Imerys Refractory Minerals South Africa (Pty) Ltd:
Rhino Andalusite Mine.

Section 24G Rectification Report under the National Environmental Management Act No 107 of 1998 (as amended) Quality Act No 34 of 2014 (as amended)

Limpopo Department of Mineral Resources and Energy

Reference Number: 74MRC

Location: Portion 3 of the farm Grootfontein 352 KQ, Waterberg District Municipality, Thabazimbi Local Municipality, Limpopo Province

February 2022

BECS Environmental (Pty) Ltd
In association with BECS Services (Pty) Ltd

IMERYS
Refractory Minerals

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ABBREVIATIONS

AEL	Atmospheric Emission License
DMRE	Department of Mineral Resources and Energy

EAP	Environmental assessment practitioner
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act no 107 of 1998 (as amended)
NEMAQA	National Environmental Management Air Quality Act no 39 of 2004 (as amended)
PM	Particulate Matter
RAM	Rhino Andalusite Mine
WBPA	Waterberg Bojanala Priority Area

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EXECUTIVE SUMMARY

Background description

Imerys Refractory Minerals South Africa (Pty) Ltd: Rhino Andalusite Mine (RAM) requested BECS Environmental (Pty) Ltd to undertake a Section 24G rectification process as part of activities associated with the mine on Portion 3 of the farm Grootfontein 352 KQ, Waterberg District Municipality, Thabazimbi Local Municipality, Limpopo Province.

Rhino Andalusite Mine is situated approximately 14km southwest of the town Thabazimbi, in the Thabazimbi Local Municipality within the Waterberg District Municipality in the Limpopo Province. The mine is located on the farms Grootfontein, Buffelsfontein, Roodedam and portions of the farm Tygerkloof. Both dryers are located on Portion 3 of the farm Grootfontein, 352 KQ. The area within a 5 km radius of the drying activity is covered primarily by Dwaalboom Thornveld and Waterberg Mountain Bushveld. Land use within the area includes mining and agriculture.

Imerys Refractory Minerals South Africa (Pty) Ltd: Rhino Andalusite Mine operates on Portion 3 of the farm Grootfontein, 352 KQ in the Thabazimbi Area. They are a mining company and the mineral being mined is Andalusite bearing meta-pellet shales. The mine has an operational area of 39,02km2.

Mineral processing at RAM occurs in four main processes, namely crushing and screening, dense medium separation, drying and magnetic separation. The mineral being mined is Andalusite bearing meta-pellet shales. Andalusite is an allumino-silicate ($Al_2O_3.SiO_2$) crystal and is mainly used as a refractory mineral in the production of furnace linings. The ore is crushed and screened, and then waste and slimes are separated by dense media separation. The concentrate is then dried by two dryers. A high-intensity magnetic separation process is used to separate magnetic material (Ferruginous material) from the product.

Both dryers are coal-fired direct heated rotary dryers. Both Dryer 1 and Dryer 2 are fitted with bag filters. Dryer 1 also has two cyclones that can act as a backup.

RAM has a number of water uses as part of their operations. As such, the following water license authorisations are in place for on the mine:

- **Section 21 (a) of the Act:** Taking water from a water resource - For taking water from boreholes for mine operations
- **Section 21 (b):** Storing water – For operations from the Office Dam and the Transfer Dam
- **Section 21 (c) and (i)** For operations currently taking place within 500m of an artificial wetland and within 100m of the drainage way –Road crossing over the drainage line
- **Section 21 (e)** For irrigation with wastewater.

- **Section 21 (f)** For operations discharging wastewater into canals next to the drainage channel.
- **Section 21 (g)**: Authorised water uses – For different operations, water authorized to be taken from different dams, quarries, slimes dams, sewage treatment, settling ponds and dust suppression on the ,mine

RAM (74MRC) is currently in the process with a variation application on its AEL as well as a Section 22A This report serves as the S24G rectification process will be undertaken to obtain environmental authorisation for Activity 34 in Listing Notice 1 of the EIA Regulations for the expansion of a drying plant which requires an amended Atmospheric Emissions License (AEL)

Summary of impacts

Drying Andalusite

As a result of the drying of Andalusite, Particulate Matter concentrations have been found to exceed the allowable highest daily and annual Particulate matter concentration thresholds around the dryer and within the mine boundaries.

The combustion of coal used in the burner (Hand-fed units) has been found to lead to exceedances in Carbon monoxide hourly ground level concentrations around the dryer and within the mine boundary. Carbon monoxide 8 hour rolling ground level concentration was exceeded around the dryer, within the mine boundary, as well as approximately 1.5km towards the south, extending beyond the mine boundary by approximately 500m.

The impacts associated with these activities include:

- Atmospheric emissions with high concentrations of particulate matter related to the drying of Andalusite have or may have a detrimental effect on the environment, including health and social conditions.
- Atmospheric emissions with high concentrations of Carbon monoxide should the coal be hand fed into the burner which have or may have a detrimental effect on the environment, including health and social conditions

Layout of document

The layout of this final section 24G report is as per Section 24G (1) (a) (vii) (aa) to (ee) of NEMA. Table 1 below indicates where the information has been provided in the report.

Table 1: Layout of document

NEMA Section	Description	Section in report
	Details of EAP, expertise, and Declaration of independence	Part A

NEMA Section	Description	Section in report
		Section 1.2 & 1.3 Addendum 2A, 2B, & Part B Section 2 (Undertaking)
	Discussion of any other permit(s) obtained or in the process of being obtained.	Part A Section 1.6
Section 24G(1)(a)(vii)(aa)	A description of the need and desirability of the activity	Part A Section 2
	A detailed description of all activities that were undertaken at the site including layout plan.	Part A Section 4 & Addendum 1B
	A description of the environment that has been and may further be affected by the activity and the manner in which the physical, biological, social, economic, and cultural aspects have been and may further be affected by the activity.	Part A Section 5
	A4 colour photographs of the activities taking place including the dryer 2	Addendum 6
Section 24G(1)(a)(vii)(bb)	An assessment of the nature, extent, duration, and significance of the consequences for or impacts on the environment of the activity, including the cumulative effects and the manner in which the geographical, physical, biological, social, economic, and cultural aspects of the environment may be affected by the proposed activity;	Part A Section 6
Section 24G(1)(a)(vii)(cc)	A description of mitigation measures undertaken or to be undertaken in respect of the consequences for or impacts on the environment of the activity	Part A Section 6
Section 24G(1)(a)(vii)(dd)	A description of the public participation process followed during the course of compiling the report, including all comments received from interested and affected parties (I&APs) and an indication of how the issues raised have been addressed	Part A Section 7
Section 24G(1)(a)(vii)(ee)	An operational environmental management programme	Part B
	a) Details of the Environmental Assessment Practitioner	Part A Section 1.2
	b) Description of the Aspects of the activity	Part A Section 4
	c) Composite map	Addendum 1
	d) Description of impact management objectives including management statements i) All listed and specified activities triggered and being applied for; and ii) A description of the associated structures and infrastructure related to the development;	Part A Section 3 and 4

NEMA Section	Description	Section in report
	f) Description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable	Part A Section 6
	h) Monitoring and reporting frequency	Part B Section 1
	i) Responsible persons	Part B Section 1
	j) Time period for implementing impact management actions	Part A Section 6.2 Under column: Management timeframe and schedule
	k) Mechanism for monitoring compliance	Part B Section 1
	Professional appraisal (S24G impact evaluation)	Part A Section 8: Conclusion

PART A: SCOPE OF SECTION 24G RECTIFICATION

SECTION 1: INTRODUCTION

1.1 Details of the applicant

Refer to Table 2 below for a description of the applicant.

Table 2: Description of the applicant

Project applicant	Imerys Refractory Minerals South Africa (Pty) Ltd: Rhino Andalusite Mine
Contact person	Hendrik Jones
Designation	Operational Director
Telephone number	+27 12 643 5940
E-mail address	Hendrik.Jones@imerys.com

1.2 Details and expertise of the environmental assessment practitioner

Refer to Table 3 below for a description of the Environmental Assessment Practitioner (EAP) and refer to Addendum 2 for a detailed CV of the EAP.

Table 3: Description of the environmental assessment practitioner

Name of company	BECS Environmental
Telephone number	012 361 9970
Cell phone number	072 191 6074
E-mail address	salome@becsenv.co.za
Name of responsible EAP	Salome Beeslaar
Expertise of EAP	B.Sc Environmental Science (UP[1]), B.Sc Honours Geography (UP), M.Sc Geography (UP), Registered EAP with EAPASA[2] number 2020/846, Professional Scientist (Environmental Science) with SACNASP[3] number 400385/14, member of the IAIAsa[4] with membership number: 5853
Name of responsible EAP	Aqeelah Carrim Janoo
Expertise of EAP	B.Sc Environmental Science (UP), B.Sc Honours Geography & Environmental Science (UP)

1.3 A declaration that the independent environmental assessment practitioner is independent in a form as may be specified by the competent authority

I, Salome Beeslaar (8310190032081), hereby declare that I have no conflict of interest related to the work of this report. Specially, I declare that I have no business, personal, or financial interests in the

[1] University of Pretoria
[2] Environmental Assessment Practitioners Association of South Africa
[3] South African Council for Natural Scientific Professions
[4] International Association for Impact Assessment South Africa

property and/or activities being assessed in this report, and that I have no personal or financial connections to the relevant property owners. I declare that the opinions expressed in this report are my own and a true reflection of my professional expertise and that there are no circumstances that may compromise my objectivity in performing such work.

_____

Salome Beeslaar
January 2022

I, Aqeelah Carrim Janoo (9704240089084), hereby declare that I have no conflict of interest related to the work of this report. Specially, I declare that I have no business, personal, or financial interests in the property and/or activities being assessed in this report, and that I have no personal or financial connections to the relevant property owners. I declare that the opinions expressed in this report are my own and a true reflection of my professional expertise and that there are no circumstances that may compromise my objectivity in performing such work.

_____

Aqeelah Carrim Janoo
January 2022

1.4 Site locality and property description

Rhino Andalusite Mine is located within the Dwaalboom Thornveld and Waterberg Mountain Bushveld and is located on the south-eastern slope of the foothills of the range of mountains known as the Witfonteinrand, on the farms Grootfontein, Buffelsfontein and Roodedam as well as portions of the Farm Tygerkloof. The dryer is located on Portion 3 of the farm Grootfontein, 352 KQ. Refer to Figure 1 below for a locality map of the site, and Table 4 for description of the property.

Table 4: Description of the property

Farm name and portion	Portion 3 of the farm Grootfontein 352 KQ
Title deed description	T100167/2003
21-digit Surveyor General Code	T0KQ00000000035200003
Property size	783.3137ha

Coordinates	24°41'18.39"S,27°16'57.84"E; 24°41'48.85"S,27°17'23.81"E 24°41'57.99"S,27°19'26.96"E; 24°40'8.95"S, 27°19'15.85"E
Landowner	Imerys Refractory Minerals South Africa (Pty) Ltd

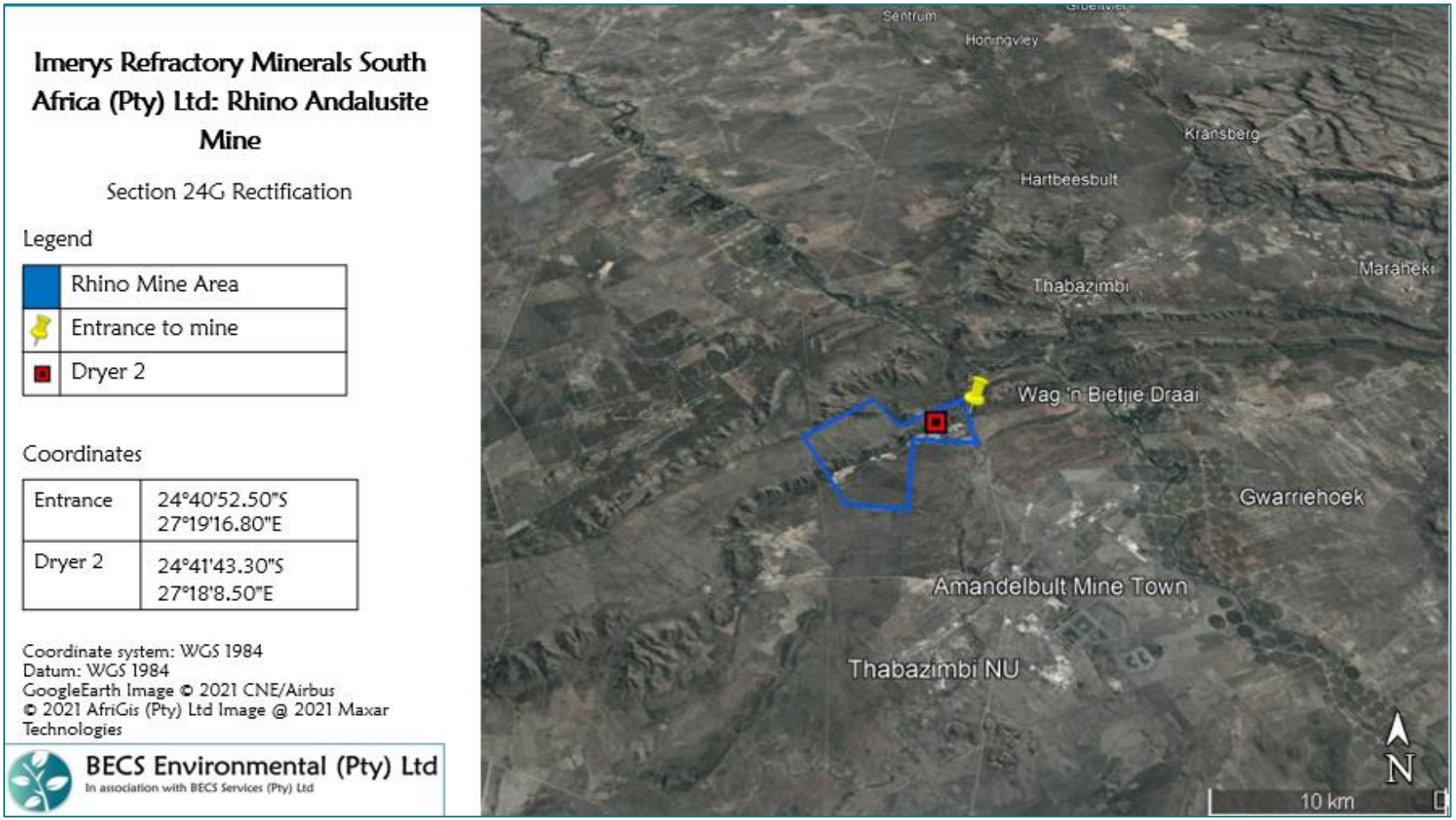

Figure 1: Locality map of portion 3 of the farm Grootfontein, 352 KQ

1.5 Steps taken to adhere to compliance notice

This is not applicable as there were no compliance notices received. Therefore, this is a proactive application.

1.6 Additional authorisations

Please note that a separate Atmospheric Emissions Licence (AEL) application is underway. The relevant Licensing Authority is the Limpopo Department of Economic Development, Environment and Tourism (LEDET). An AEL application has been initiated on the South African Atmospheric Emission Licensing & Inventory Portal (SAAELIP) (Current Atmospheric Emission Licence Number: 12/4/12L-W1/R1). A copy of the AEL application will be obtainable from TiKOTECH (Pty) Ltd, Patricia van der Walt. Contact details: 225 Crown Avenue, Waterkloof, Pretoria, 0145, Tel: 081 040 7178, Fax: 086 600 4481, Email: patricia@tikotech.co.za.

SECTION 2: NEEDS AND DESIRABILITY OF THE ACTIVITY

Many people are employed by the mine, making its presence important for the livelihood of many individuals. There are 186 permanent employees at the mine who are all dependent on mining activities. The mine has decided to expand their operations which is why they want to apply for rectification for the expansion that has taken place. This will allow more efficiency in their operations and will allow a constant supply of product to enter the market, thereby also benefiting the South African economy. The operational consequences of not obtaining the listed activity will directly impact the mines production output and negatively impact the economic viability of the operation. The new dryer is an integral part of the processing system and is responsible for further cleaning the material obtained from plant 6. If the new dryer cannot operate then the viability of plant 6 will also come into question as the material is not processed enough to be a saleable product until it has passed through the drying process. There are several operational personnel who directly operate these plants on a daily basis whose positions would be compromised should they no longer be allowed to operate

SECTION 3: APPLICABLE LEGISLATION

3.1. Legislation

According to Activity 34 of GN983 (NEMA):

The expansion or changes to existing facilities for any process or activity where such expansion or changes will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions or pollution, excluding-
(i) where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or
(ii) the expansion of or changes to existing facilities for the treatment of effluent, wastewater or sewage where the capacity will be increased by less than 15 000 cubic metres per day.

According to section 24(1) & (2) of the NEMA:

In order to give effect to the general objectives of integrated environmental management laid down in this Chapter. The potential consequences for or impacts on the environment of listed activities or specified activities must be considered, investigated, assessed, and reported on to the competent authority or the Minister of Environment, as the case may be, except in respect of those activities that may commence without having to obtain an environmental authorisation in terms of this Act.

The Minister or an MEC, and every MEC may with the concurrence of the Minister may identify activities which may not be commenced without prior authorisation from the competent authority - Section (24)(2)(a)

Section 24F & G of the NEMA state that:

Notwithstanding any other Act, no person may commence an activity listed or prescribed in terms of section 24(2)(a) or (b) unless the competent authority or the Minister of Minerals and Energy, as the case may be, has granted an environmental authorisation for the activity.

On application by a person who has commenced with a listed or specified activity without an environmental authorisation in contravention of section 24F(1) 24G(2); the Minister, Minister responsible for mineral resources or MEC concerned, as the case may be, may direct the applicant to compile a report containing…. The Minister, Minister responsible for mineral resources or MEC concerned must consider any report or information submitted in terms of subsection (1) and thereafter may:

a) *refuse to issue an environmental authorisation; or*
b) *issue an environmental authorisation to such person to continue, conduct or undertake the activity subject to such conditions as the Minister, Minister responsible for mineral resources or*

MEC may deem necessary, which environmental authorisation shall only take effect from the date on which it has been issued; or

c) *direct the applicant to provide further information or take further steps prior to making a decision provided for in paragraph (a) or (b).*

3.2 Description of the scope of the proposed overall activity

On 5 May 2018, RAM (mining right: 74MRC) was granted an AEL (12/4/12L-W1/R1) that is valid for a period of 5 years on Portion 3 of the farm Grootfontein 352 KQ and Portion 1 of the remaining extent of the farm Buffelsfontein 353 KQ, and Roodedam 368 KQ MA3, Portion MA1 and remainder of Portion 4, and Roodedam 368 KQ MA2, Portion MA1 and remainder of Portion 13, and Portion 15 of Roodedam 368 KQ.

RAM (74MRC) is currently in the process with a variation application on its AEL as well as a Section 22A application for the unlawful construction of a new drying plant. in terms of the National Environmental Management Air Quality Act No 39 of 2004 (as amended) (NEMAQA).

This report serves as the S24G rectification process will be undertaken to obtain environmental authorisation for Activity 34 in Listing Notice 1 of the EIA Regulations for the expansion of a drying plant which requires an amended Atmospheric Emissions License (AEL). The application form was acknowledged by the Limpopo Department of Mineral Resources and Energy (DMRE) on 21 September 2021, with file reference number: LP 30/5/1/2/3/2/1 (10093) EM (refer to addendum 4A for proof of acknowledgement) There is an appeal letter in process. RAM is to submit this appeal by the 25 January 2022

The purpose of this document is to supply Limpopo DMRE with the requested information for the Section 24G rectification application (file reference: LP 30/5/1/2/3/2/1 (10093) EM).

3.3 Listed and specified activities

Refer to the Table 5 below for the activities which are trigged in terms of the Environmental Impact Assessment Regulations

Table 5:Triggered activities in terms of Regulations

Legislation	Applicable listing notice	Listed activity/ category	Name of activity	Description	Comments
NEMA	GN 983 of 2014 (as amended)	Activity 34	The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent, or pollution. Please note that a separate Atmospheric Emissions Licence (AEL) application is also done	Dryer 2 - a S24G rectification process in terms of NEMA will be undertaken to obtain environmental authorisation for Activity 34 in Listing Notice 1.	AEL Underway

3.4 Motivation for the exclusion of specialist studies

This Section 24G Rectification is specifically related to the expansion of dryer 2 at the Imerys Refractory Minerals South Africa (Pty) Ltd: RAM. This mine has been operational for more than 25 years. The dryer is used for the drying of Andalusite. The concentrate is dried by two dryers. A high-intensity magnetic separation process is then used to separate magnetic material (Ferruginous material) from the product. The only considerable impacts associated with this is the release of emissions from the dryer, such particulate matter and carbon monoxide, is health and social conditions. This will have no impact on the geology and little to no impact on the groundwater quality.

The activities are not likely to impact the soil, fauna, or flora either. There was no modification to the topography and heritage sites will not be harmed as a result of the ongoing activities. There is no visual impact as the dryer is already constructed and the mine is contained within its own property which is not visible unless on site. The noise impact is negligible. Therefore, additional specialist studies (aside from the atmospheric impact assessment) are not required.

The drying and combustion emissions released may have negative health impacts, however, it was recommended in the Atmospheric Impact Report that continuous feed of the burner should be maintained and hand fed scenarios (e.g. breakdowns) should be avoided as far as possible as manual feed (hand-fed) will result in increased CO levels. It was also recommended that emission monitoring of Particulate Matter (PM, PM10 and PM2.5), Carbon monoxide (CO), Sulphur dioxide (SO2) and Oxides of Nitrogen (NOx) as well as design parameters: gas velocity, gas volumetric flow rate, gas temperature, take place regularly.

A feasibility study is also recommended to determine the most viable monitoring method (periodic or continuous) and equipment that will comply with the requirements for compliance monitoring as specified in part 2 of GG 37054, GN 893. The results of this study should be submitted to the Licensing authority for approval. Design specifications together with measured parameters should be documented, as they will give an indication of the condition of the dryer.

SECTION 4: PROJECT DESCRIPTION

4.1. General Description

This S24G Rectification applies to the expansion of dryer 2 specifically. The process is as follows:

The preconcentrate after crushing and screening is dried, and a high intensity magnetic separation process is used to separate magnetic material (Ferruginous material) from the product. Approximately 110 000 metric tonnes of Andalusite ore are dried per year. On average the dryer operates 24 hours a day, 250 days per year. The ore is dried by a coal fired C1550 direct heated rotary dryer. This dryer is fitted with two cyclones, with a combined efficiency of 95%. Coal used in the drying of Andalusite ore and the ash generated from the burning of coal is stored on concrete bays. The ash and dust caught in the cyclone, are mixed with production waste and dumped on stockpiles. Table 6 below gives a detailed breakdown of the process and associated structures used in the process.

Table 6: Processes, associated structures, and functions

Process	Associated structures	Function
Dryer	Dryer Bag filter	Drying of mineral solids including ore. Drying and calcining of mineral solids including ore. The drying of mineral solids including ore, using dedicated combustion installations. Facilities with a production capacity of more than 100 tons/month product.
Combustion of coal in burner	Concrete bays Bag filters	Coal used in the drying of Andalusite ore and the ash generated from the burning of coal is stored on concrete bays. The ore is dried by a coal fired C1550 direct heated rotary dryer

Refer to the diagram below for a visual representation of the process involved.

4.2. Activity specific description

Emissions, of regulatory importance, generated as a result of the burning of coal include Particulate matter. Primary sources of particulate matter emissions are from the dryer. Regular maintenance and monitoring of emissions of Particulate Matter(PM, PM10 and PM2.5), can help reduce the amount of particulate matter in the air.

Combustion emissions from the burner in the dryer used in the drying process causes air pollution including Sulphur dioxide and Oxides of Nitrogen. Regular maintenance and by continuously feeding the burner should be maintained and hand fed scenarios (e.g. breakdowns) should be avoided as far as possible as manual feed (hand-fed) will result in increased CO levels. It is also recommended that emission monitoring Carbon monoxide (CO), Sulphur dioxide (SO_2) and Oxides of Nitrogen (NOx) as well as design parameters: gas velocity, gas volumetric flow rate, gas temperature, take place regularly.

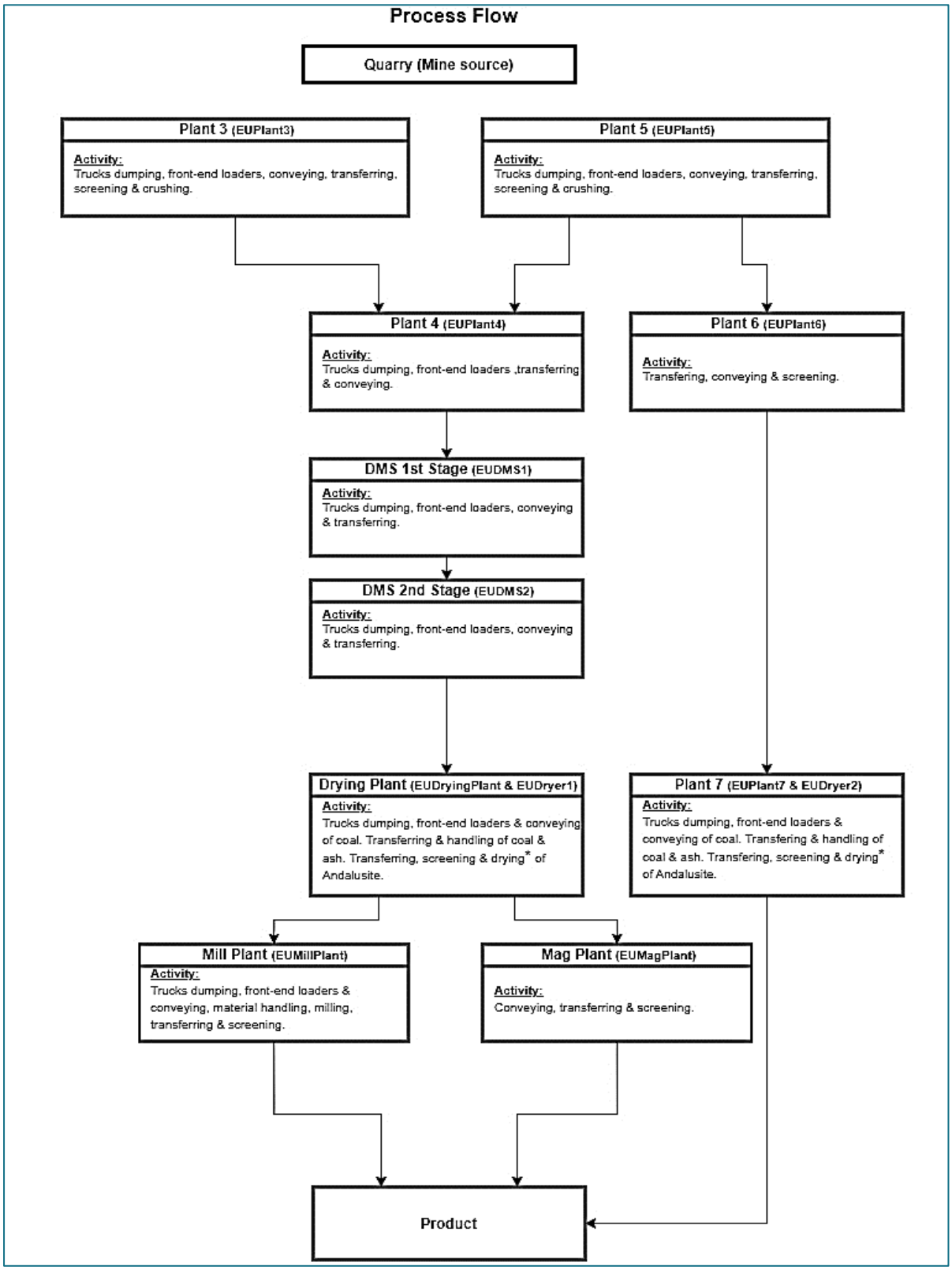

Figure 2: Drying facility process at RAM

Refer below to photographs of the activities

Figure 3: Area around dryer

Figure 4: Coal storage area

Figure 5: Dryer 2

Figure 6: Concrete bays where ash is stored

Refer to Addendum 1B for a larger version of the site layout plan.

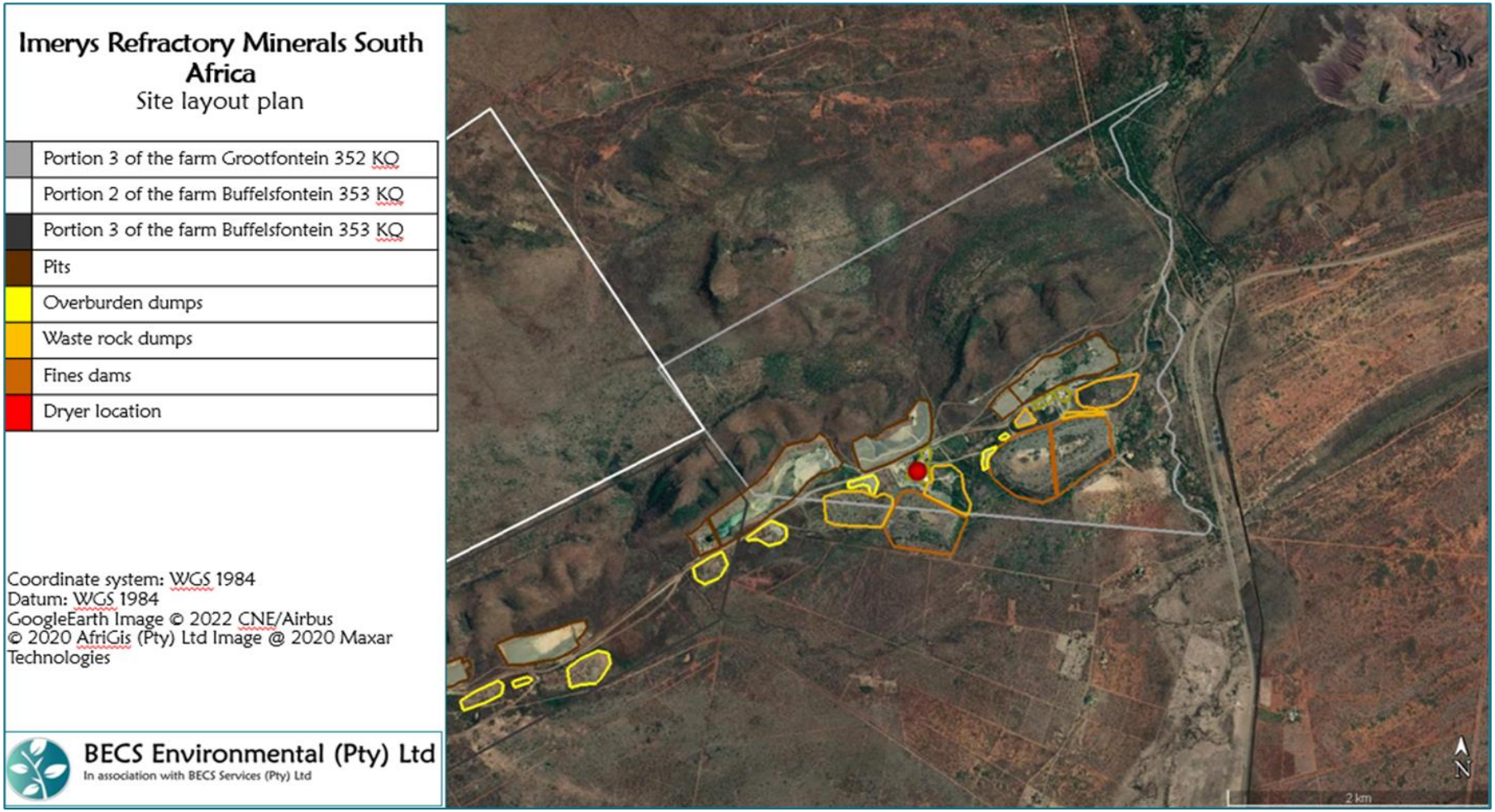

Figure 7: Site layout plan

SECTION 5: DESCRIPTION OF THE RECEIVING ENVIRONMENT

5.1 Air Quality

Information for this section was obtained from 'Air Quality Specialist Report for the Proposed Tygerkloof Mine, Thabazimbi, Limpopo Province' (Airshed Planning Professionals, 2015).

Neighbouring land-use in the surrounding of the proposed project comprises predominantly of farming and mining activities. These land-uses contribute to baseline pollutant concentrations via fugitive and process emissions, vehicle tailpipe emissions, household fuel combustion, biomass burning etc. The main sources of air quality are:

- Mining sources: Particulates represent the main pollutant of concern at mining operations.
- Unpaved and paved roads: Particulate emissions occur whenever vehicles travel over a paved surface. The fugitive dust emissions are due to the re-suspension of loose material on the road surface.
- Wind erosion of open areas: Windblown dust emanates from natural and anthropogenic sources
- Vehicle Tailpipe Emissions: Emissions resulting from motor vehicles can be grouped into primary and secondary pollutants. While primary pollutants are emitted directly into the atmosphere, secondary pollutants form in the atmosphere as a result of chemical reactions
- Agriculture: Particulate matter is the main pollutant of concern from agricultural activities as particulate emissions are derived from windblown dust, burning crop residue, and dust entrainment as a result of vehicles travelling along dirt roads
- Biomass and residential fuel burning: Aerosols, black C and hydrocarbons are associated with biomass burning. Burning crop residue may be a significant source of atmospheric emissions within the area. Pollutants arising from the combustion of wood include respirable particulates.

Ambient Air quality:

The site is located in a rural area currently affected by air pollution sources as described in the preceding section. Pollutants released include but are not limited to, fugitive PM2.5, PM10 and Total Suspended Particulates (TSP) and gaseous pollutants as products of the combustion of petrol and diesel. Ambient monitoring data was obtained from the TIOM monitoring network as well as the Department of Environmental Affairs (DEA's) Thabazimbi monitoring station (Waterberg/Bojanala Priority Area network (WBPA)).

5.2 Climate

The following information was extracted from the Integrated Water and Waste Management Plan and Integrated Water Use License Application (Rational Environmental, 2015).

The climate is semi-arid and hot for most of the year. In winter, the nights are cold but the days are bracing at about 23°C. The average annual rainfall, mainly occurring because of thunderstorms, is about 650mm. Diurnal and average monthly temperature trends are presented in below. Monthly mean, maximum and minimum temperatures are given in Table 14. Temperatures ranged between 1.5°C and 32.9°C. During the day, temperatures increase to reach maximum at around 15:00 in the afternoon. Ambient air temperature decreases to reach a minimum at around 04:00 i.e. just before sunrise.

5.3 Topography

Information for this section was obtained from 'Information in support of application for rectification of existing mine residue disposal' (Shangoni Management Services, 2011); and 'Report on geohydrological investigation as part of the EIA, environmental management plan (EMP) and IWULA (Groundwater Complete, 2015).

The site falls within a low mountainous terrain morphological unit. The northern part of the site is a mountainous area, namely the Witfonteinrand range. The site slopes from the range into a southern direction. Surface elevations vary from approximately 1,040 to 1,340 meters above mean sea level (mamsl).

5.4 Soil, land use and land capability

Information for this section was obtained from 'Rhino Minerals: Buffelsfontein – EMPR Addendum' (Shangoni Management Services, 2010).

The RAM property covers 3 main soil types. The northern parts of the property are classified as soils with minimal development – usually shallow on hard or weathered rock- with or without intermittent diverse soils. On the eastern-most section of the property there is a thin band of soils classified as: black and red-strongly structured clayey soils with high base status. The remainder of the site consists of soils classified as red- massive or weak structured soils with high vase status. There is a gradient from the Hutton form to the Bonheim / Valsrivier spectrum to the Arcadia form going down slope. There are no signs of erosion except in disturbed sites (along the roadways, etc.) in the area.

Land use is limited largely both by the dry climate and the limited arable soils. Although occupied by a fairly steep colluvium, the topsoil that is being stripped for use in rehabilitation is very stony. Grazing of wild animals occurs on the site but no commercial land use other than mining occurs. Game and cattle farming occurred on site prior to the mining activities. There is evidence of overgrazing and poor veldt management, especially where sickle bush is abundant in noticeable bush encroachment structures.

5.5 Surface water

The following information was extracted from the Integrated Water and Waste Management Plan and Integrated Water Use License Application (Rational Environmental, 2015).

The mine is located in the Limpopo catchment, Bierspruit Sub-catchment a part of the Crocodile Catchment, in the quaternary catchment area A2. The operation is located in the Crocodile (West) and Marico Water Management Area. The relevant water authority in this instance is the DWS – Lower Crocodile (West) and Marico (Hartbeespoort) regional office.

Surface water draining from the site mostly takes place in the form of overland flow collecting in the network of non-perennials originating on the site. The non-perennials drain into the Bierspruit to the south of RAM, which in turn flows into the Crocodile River situated north-east from the site.

Surface water use in the area is mainly for agricultural purposes, with little domestic use. Agricultural water uses include both irrigation and livestock watering.

5.6 Vegetation

Information for this section was obtained from the 'Ecological Evaluation for the Tygerkloof Mine Report' (Pachnoda Consulting cc, 2015). The site corresponds to the Savanna Biome and more particularly to the Central Bushveld Bioregion as defined by Mucina & Rutherford (2006). It comprehends two ecological types known as the (1) Waterberg Mountain Bushveld and (2) Dwaalboom Thornveld:

1. Waterberg Mountain Bushveld

This vegetation type is restricted to the Waterberg Mountains including a number of outlier hills and ridges of the Vlieëpoortberge and Boshofsberge near Thabazimbi. The floristic composition is complex and varies between *Faurea saligna – Protea caffra* bushveld on the high slopes, grading into mixed *Diplorhynchus condylocarpon* woodland on the mid and foot slopes while *Burkea africana – Terminalia sericea* savanna occurs on the low-lying valleys and areas of deep sand.

2. Dwaalboom Thornveld

This vegetation type is restricted to the southern section of the study site and occurs on the flats north of the Dwarsberge and ridges associated with the Crocodile River. The floristic and structural attributes of Dwaalboom Thornveld is fairly homogenous and consists of low to medium high microphyllous bushveld that is dominated by taxa of the genus *Vachellia* and *Senegalia* (=*Acacia*). The herbaceous layer is dominated by graminoid taxa as opposed to forb species.

Seven invasive species are present on site. The species present in the densest populations are Fountain grass (*Pennisetum setaceum*), Salt cedar (*Tamarix ramosissima*) and Smelter's bush (*Flaveria bidentis*).

Wild tobacco is emerging towards the more recent quarries and this species needs to be monitored as its density is expected to increase. The densities of the remaining species can be classified as scattered. Please note that Milkweed is not alien, however it is a problem plant.

5.7 Animal life

Information for this section was obtained from the 'Ecological Evaluation for the Tygerkloof Mine Report' (Pachnoda Consulting cc, 2015).

A total of 65 mammal species could occur on the proposeds site. Among those confirmed were seven antelope species, five rodents, one canine (jackal), one feline (cats), one hyaenid, two leporids (hares), one mustellid, aardvark, two suids (pigs), one hyrax (dassie) and three primates. Fifteen frog species are expected to occur on the study site. No threatened or near-threatened frog species are likely to be present. Seventeen taxa (comprising snakes, lizards, geckos, tortoises, and terrapins) have been recorded on the proposed site. Fifteen diurnal butterfly species is known to occur in the proposed site, as well as four dragonfly taxa.

5.8 Socio-economic environment

Information for this section was obtained from the 'Integrated Development Plan' (Thabazimbi Local Municipality, 2013), and 'Integrated Development Plan' (Waterberg District Municipality, 2013)

Limpopo is the fifth most populated province at 5.4 million. Population increased in WDM from 604,936 in 2001 to 679,336 in 2011. Population increased in TLM from 65,533 in 2001 to 85,234 in 2011. Refer to Table 38 below for population, age, and gender structure. The majority of population is aged below 35 years. TLM experienced fast population growth for the period between 2001 and 2011. Majority of population is age between 15 and 64 with males in the majority.

SECTION 6: CONSEQUENCES OR IMPACTS ON THE ENVIRONMENT, INCLUDING THE CUMULATIVE EFFECTS AND MITIGATION MEASURES.

6.1 Environmental impact assessment methodology

Prior to mitigation

Intensity and magnitude	1 Natural processes or functions are not affected and will adequately return to its natural state. The impact will be completely reversed with correct management, and can be completely avoided, managed, or mitigated.	2 Natural processes or functions are affected, and natural processes or functions will continue in a modified manner. The impact will be reversed to some degree with correct management, and can be somewhat avoided, managed, or mitigated	3 Natural processes or functions are to the extent where it temporarily or permanently ceases. The impact cannot be reversed even with correct management, and cannot be avoided, managed, or mitigated
Resource replaceability	1 Loss of resource can be completely replaced.	2 Loss of resource can somewhat be replaced.	3 Resources will be completely lost.
Duration	1 The impact will be short-lived.	2 The impact will last for the entire operational life of the activity but will be mitigated thereafter.	3 The impact will not cease after the operational life of the activity ceases but will be permanent.
Extent or spatial scale	1 The impact will be site specific.	2 The impact will affect the local area.	3 The impact will affect an area larger than just the local area.
Probability	1 It is unlikely that the impact will occur.	2 There is a probability for the impact to occur.	3 The impact will definitely occur.
Significance	None or low If the sum of the above ranking is equal or more than 5 and 7, and no ranking equals 3.	Medium If the sum of the above ranking is equal or more than 8 to 11.	High If the sum of the above ranking is 12 or more.

Post to mitigation

Intensity and magnitude	1 Natural processes or functions are not affected	2 Natural processes or functions are affected, and natural	3 Natural processes or functions are to the extent

	and will adequately return to its natural state. The impact will be completely reversed with correct management, and can be completely avoided, managed, or mitigated.	processes or functions will continue in a modified manner. The impact will be reversed to some degree with correct management, and can be somewhat avoided, managed, or mitigated	where it temporarily or permanently ceases. The impact cannot be reversed even with correct management, and cannot be avoided, managed, or mitigated
Resource replaceability	1 Loss of resource can be completely replaced.	2 Loss of resource can somewhat be replaced.	3 Resources will be completely lost.
Duration	1 The impact will be short-lived.	2 The impact will last for the entire operational life of the activity but will be mitigated thereafter.	3 The impact will not cease after the operational life of the activity ceases but will be permanent.
Extent or spatial scale	1 The impact will be site specific.	2 The impact will affect the local area.	3 The impact will affect an area larger than just the local area.
Probability	1 It is unlikely that the impact will occur.	2 It is likely for the impact to occur.	3 The impact will definitely occur.
Significance	None or low If the sum of the above ranking is equal or more than 5 and 7, and no ranking equals 3.	Medium If the sum of the above ranking is equal or more than 8 to 11.	High If the sum of the above ranking is 12 or more.

6.2 Environmental issues, significance, and mitigation measures

There will be no significant impacts on the **soils**, **vegetation, animal life, geology, topography, climate, environmental noise, visual aspects, or heritage sites**. The responsible person for all management measures is the applicant.

6.2.1 Air pollution impacts (Dryer)

Rhino falls within the Waterberg-Bojanala airshed priority area

Activity, nature, and consequence of impact:

The drying of Andalusite generates air pollution, including but not limited to the criteria pollutants Particulate Matter (PM, PM10, PM2.5), Sulphur dioxide (SO_2), Nitrous Oxide (NOx). These criteria air pollutants have the potential to impact on human health and ecological conditions.

Stack emission sampling conducted on 30 April 2021 found Dryer 2' PM, SO2 and NOx emissions to be significantly lower than the minimum emission standards (MES) specified for the listed activity Category 5: Subcategory 5.2: Drying (Refer to Table 7 below).

Table 7: Dryer 2 emission rates.

Pollutant name	Stack emissions	MES for new plant
Particulate Matter (PM)	5.15	50
Sulphur Dioxide	0.06	1000
Oxides of Nitrogen Expressed as NO2	15.54	500

Cumulative impacts:

The combination of the different pollutants can have a cumulative impact on human health. The nearby town of Thabazimbi may also impact on the regional air quality

Assumptions, uncertainties, and gaps in knowledge

Risk assessment is not based on any quantitative data or assessments.

Impact pre-mitigation:

	Human health
Intensity and magnitude	2 Natural and/ or processes are slightly altered
Resource replaceability	1 The resource is not damaged irreparably or is not scarce
Duration	2 Medium term: the impact will last for the entire operational life of the mine.
Extent or spatial scale	2 The impact will affect the local area
Probability	2 It is most likely that the impact will occur
Significance	9 Medium

Impact post-mitigation:

	Human Health
Intensity and magnitude	2 Natural and/ or social functions and/ or processes are moderately altered but will continue in a modified manner.

	Human Health
	The impact, with correct management, and can be somewhat managed but cannot be reversed.
Resource replaceability	1 The resource is not damaged irreparably or is not scarce
Duration	3 The impact will not cease after the operational life of the activity ceases but will be permanent.
Extent or spatial scale	2 The impact will affect the local area
Probability	3 The impact will definitely occur.
Significance	11 Medium

Environmental objective
To avoid or minimise air pollutants such as PM and combustion gasses such as SO2 and NOx emissions.

Management measures to be applied	**Phase applicable to management measure**	**Description of Occurrence of Potential Releases**	**Management timeframe and schedule**	**Responsibilities for implementation and long-term maintenance**
Drying.	Start up and operational	Breakdown of Burner	On a regular and on-going basis.	Continuous feed of the burner should be maintained and hand fed scenarios (e.g., breakdowns), Should be avoided as far as possible as manual feed (hand-fed) will result in increased emissions
	Start up, operational and closure	Fire or explosion	On a regular and on-going basis	Reference can be made to Rhino Andalusite Mine's Energy Response Procedure

Stakeholder expectations and / or comments
None received.
Residual and latent risks
Depending on the results of further monitoring, the risk of potential pollution will not be a latent risk.

6.3 Monitoring programme

The following monitoring program is proposed as part of the operational activities of the Applicant.

Table 8: Monitoring programme

Type of monitoring	Sampling Frequency	Parameters to be measured and reported	Parameters to be reported	Frequency of reporting
Periodic Emission monitoring (in-stack)	Quarterly	PM, SO_2, NO_x	PM, SO_2, NO_x, CO_2	Quarterly and Annual
Dustfall monitoring and PM10 Monitoring	Monthly	PM, SO_2, NO_x	PM, SO_2, NO_x, CO_2	Monthly

SECTION 7: PUBLIC PARTICIPATION PROCESS

7.1 Legislative context

According to the Publication of Participation Guideline (NEMA), an I&AP is:
"(a) any person, group or persons or organisations interested in or affected by an activity, and (b) any organ of state that may have jurisdiction over any aspect of the activity".

This definition is more detailed in the Guideline for consultation with communities and I&APs (MPRDA):
"I&APs include, but are not limited to; (i) Host Communities, (ii) Landowners (Traditional and Title Deed owners), (iii) Traditional Authority, (iv) Land Claimants, (v) Lawful land occupier, (vi) The Department of Land Affairs, (vii) Any other person (including on adjacent and non-adjacent properties) whose socio-economic conditions may be directly affected by the proposed prospecting or mining operation (viii) The Local Municipality, (ix) The relevant Government Departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project."

The PPP followed for this application process was based on the requirements as set out in Chapter 6 (regulations 54 – 57) of the EIA Regulations, 2014, in terms of sections 24(5), 24M (exemptions) and 44 of the NEMA; the Publication of Participation Guideline, GN 807 of 2012, in terms of section 27J of the NEMA.

7.2 Stakeholders and interested and affected parties database

The I&APs and stakeholders identified are included in Table 9 below. Refer to Addendum 3A for a list of all I&APs, also indicating I&APs that registered and all stakeholders. Refer to Addendum 3B for a map of the adjacent landowner's map.

Table 9: Interested and affected parties identified.

Interested and Affected Parties	Issues received	EAPs response to issues as mandated by the applicant	Section reference in this report where issues and or response were incorporated
Imerys Refractory Minerals South Africa (Pty) Ltd: - Hendrik Jones (Portion 3 Grootfontein 352 KQ)	None	N/A	N/A
Rhino Minerals - Hendrik Jones (Portion 3 Buffelsfontein 353 KQ)	None	N/A	N/A
Rhino Minerals- Hendrik Jones (Portion 2 Buffelsfontein 353 KQ)	None	N/A	N/A

Interested and Affected Parties	Issues received	EAPs response to issues as mandated by the applicant	Section reference in this report where issues and or response were incorporated
J N RHEEDERS EIENDOMME CC (Portion 4 Grootfontein 352 KQ)	None	N/A	N/A
Imerys Refractory Minerals SA - Hendrik Jones (Portion 4 Roodedam 368 KQ)	None	N/A	N/A
STRYDOM PETRUS JOHANNES (Portion 9 Roodedam 368 KQ)	None	N/A	N/A
Rhino Minerals	None	N/A	N/A
Thabazimbi Local Municipality	None	N/A	N/A
Waterberg District Municipality	None	N/A	N/A
Waterberg District Municipality - Air Quality Officer	None	N/A	N/A
Department: Agriculture	None	N/A	N/A
Department Cooperative Governance, Human Settlements and Traditional Affairs	None	N/A	N/A
Department Economic Development, Environment and Tourism	None	N/A	N/A
Department Economic Development, Environment and Tourism - Air Quality Management and Climate Change	None	N/A	N/A
Department of Water Affairs	None	N/A	N/A
South African Heritage Resources Agency (SAHRA)	None	N/A	N/A
Ward Counsellor (Ward 2) (Mrs Tokkie Swanepoel)	None	N/A	N/A

7.3 Steps undertaken in accordance with the plan of study

An advertisement was published in Die Pos newspapers on 22 October 2021. Refer to Addendum 3C for a copy and proof of these advertisements. A site notice was placed at the site on the 22 October 2021. Refer to Addendum 3D for a copy and proof of the site notice placed. Also, refer to Addendum 3E for a Google Earth map indicating the location of the site notice.

An e-mail (to which the public participation letter was attached), was sent to all adjacent landowners, and stakeholders on Thursday 22 October 2021. Refer to Addendum 3F for a copy and proof of the letter sent to all I&APs and stakeholders. The draft report was then sent to stakeholders on 28 February 2022 for 30 days for comments. Refer to Addendum 3G for proof of draft report sent to all the I&Aps and stakeholders.

7.4 Correspondence with interested and affected parties and stakeholders

Refer to Table 9 above for any additional comments from I&APs identified as well as responses of the EAP to these comments. There were no comments received to add to Table 8 for phase 1 or phase 2 of PPP.

7.5 Conclusion to public participation process

No comments received for Phase 1 and Phase 2 for the PPP. This report will be sent for comments to DMR, and any additional comments will be included in the final report.

SECTION 8: CONCLUSION

Imerys Refractory Minerals South Africa (Pty) Ltd: Rhino Andalusite Mine has been operational for more than 25 years. A second dryer was added as part of the mineral processing taking place at the mine. The main impact associated with the expansion of the dryer is Air quality. The impacts associated with this are summarized below:

The recommended mitigation measures based on the impacts of the expansion of the dryer are summarised as follows.

- Regular preventative maintenance and condition monitoring of equipment (dryer and bag filter) to ensure that there are no faults and to reduce the quantity of the atmospheric pollutants released.
- Monitoring for dust fallout and PM10 monitoring to take place on a monthly basis
- Continuous feed of the burner should be maintained and hand fed scenarios (e.g., breakdowns), Should be avoided as far as possible as manual feed (hand-fed) will result in increased emissions
- Periodic Emission monitoring (in-stack) to take place on a quarterly basis
- Conduct and compile a fugitive management emission management plan, whereby the plan must identify all significant sources. This plan must also include detailed control methods, contingency plans, timeframes for implementation, efficiency assessments, and regular monitoring and reporting.

PART B: ENVIRONMENTAL MANAGEMENT PLAN

SECTION 1: MECHANISMS FOR MONITORING THE IMPLEMENTATION OF THE IMPACT MANAGEMENT ACTIONS

1.1 Site inspection

Mechanism for monitoring compliance	Monitoring and reporting frequency	Responsible persons
• Inspection of dryer and its components	Weekly	Site personnel
• Good house-keeping and spraying of water for dust suppression	Daily	Site personnel

1.2 Monitoring

Mechanism for monitoring compliance	Monitoring and reporting frequency	Responsible persons
• Regular Periodic Emission monitoring (in-stack)	Quarterly	Operational manager/ specialist
• Regular PM monitoring to take place	Monthly	Operational manager/ specialist
• Regular dust fallout monitoring to take place	Monthly	Operational manager/ specialist

1.3 Quarterly reporting

Mechanism for monitoring compliance	Monitoring and reporting frequency	Responsible persons
• Complaints Register	Must be available at all times	Operational manager
• Operational and production records	Operation and production must be tracked on a monthly basis	Operational manager/ specialist
• Emissions monitoring and measurements and performance against limits	Quarterly	Operational manager/ specialist

1.4 A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;

Audits will be done as stated in the Environmental authorisation.

SECTION 2: ENVIRONMENTAL AWARENESS PLAN

Awareness is proportional to risk management and functions as a measure to decrease risk by ensuring reasonably practicable compliance and adherence to all environmentally related legislation The following is an awareness for the entire site.

- Liaison with regulatory authorities
- Participate in various forums as related to high risk issues
- Management of trust funds
- Environmental Impact Assessments
- Determine rehabilitation liabilities
- Develop Awareness to Mining Impacts
- Reduce liabilities through concurrent rehabilitation

Environment, health, and safety management is focused on the development of companywide health and safety policies, taking cognisance of the legislation and regulatory environment.

SECTION 3: SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No specific information has been requested by the competent authority yet.

UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports ☒

b) the inclusion of comments and inputs from stakeholders and I&APs ☒

c) the inclusion of inputs and recommendations from the specialist reports where relevant ☒

d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed ☒

Full names and surname of the EAP	Salome Beeslaar
Signature of the EAP	
Name of Company	BECS Environmental
Date	February 2022

-END-

REFERENCES

Department of Environmental Affairs.2017. Public Participation Guideline in terms of National Environmental Management Act, 1998 Environmental Impact Assessment Regulations.

Department of Mineral Resources. 2002. Guideline for consultation with communities and I&Aps - as required in terms of sections 10(1)(b),16(4)(b), 22(4)(b),27(5)(b) and 39 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002).

Google Earth. 2022. [Accessed: January 2022]

Pachnoda Consulting cc. 2015. Ecological Evaluation for the Tygerkloof Mine Report.

Rational Environmental. 2015. Integrated Water and Waste Management Plan and Integrated Water Use License Application

Shangoni Management Services. 2010. EMPR Addendum. Rhino Minerals: Buffelsfontein

Thabazimbi Local Municipality.2013. Integrated Development Plan.

Waterberg District Municipality. 2013. Integrated Development Plan.