash dumps.
- Coal dust from the coal stockpiles and conveyor systems.
- Dust generated by heavy and light duty vehicles moving around on dirt roads.
- Dust generated by construction vehicles and construction activities that is still ongoing onsite of Kusile Power Station.

Other offsite sources of atmospheric dust emissions that may contribute to dust emissions measured onsite at Kusile Power Station (as cited in Gijima, 2023) include:

- Agricultural activities.
- Dust from coal mines surrounding Kusile Power Station.
- Quarry and crusher plant situated to the north-east of Kusile Power Station.
- Fly ash from stack emissions and the ash dump at Kendal Power Station situated 19km to the south of Kusile Power Station.
- Metallurgical and Ferrochrome plants and smelters in Emalahleni situated 30 km to the east of Kusile Power Station.

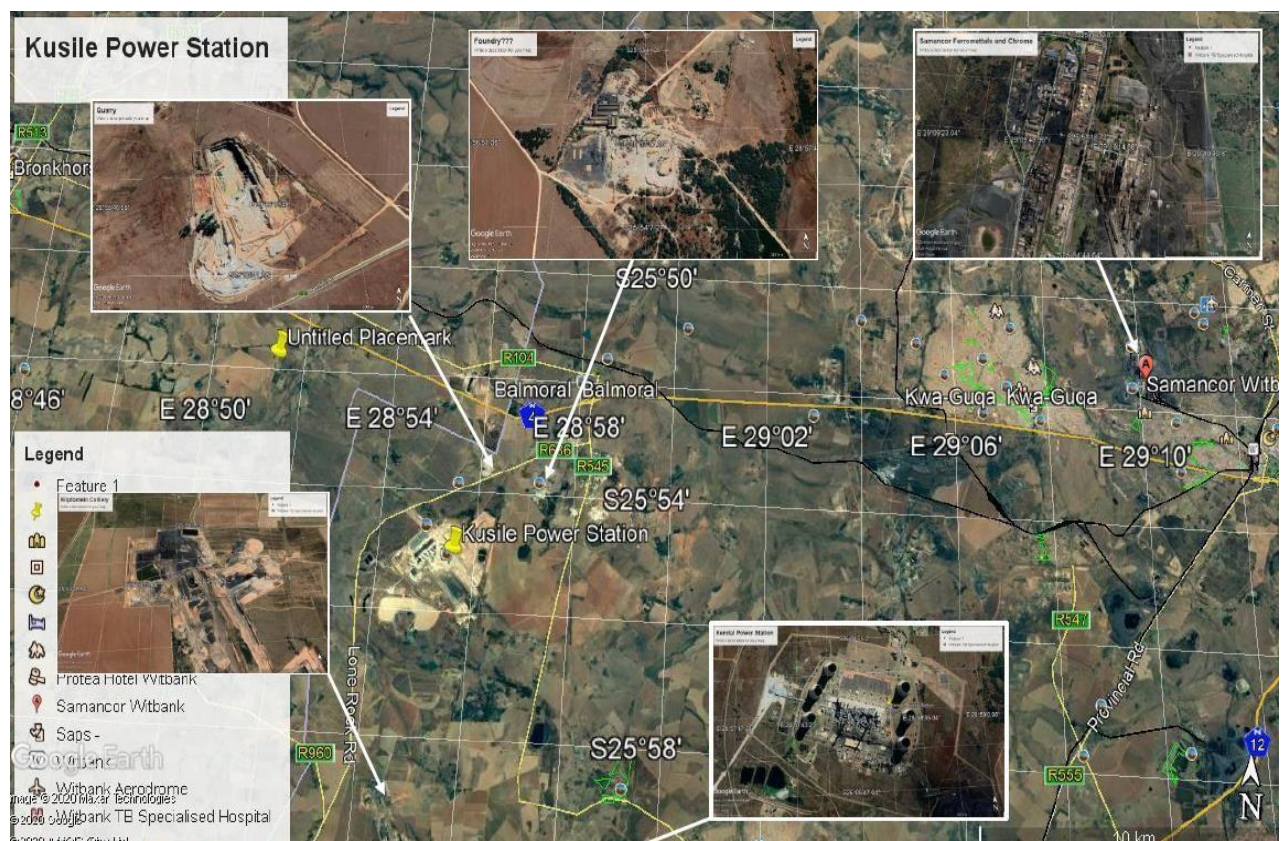


Figure 2: Industries and mines around the Eskom Kusile Power Station (Google Earth Image)

1.4.2. Dispersion pathways

Based on historic meteorological data for typical winter months (July to August), it indicates increased frequency of north-westerly winds in the Witbank region. During typical summer months (December to February), an increase in the frequency of easterly winds has been observed. Autumn and winter months are associated with a greater frequency of calm wind conditions, with the smallest number of calms occurring during spring and summer months (as cited in Gijima, 2023).

1.4.3. Sensitive receptors

Given that the power station will be associated with low level emissions (e.g., from mining and ashing operations) and elevated emissions (power station stacks), Kusile has the potential of impacting on receptors in the near and medium fields. Residential areas in the immediate vicinity of the operations include Phola and Ogies located 10-18 km east, with smaller populated areas of Voltargo, Cologne, Klippoortjie, Madressa, Witcons, Saaiwater, Tweefontein, Klipplaat, etc. The largest residential development within a 30km radius is Witbank (as cited in Gijima, 2023).

Refer to the Air Quality Impact Assessment report (Report No.: APP/06/NMS-01 Rev 0.2) for more details regarding emission source parameters, regional and mesoscale dispersion potential of the area, as well as illustrations depicting the distribution of sensitive receptors around the Kusile site.

1.5. Fall-Out Dust Standards

Measured results obtained were evaluated against the South African National Standard (SANS) 1929:2011 Particulate Fall-out Guideline limits. Refer to **Table 1** for the applicable standards on fall-out dust.

Table 1: Four-band scale evaluation criteria for dust deposition (SANS 1929:2011)

Band number	Band description label	Dust fall rate, D (mg/m ² /day, 30-day average)	Comment
1	Residential	D < 600	Permissible for residential and light commercial
2	Industrial	D ≤ 1200	Permissible for heavy commercial and industrial
3	Action	1200 < D ≤ 2400	Requires investigation and remediation if two sequential months lie in this band, or more than three occur in a year
4	Alert	D > 2400	Immediate action and remediation required following the first incident of the dust fall rate being exceeded. Incident report to be submitted to the relevant authority

The table indicates the targets and thresholds of the different bands and the permitted frequency within one reporting year. In terms of the SANS 1929 Particulate Fall-out Guideline a dust fall-out rate (measured in mg/m²/day over a 30-day average) exceeding 600 mg/m²/day

is still permissible for heavy commercial and industrial areas. However, when the rate falls within the 1200-2400 mg/m²/day bracket (which is within the Action Band) for two sequential months or if this occurs more than three times a year, the situation requires investigation and remediation. Whenever the dust fall-out rate exceeds 2400 mg/m²/day (which is within the Alert Band) immediate action and remediation is required following the first incidence of the dust fall-out rate being exceeded. Incident reports should then be submitted to the relevant authority.

The following table provides the limits and requirements as provided by the National Dust Control Regulations (NDCR) of 2013.

Table 2: South African National Dust Control Regulations, 2013

RESTRICTION AREAS	DUSTFALL RATE (D) ⁽¹⁾	FREQUENCY OF EXCEEDANCE
Residential Areas	D < 600	Two within a year, no two sequential months ⁽²⁾
Non-residential areas	600 < D < 1200	Two within a year, no two sequential months ⁽²⁾
Notes: (1) Averaged over 1 month (30±2-day average) (mg/m ² /day) (2) Per dust-fall monitoring site.		

The table below, indicates the acceptable dust control rates as per the National Environmental Management Air Quality Act, 2004 (Act No. 36 of 2004) (NEM: AQA) National Dust Control Regulations.

Table 3: Acceptable dust control rates as per the NEM:AQA National Dust Control Regulations, 2013.

Restriction Areas	Dust fall rate, D (mg/m ² /day, 30 day average)	Permitted frequency of exceeding dust fall rate
Residential area	D < 600	Two within a year, not sequential months.
Non-residential area	600 < D <1200	Two within a year, not sequential months. (Complies with the Eskom Kusile's CEMP SES limit.)

2. DUST FALL-OUT RESULTS

2.1 Results and Findings

The results of this dust fall-out monitoring survey, performed during the period of the 18th of June to the 16th of July 2024 at the respective locations are discussed in the executive summary, and as per site location in **Annexure A**. Refer to the tables and graph in this section with relevant sub-sections in this regard.

2.1.1 Gravimetric dust fall-out results

Refer to **Table 4, 5, 6 and 7 and 8** for the results of the dust fall-out monitoring survey, performed during the period of 18 June to 16 July 2024, a 30±2 days sampling period. Dust monitors that are subject to the dustfall limits set out by the NDCR, can be either of the following:

- Residential monitors- means any dust monitor situated within an area classified for residential use as per the local town planning scheme.
- Non-Residential monitors - means any dust monitor situated within an area not classified for residential use as per the local town planning scheme.

Gravimetric results discussion:

- Of the 32 dust monitoring sampling points, 30 were sampled and analysed during the month of July 2024. The other two monitoring point that were not sampled was EK 06 (Ash Dump) and EK 24 (Construction Site - Point D) due to the buckets missing or damage. These missing buckets have been installed and monitoring to commence in the month of August 2024.
- Dust deposition concentrations at most of the sampling sites conform to the Eskom Kusile CEMP SES limit as well as the non-residential limit when evaluated against the dust deposition criteria stipulated by the NDCR, 2013, SANS 1929:2011 and SANS 1137:2012.
- The exception was the monitoring point EK15 (Coal Stockpile North) that exceeded the non-residential limit of the NDCR.
- The trends for the dust fall-out levels were measured from the 18th of June 2024 to the 16th of July 2024 period.
- It is also important to note that Regulation 7 of the NDCR, 2013, states that PM10 monitoring may be required if the dust-fall out standards has been exceeded.

2.1.2 Chemical Analytical Results:

- Refer to Sections 2.1.3.
- Chemical analyses (insoluble trace elements) were conducted for the July 2024 sampling run.

- No standards exist for trace elements in fall-out dust locally and abroad, however, extensive standards exist for trace elements for PM10 sampling.
- Trace elements of interest are the soluble component of arsenic, boron, barium, cadmium, chromium, lanthanum, manganese, molybdenum, lead and antimony, since these elements or their compounds are the most likely to be absorbed through inhalation (Gijima, 2023). Of these elements, only chromium and manganese were analysed for July 2024.
- The data for the trace elements analyses is included in Table 8.

Table 4: Dust Fall-Out results for Eskom Kusile Power Station – 18 June 2024 to 16 July 2024

SAMPLE & FILTER NUMBERS	MEASUREMENT LOCATION AND ZONING	MEASURED FALLOUT DUST (mg/m ² /day)	INTERPRETATION OF FALLOUT DUST DEPOSITION
EK01	Contractor Yard Non-residential	233	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 272, trending down
EK02	Perimeter South Non-residential	1008	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 484.10, trending up
EK03	Relocation North Non-residential	200	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 213.50, trending down
EK04	Perimeter West Non-residential	206	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 328.67, trending down
EK05	Raw Water Reservoir 1 Non-residential	324	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 340.30, trending up
EK06	Ash Dump Non-residential		No sample Annual average (previous 12 months) = 421, trending down
EK07	Raw Water Reservoir 2 Non-residential	275	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 237.70, trending down
EK08	HV Yard Non-residential	294	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 333.70, trending up
EK09	Perimeter East Non-residential	298	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 253.67, trending down
EK10	Perimeter West Non-residential	431	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 343, trending up
EK11	Ash Dump West Non-residential	251	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 342, trending up
EK12	Ash Dump North Non-residential	679	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 444, trending up
EK13	Ash Dump East Non-residential	1020	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 492, trending up
EK14	Coal Stockpile Southwest Non-residential	731	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 445, trending up
EK15	Coal Stockpile North Non-residential	1206	Monitoring point do not conform to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 723.4, trending up
EK16	Coal Stockpile East Non-residential	987	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 645, trending up

*Refer to Table 1 for colour coding explanations.

Table 5: Dust Fall-Out results for Eskom Kusile Power Station – 18 June 2024 to 16 July 2024

SAMPLE & FILTER NUMBERS	MEASUREMENT LOCATION AND ZONING	MEASURED FALLOUT DUST (mg/m ² /day)	INTERPRETATION OF FALLOUT DUST DEPOSITION
EK17	Next to farm offices Non-residential	257	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 202.6, trending up
EK18	Air quality machine Non-residential	708	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 270.0, trending up
EK19	Next to farm gate Non-residential	502	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 383.0, trending up
EK20	Next to farm accommodation Non-residential	146	Monitoring point conforms to CEMP SES limit and NEM: AQA non-residential standard Annual average (previous 12 months) = 295.0, trending up

Table 6: Dust Fall-Out results for Eskom Kusile Power Station – 18 June 2024 to 16 July 2024

SAMPLE & FILTER NUMBERS	MEASUREMENT LOCATION AND ZONING	MEASURED FALLOUT DUST (mg/m ² /day)	INTERPRETATION OF FALLOUT DUST DEPOSITION
EK21	Construction Site - Point A Non-residential	252	Annual average = 399, trending up, conforming to the CEMP SES limit and NEM: AQA non-residential standard
EK22	Construction Site - Point B Non-residential	592	Annual average = 326, trending up, conforming to the CEMP SES limit and NEM: AQA non-residential standard
EK23	Construction Site - Point C Non-residential	341	Annual average = 337, trending up, conforming to the CEMP SES limit and NEM: AQA non-residential standard
EK24	Construction Site - Point D Non-residential	monitoring point not located/displaced by construction during sampling period	Annual average = 239, conforming to the CEMP SES limit and NEM: AQA non-residential standard
EK25	Construction Site - Point E Non-residential	335	Annual average = 250, trending up, conforming to the CEMP SES limit and NEM: AQA non-residential standard
EK26	Construction Site - Point F Non-residential	261	Annual average = 321, trending up, conforming to the CEMP SES limit and NEM: AQA non-residential standard

Table 7: Dust Fall-Out results for Eskom Kusile Power Station – 18 June 2024 to 16 July 2024

SAMPLE & FILTER NUMBERS	MEASUREMENT LOCATION AND ZONING	MEASURED FALLOUT DUST (mg/m2/day)	INTERPRETATION OF FALLOUT DUST DEPOSITION
TP 01	TOPIGS Farm Non-residential	242	Conforms to CEMP SES limit and NEM: AQA non-residential standard
TP 02	TOPIGS Farm Non-residential	133	Conforms to CEMP SES limit and NEM: AQA non-residential standard
TP 03	TOPIGS Farm Non-residential	224	Conforms to CEMP SES limit and NEM: AQA non-residential standard
GHB 01	GHB Farm Non-residential	346	Conforms to CEMP SES limit and NEM: AQA non-residential standard
GHB 02	GHB Farm Non-residential	170	Conforms to CEMP SES limit and NEM: AQA non-residential standard
GHB 03	GHB Farm Non-residential	220	Conforms to CEMP SES limit and NEM: AQA non-residential standard

Note

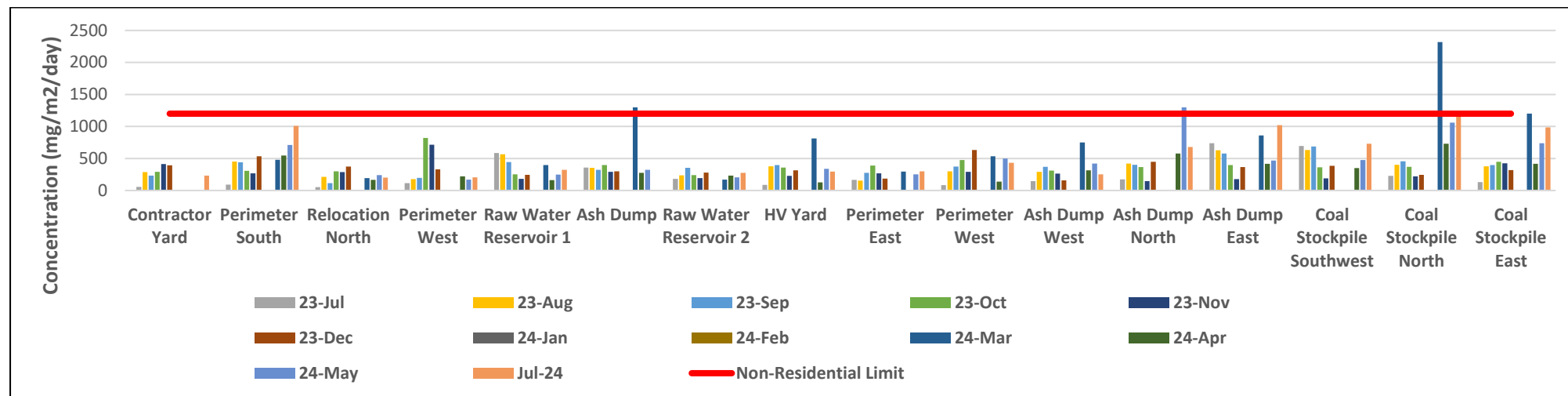
Green	Conforms to CEMP SES limit and NEM: AQA non-residential standard
Red	Monitoring point do not conform to CEMP SES limit and NEM: AQA non-residential standard

Table 8: Insoluble Trace-Elements Analysis Results for Eskom Kusile Power Station – 18 June 2024 to 16 July 2024

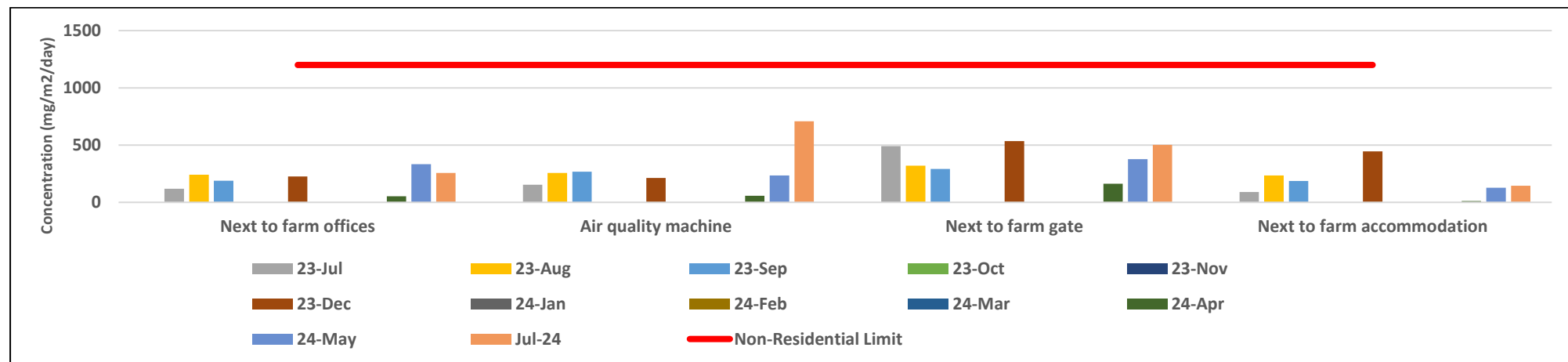
Site	Temperature	Ortho Phosphate	Silicon	Sulphate	Aluminium	Chromium	Hexavalent Chromium	Copper	Iron	Manganese	Nickel	Vanadium	Zinc
	°C	mg P/l	mg Si/l	mg SO4/l	mg Al/l	mg Cr/l	mg Cr/l	mg Cu/l	mg Fe/l	mg Mn/l	mg Ni/l	mg V/l	mg Zn/l
EK02	21.00	0.05	119	11.1	28.6	0.60	<0.02	0.17	19.7	0.31	0.01	0.10	0.10
EK03	21.00	0.11	106	12.2	43.8	1.12	<0.02	0.11	22.4	0.43	0.02	0.18	0.16
EK04	21.00	0.29	71.2	8.19	26.1	1.06	<0.02	0.17	11.2	0.33	<0.01	0.09	0.10
EK05	21.00	0.06	109	14.1	41.0	3.31	<0.02	0.19	22.0	0.50	0.02	0.20	0.15
EK06	21.00	0.11	115	11.3	40.4	1.06	<0.02	0.14	21.2	0.48	0.03	0.18	0.13
EK07	21.00	0.09	102	9.40	31.2	0.91	<0.02	0.09	15.2	0.36	<0.01	0.14	0.10
EK08	21.00	0.13	86.4	27.7	44.7	0.97	<0.02	0.14	32.9	0.77	0.02	0.14	0.11
EK09	21.00	0.07	112	11.9	39.8	1.27	<0.02	0.37	22.6	0.40	0.02	0.17	0.31
EK10	21.00	0.10	102	18.9	46.3	0.37	<0.02	0.13	16.0	0.45	<0.01	0.09	0.10
EK11	21.00	0.06	101	16.9	41.7	0.44	<0.02	0.18	16.9	0.46	<0.01	0.10	0.08
EK12	21.00	0.10	96.3	12.8	48.5	0.30	<0.02	0.13	13.9	0.43	<0.01	0.07	0.07
EK13	21.00	<0.03	101	13.6	43.9	0.46	<0.02	0.23	26.2	0.42	0.01	0.13	0.09
EK14	21.00	0.08	93.0	18.4	48.0	0.54	<0.02	0.18	21.5	0.51	0.02	0.10	0.19
EK15	21.00	0.10	111	14.7	47.4	0.38	<0.02	0.18	16.9	0.46	<0.01	0.10	0.11
EK16	21.00	<0.03	111	12.0	38.4	0.68	<0.02	0.16	20.6	0.38	0.02	0.11	0.11
EK17	21.00	0.14	127	9.88	30.3	0.86	<0.02	0.10	19.8	0.27	<0.01	0.13	0.15
EK18	21.00	0.14	105	11.1	44.2	0.74	<0.02	0.12	18.4	0.37	0.01	0.13	0.15
EK19	21.00	0.36	104	12.7	43.1	1.27	<0.02	0.20	20.1	0.49	0.02	0.16	0.17
EK20	21.00	0.04	43.5	6.60	19.5	1.28	<0.02	0.12	11.5	0.28	0.02	0.15	0.12
TP 01	21.00	0.18	70.1	12.0	23.5	0.96	<0.02	0.13	24.1	0.57	0.02	0.11	0.17
TP 02	21.00	0.09	62.6	11.0	19.4	1.56	<0.02	0.15	20.5	0.44	0.05	0.13	0.20
TP 03	21.00	<0.03	1.36	<0.5	0.51	0.06	<0.02	0.16	0.59	0.01	<0.01	<0.01	0.03
GHB 01	21.00	<0.03	42.4	5.32	14.5	1.33	<0.02	0.14	9.76	0.23	<0.01	0.10	0.07
GHB 02	21.00	<0.03	65.5	7.60	20.3	0.82	<0.02	0.08	12.7	0.29	<0.01	0.09	0.10
GHB 03	21.00	<0.03	98.5	8.78	23.8	0.67	<0.02	0.11	15.0	0.28	<0.01	0.09	0.10

Note: There are currently no established environmental limits for trace element in fall out dust, against which to compare the analytical results determined in this survey.

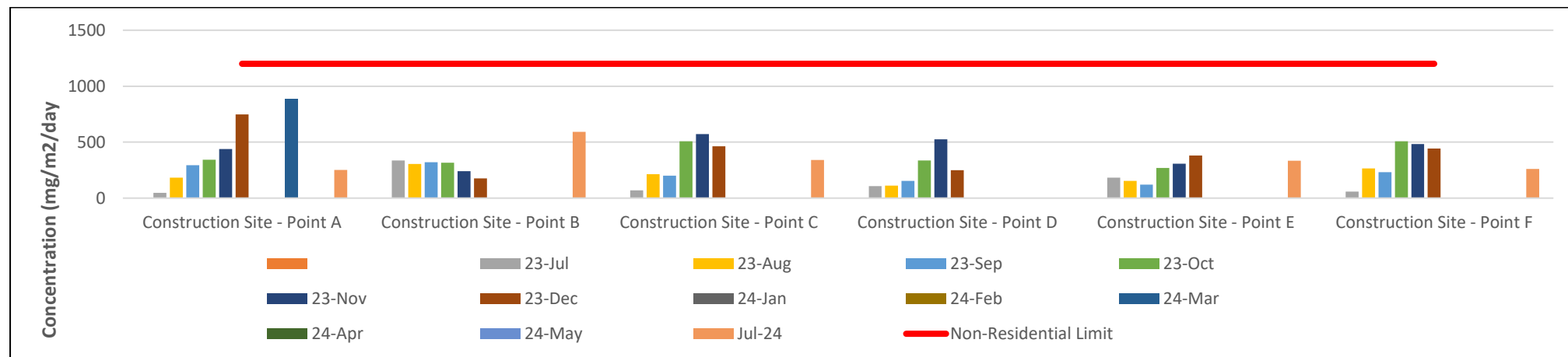
Graph 1: Dust Fall-Out results for Eskom Kusile Power Station – 18 June 2024 to 16 July 2024



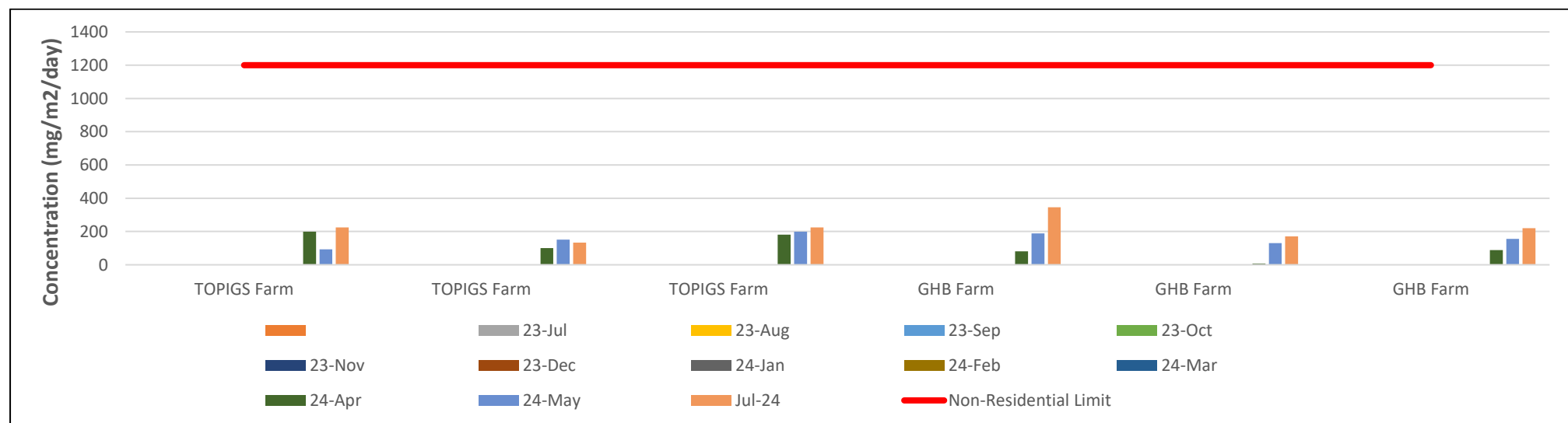
Graph 2: Dust Fall-Out results for Eskom Kusile Power Station – 18 June 2024 to 16 July 2024



Graph 3: Dust Fall-Out results for Eskom Kusile Power Station – 18 June 2024 to 16 July 2024



Graph 4: Dust Fall-Out results for ESKOM Kusile Power Station – 18 June 2024 to 16 July 2024



2.2 Meteorological Conditions

The dominant wind directions at Phola monitoring station during the day were south-west, west, west-north-west and north-west. During the night, the dominant wind directions were east-south-east, south-east and south-south-east. The monitoring station is south-east of Kusile power station.

The distributions of wind direction and wind speed for daytime and night-time hours for the reporting period are summarised on polar diagrams. The centre of the wind rose depicts the position of the air quality monitoring site. The positions of the spokes in the polar diagram represent directions from which the wind was blowing. The length of the segment indicates the percentage of the time the wind blew from that direction and the speed in the various categories are denoted by colours and width.

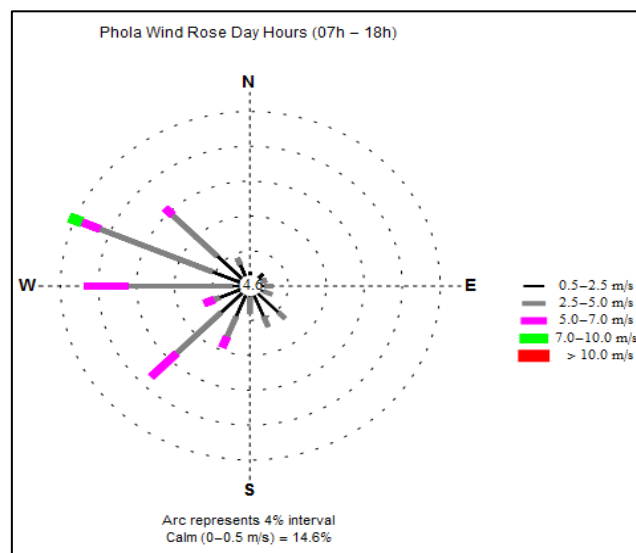


Figure 4: Chicken Farm Wind Rose for Eskom Kusile for the Month of July 2024 -day time (07h – 18h).

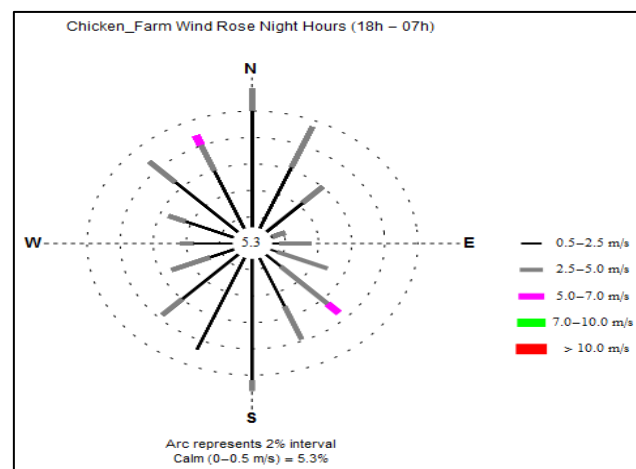


Figure 5: Chicken Farm Wind Rose for Eskom Kusile for the Month of July 2024 – night-time (18h – 7h).

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Dust Monitoring Results

The results of this dust fall-out monitoring survey, performed for the month of July 2024 (during the period of 18 June 2024 to 16 July 2024) at the respective locations are reflected in the executive summary and in Section 2.1. Refer to the Table 1 and the graph in Figure 3 in this regard.

3.2 Weather Conditions for Monitoring Period:

The dominant wind directions at Chicken Farm monitoring station during the day were west-south-west, west-north-west and north-west. During the night, the dominant wind directions were north, north-east, south and north-west. The monitoring station is south of Kusile power station.

3.3 Evaluation of the dust-fall results against statutory requirements:

- **EK01 - Contractor Yard – Point conforms to CEMP SES limit and non-residential standard.**
- **EK02 - Perimeter South – Point conforms to CEMP SES limit and non-residential standard,** No action required.
- **EK03 - Relocation North – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK04 - Perimeter West – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK05 - Raw Water Reservoir 1 – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK06 - Ash Dump – No Sample.**
- **EK07 - Raw Water Reservoir 2 – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK08 - HV Yard – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK09 - Perimeter East – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK10 - Perimeter West – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK11 - Ash Dump West – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK12 - Ash Dump North – Point conforms to CEMP SES limit and non-residential standard (Action Band);** No action required.
- **EK13 - Ash Dump East – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK14 - Coal Stock Pile South West – Point conforms to CEMP SES limit and non-residential standard;** no action required.
- **EK15 - Point do not conforms to CEMP SES limit and exceeds non-residential standard (Action Band);** action required to improve dust suppression and ensure compliance.

- **EK16 - Coal Stock Pile East** – **Point conforms to CEMP SES limit and non-residential standard**; no action required.
- **EK17 - Next to farm offices** – **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **EK18 - Air quality machine** – **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **EK19 - Next to farm gate** – **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **EK20 - Next to farm accommodation** – **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **EK21 – Construction Site - Point A** - **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **EK 22 – Construction Site - Point B** - **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **EK 23 – Construction Site - Point C** - **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **EK 24 – Construction Site - Point D** - **No sample.**
- **EK 25 – Construction Site - Point E** - **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **EK 26 – Construction Site - Point F** - **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **TP 01 - TOPIGS Farm** – **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **TP 02 - TOPIGS Farm** – **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **TP 03 - TOPIGS Farm** – **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **GHB 01 - GHB Farm** – **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **GHB 02 - GHB Farm** – **Conforms to CEMP SES limit and non-residential standard**; no action required.
- **GHB 03 - GHB Farm** – **Conforms to CEMP SES limit and non-residential standard**; no action required.

3.4 Recommendations

Based on measured dust deposition and the mitigation requirements specified in the Eskom Kusile CEMP SES documentation, the following recommendations can be made:

- Actions recommended to limit / reduce dust include the following:
 - Increased volume and frequency of dust suppression on unpaved roads.
 - Increase volume/duration and frequency of dust suppression on the ash dump and coal stockyard.
 - Reduced vehicle speeds on dry, unpaved roads.
 - All loads on coal vehicles should be covered or not to be overfilled.
 - Increase cleaning of haulage vehicles.
 - Dust suppression at open and exposed areas around the ash dump.
- Actions required in terms of dust monitoring:
 - Keep a register of the required monthly sampling localities to ensure all required localities are reported on.

- Names of sampling localities should be kept constant and cannot change.
- When a new site is established, that site will obtain a new name. If a site is moved, the original site name will become discontinued and a new name will be assigned to the new locality.
- Find the points that have not been found, or alternatively, if stolen, replace these points. If theft remains a problem, it should be considered to remove these from the monitoring plan.
- Dust fall-out monitoring should continue as scheduled to determine trends in future.
- Exact dates of sampling should be noted in the field report.
- Sources of likely fugitive dust generation and emission sources should be identified and dust suppression should be done at known dust sources (where possible).
- Any dust and air quality complaints should be recorded, including the date and time, weather information at the time of the complaint and the area of the complaint.
- Update the monitoring plans / figures for the reports to indicate all new points, and to remove discontinued points (if applicable).
- Ensure that all trace elements of interest, especially those that are likely to be absorbed through inhalation, are analysed for as part of the mineralogy analyses.

4. GLOSSARY AND REFERENCES

4.1 Glossary

NONE

4.2 References

- American Society for Testing and Materials (ASTM), 2010. Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter), Reference No. ASTM D 1739 – 98 (2010)
- Department of Environmental Affairs (DEA) 2013. National Dust Control Regulations, 2013.
- Gijima Occupational Hygiene and Environmental Service. 2023. Fall-out Dust Monitoring Final monthly report for ESKOM Kusile Power Station. Report no. 25461 Rev.00 SR.
- National Environmental Management Act, 1998 (Act 107 of 1998).
- National Environmental Management Air Quality Act & Regulations, 2004 (Act 39 of 2004).
- Environmental Conservation Act & Regulations, 1989 (Act 73 of 1989).
- South African National Standard (SANS) 1929:2011. The Standard test method for Particulate Fall-out Guideline.
- South African National Standard (SANS) 1137:2012. The Standard test method for collection and measurement of dust fall (Settleable Particulate Matter).

5. ANNEXURE A

SAMPLE SITE LOCATION

SAMPLE LOCATION COORDINATES FOR DUST FALLOUT AT ESKOM KUSILE POWER STATION

MAP KEY	SITE NUMBER	MEASUREMENT LOCATION AND ZONING	LOCATION COORDINATES
1	EK - 01	Contractor Yard Non-residential	25° 54' 30.204"S 28° 55' 43.098"E
2	EK - 02	Perimeter South Non-residential	25° 55' 50.981"S 28° 56' 6.644"E
3	EK - 03	Relocation North Non-residential	25° 54' 26.249"S 28° 53' 51.766"E
4	EK - 04	Perimeter West Non-residential	25° 56' 31.200"S 28° 54' 16.300"E
5	EK - 05	Raw Water Reservoir 1 Non-residential	25° 55' 29.700"S 28° 56' 10.900"E
6	EK - 06	Ash Dump Non-residential	25° 56' 45.94"S 28° 55' 39.542"E
7	EK - 07	Raw Water Reservoir 2 Non-residential	25° 54' 31.060"S 28° 56' 23.86"E
8	EK - 08	HV Yard Non-residential	25° 54' 43.779"S 28° 54' 41.946"E
9	EK - 09	Perimeter East Non-residential	25° 53' 55.300"S 28° 56' 21.600"E
10	EK - 10	Perimeter West Non-residential	25° 55' 40.79"S 28° 53' 38.69"E
11	EK - 11	Ash Dump West Non-residential	25° 55' 55.67"S 28° 53' 56.52"E
12	EK - 12	Ash Dump North Non-residential	25° 55' 41.24"S 28° 54' 44.35"E
13	EK - 13	Ash Dump East Non-residential	25° 56' 08.36"S 28° 55' 27.22"E
14	EK - 14	Coal Stockpile southwest Non-residential	25° 55' 44.29"S 28° 55' 25.82"E
15	EK - 15	Coal Stockpile North Non-residential	25° 55' 23.23"S 28° 55' 35.46"E
16	EK - 16	Coal Stockpile East Non-residential	25° 55' 33.47"S 28° 55' 49.97"E
17	EK - 17	Next to farm offices Non-residential	25° 59' 39.89"S 28° 56' 19.66"E
18	EK - 18	Air Quality Machine Non-residential	25° 58' 43.46"S 28° 56' 35.57"E
19	EK - 19	Next to Farm Gate Non-residential	25° 56' 51.36"S 28° 57' 56.75"E
20	EK - 20	Next to Farm Non-residential	25° 56' 45.67"S 28° 57' 35.54"E

MAP KEY	SITE NUMBER	MEASUREMENT LOCATION AND ZONING	LOCATION COORDINATES
21	EK – 21	Construction Site - Point-A Non-residential	25° 57' 37.45"S 28° 53' 51.26"E
22	EK – 22	Construction Site - Point B Non-residential	25° 57' 32.82" S 28° 52' 52.87" E
23	EK – 23	Construction Site - Point C Non-residential	25° 59' 14.29" S 28° 53' 28.96" E
24	EK – 24	Construction Site - Point D Non-residential	25° 58' 37.98" S 28° 53' 56.50" E
25	EK – 25	Construction Site - Point E Non-residential	25° 57' 52.90" S 28° 53' 54.07" E
26	EK – 26	Construction Site - Point F Non-residential	25° 58' 14.54" S 28° 53' 54.51" E
27	TP01	TOPIGS Farm Non-residential	25° 54' 24.59" S 28° 52' 12.86" E
28	TP02	TOPIGS Farm Non-residential	25° 54' 45.36" S 28° 50' 03.88" E
29	TP03	TOPIGS Farm Non-residential	25° 53' 00.10" S 28° 51' 15.40" E
30	GHB01	GHB Farm Non-residential	25° 51' 03.87" S 28° 56' 23.32" E
31	GHB02	GHB Farm Non-residential	25° 51' 44.25" S 28° 56' 01.36" E
32	GHB03	GHB Farm Non-residential	25° 51' 05.44" S 28° 55' 56.72" E

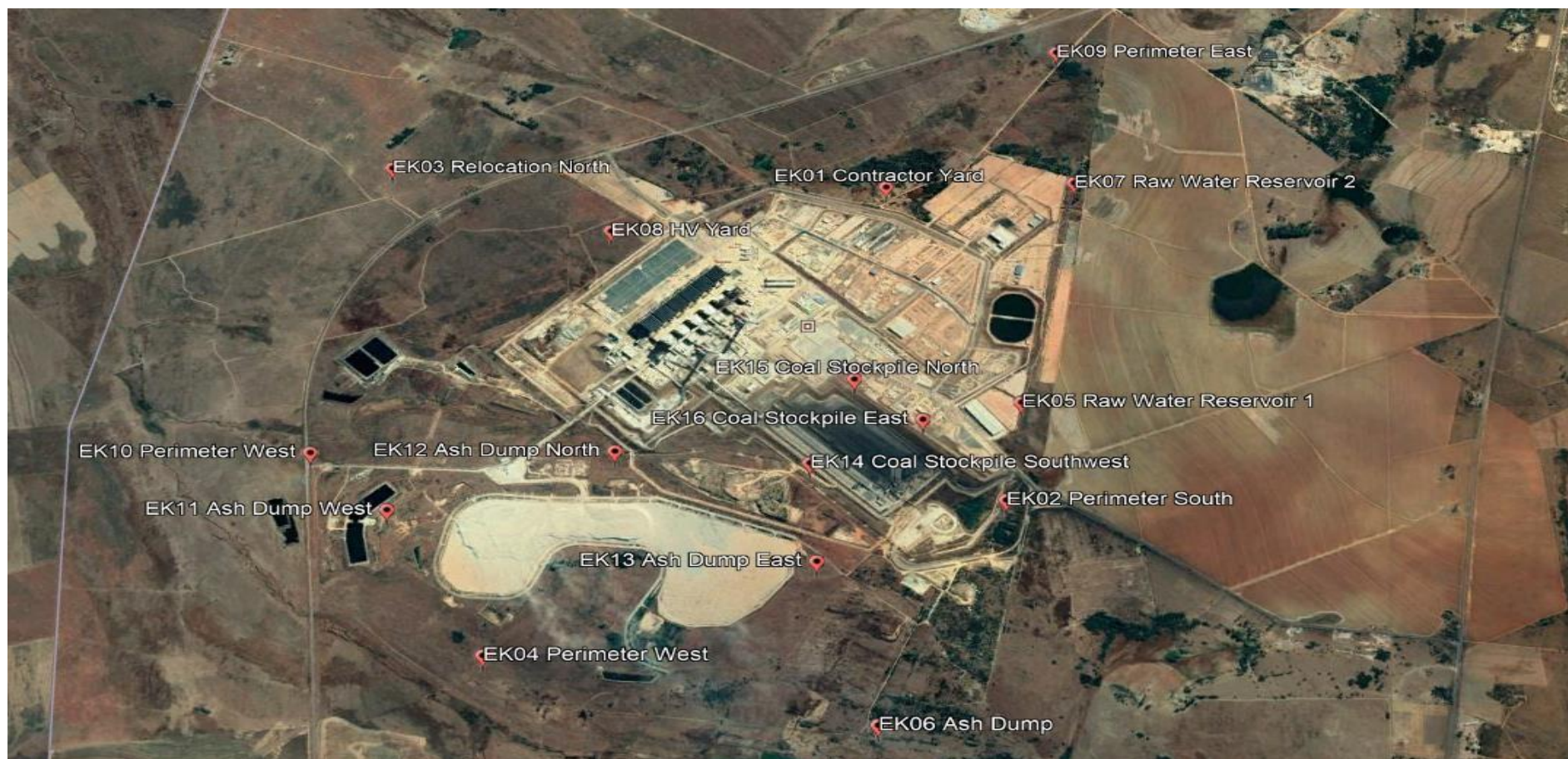


Figure 3: Eskom Kusile satellite image of sampling locations (Google Map Image)



Figure 4: Eskom Kusile satellite image of sampling locations and surrounds (Google Map Image).

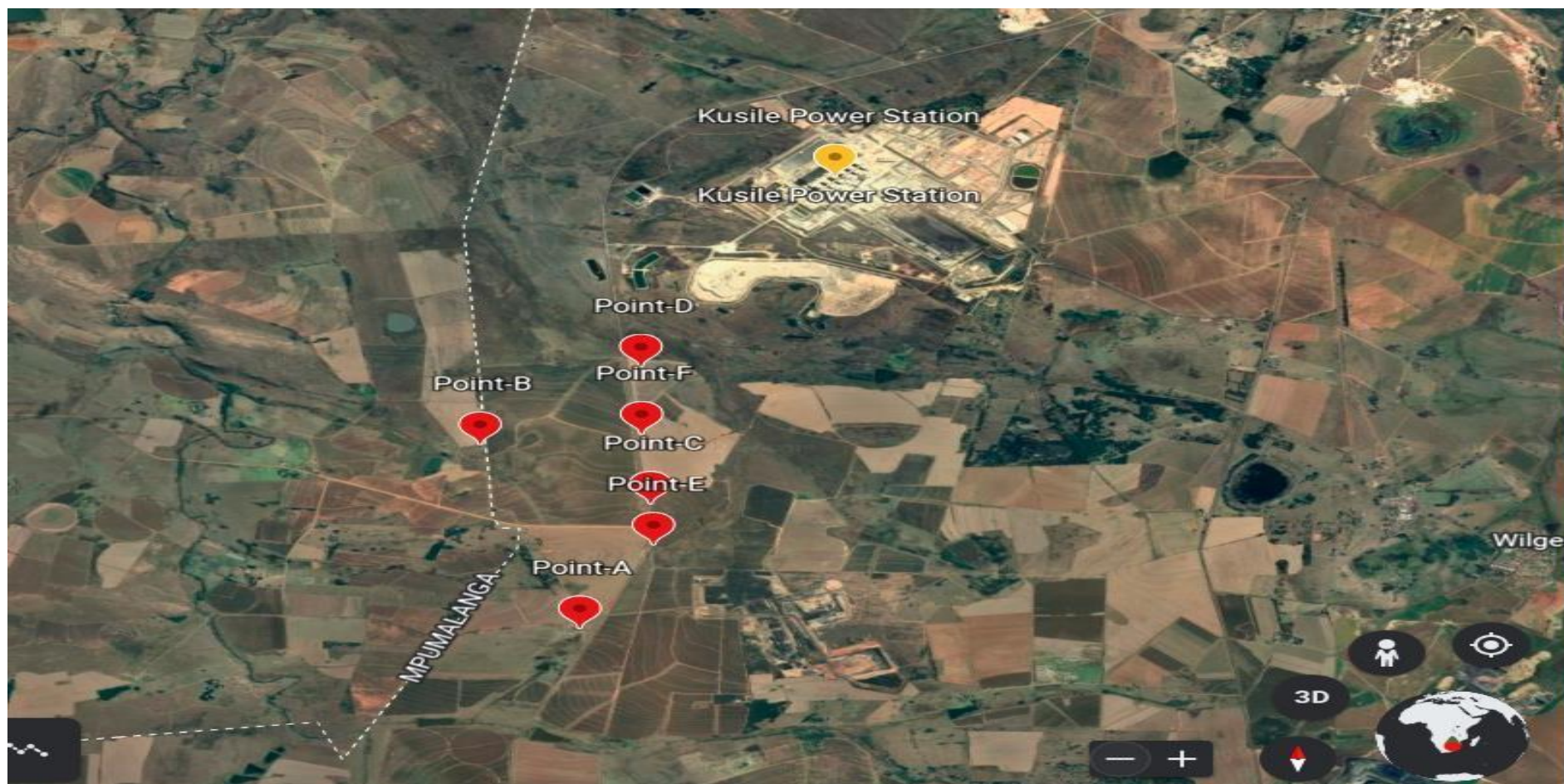



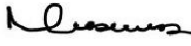


Figure 5: Eskom Kusile satellite image of sampling locations and surrounds - farms (Google Map Image).

6. ANNEXURE B

Environmental Scientist's
Professional Registration Certificate

 <p>SACNASP South African Council for Natural Scientific Professions</p>	
<p>herewith certifies that</p> <p>Ilse Botha</p> <p>Registration Number: 400041/10</p> <p>is a registered scientist</p>	
<p>in terms of section 20(3) of the Natural Scientific Professions Act, 2003 (Act 27 of 2003)</p> <p>in the following field(s) of practice (Schedule 1 of the Act)</p> <p>Environmental Science (Professional Natural Scientist)</p>	
Effective	3 March 2010
Expires	31 March 2025
	
 Chairperson	 Chief Executive Officer
<p>To verify this certificate scan this code</p> 