



**Imerys (South Africa) (Pty) Ltd – Anref  
Operation**

**FINAL ENVIRONMENTAL PERFORMANCE  
ASSESSMENT: ANREF REHABILITATION PLAN**

**DMR REF NR: NW30/5/1/2/2/522MR**

**JULY 2018**

**SHANGONI**  
*Management Services (Pty) Ltd*



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## PROJECT DETAILS

**Project Title:** Imerys South Africa (Pty) Ltd: Final Environmental Performance Assessment: Anref Operations Rehabilitation Plan

**Project Number:** IME-ANR-17-02-09

**Audit team:** Emma Fourie

**Date:** July 2018

**Location:** Groot Marico, North-West

**Technical Reviewer:** Jan Nel

**DRAFT FOR REVIEW**

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Jan Nel



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# 1 Introduction

Imerys South Africa (Pty) Ltd. decided to apply for a closure certificate for Anref Andalusite Mine (hereafter Anref).

Anref was an Andalusite mine situated west from the town of Groot Marico, which is 25 km east of Zeerust in the North-West Province. The mine has not been operational since 2008. Concurrent rehabilitation has been implemented since operations have ceased, and the mine plans to commence with decommissioning after the necessary Environmental Authorisations have been received.

The Mineral and Petroleum Resources Development Act (Act 28 of 2012) (MPRDA) requires that: *The any organisation that has obtained a mining permit or a mining right must compile and submit an Environmental Management Performance Assessment Report (EMPR-PAR) to the Director: Mineral Development of the Department of Mineral Resources for approval.*

In terms of section 43(1) of the MPRDA, the holder of a prospecting right, mining right, retention permit or mining permit remains responsible for any environmental liability, pollution or ecological degradation, and the management thereof, until the Minister has issued a closure certificate to the holder concerned.

An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in section 43(3) and must be accompanied by the prescribed environmental risk report. The environmental risk assessment (ERA) process to be followed during the development of the mine closure report is prescribed in Section 60 of the regulations published under the new MPRDA (GN 527, 23 April 2004).

The following regulations regarding closure have been published under the MPRDA:

An application for a closure certificate should be accompanied by the following, according to Regulation 57:

- A Closure plan as contemplated in Regulation 62;
- An environmental risk report according to Regulation 60; and
- A final EMP performance assessment as per Regulation 55(9).

Regulation 55 (8) states that when a holder of a prospecting right, mining right or mining permit intends closing an operation, a final performance assessment must be conducted, and a report submitted to the Minister to ensure the following:

- (a) The requirements of the relevant legislation have been complied with;
- (b) The closure objectives as described in the environmental management programme or environmental management plan have been met; and



- (c) All residual environmental impacts resulting from the holder's operations have been identified and the risks of latent impacts which may occur have been identified, quantified and arrangement for the management thereof have been assessed.

As per Regulation 55(9), a final performance assessment report must either precede or accompany an application for a closure certificate in terms of the Act.

In compliance with the legislative requirements as indicated above, a Performance Assessment (PA) has been undertaken for Anref for determining the level of compliance with the provisions of the rehabilitation plan, compiled in 2013, to determine whether rehabilitation was conducted in line with the commitments made in the above-mentioned plan. The PA was conducted on the rehabilitation plan, as the EMP did not contain detailed rehabilitation measures against which the success of the completed rehabilitation could be determined.

## **2 Objectives and purpose of the environmental audit**

The objectives of this environmental audit are to-

- (a) report on-
- (i) the level of compliance with the conditions of the environmental authorisation and the EMP, and
  - (ii) the extent to which the avoidance, management and mitigation measures provided for in the EMP, achieve the objectives and outcomes of the EMP, and closure plan.
- (b) identify and assess any new impacts and risks as a result of undertaking the activity;
- (c) evaluate the effectiveness of the EMP;
- (d) identify shortcomings in the EMP; and
- (e) identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMP.

## **3 Previous EMP environmental audits**

No previous EMP's were conducted, as mining had ceased in 2008.

## **4 Scope and period relevant to assessment**

This Performance Assessment serves the purpose of fulfilling the requirements of the Regulation 57 of the MPRDA, to fulfil the requirements of applying for a mine closure certificate.





No external consultation process was undertaken during the course of carrying out of this environmental audit, or the drafting of the environmental audit report. The comments received during a consultation process with Imerys are included in this environmental audit report.

## 5 Methodology used for the environmental audit

The audit was conducted by reviewing and abstracting the commitments (management and mitigation measures) from the EMP and including it in the commitment table. In cases where the commitments had not been fulfilled, such has been indicated in this report. A column has been added for recommended actions to be taken by Imerys in the case of non-compliance. In addition to assessing the compliance to commitments, the adequacy of the information was also assessed through evaluating site activities and verifying such against the descriptions and risk assessment provided in the EMP, and whether location specific risks and the necessary specialist assessments had been undertaken.

### 5.1 Audit team

The members of Shangoni that participated in the final PA are presented in Table 1 below.

**Table 1: Members of the environmental audit team**

TEAM MEMBER	RESPONSIBILITIES	COMPETENCE
Emma Fourie	Environmental Auditor	Emma obtained a B.Sc. Hons degree in Environmental Management from the University of North West (Potchefstroom). She gained international exposure through participation in Finnish and Russian environmental management courses and conferences in 2010 and is a current member of the Land Rehabilitation Society of Southern Africa (LaRSSA). Emma has been an Environmental Practitioner at Shangoni since 2011, where she is part of the Mine Closure and Rehabilitation Department, specialising in the compilation of Closure Plans, Rehabilitation Plans and Financial Provision calculations. She also has experience in Environmental Impact Assessment (EIA), Environmental Management Programme (EMP) compilation and EMP Performance Assessments.
Jan Nel	Technical Review	Jan, has been actively involved or the past 22 years in environmental management within the mining industry, providing assistance with EMP Compliance, Environmental Impact Assessments (EIA), Financial Provision Calculations, Closure Plans, Rehabilitation Plans, Environmental Management Programme Reports (EMP) and EMP Performance Assessments. He is further experienced in environmental management through third party certification audits as



TEAM MEMBER	RESPONSIBILITIES	COMPETENCE
		well as Environmental Management System (EMS) implementation and has in excess of 8500 audit hours to date. Jan is also the chairman of TC 207 in South Africa.

## 5.2 Audit execution

The environmental audit comprised of:

- The commitments from the relevant documentation were incorporated into the auditing criteria,
- The relevant environmental legal requirements were incorporated into the auditing criteria,
- A site visit was undertaken on the 14<sup>th</sup> of June 2017 for site observation purposes,
- Interviews was conducted with relevant mine personnel and where relevant contract personnel for the purpose of assessing documented evidence of compliance with the auditing criteria, and
- A photographic record of the areas visited during the site audit was compiled, which reflected the state of the environment and operations at the time of the site visit.

## 5.3 Rating of findings

The level of compliance to the commitments as specified in the rehabilitation plan has been divided into five categories as indicated below:

**Table 2: Compliance categories**

Full compliance	Commitment has been achieved 100% or is not yet applicable (e.g. activities have not yet commenced)	<b>C</b>
Partial compliance	Evidence of implementation or progress thereto is observed and/or implementation programmes or investigations are launched.	<b>PC</b>
Non-conformance	None or very little of the commitment has been implemented.	<b>NC</b>
Commitment not applicable / adequate, to be removed / revised,	EMPr report commitments are not applicable or need to be revised in accordance with current practice.	<b>N/A</b>
Commitment could not be verified on information available or site not accessible.		<b>CNV</b>



## **5.4 Assumptions, uncertainties and gaps in knowledge**

Although all reasonable attempts were made to verify comments made during interviews held through further record assessments, it is assumed that such comments provided are a true and accurate reflection, unless otherwise indicated in the report. In the event of insufficient information being provided to support compliance, the auditors' general approach was to raise a non-conformance against the applicable condition. Such detail is provided in Section 6 of this report.

Observations made represent the status quo, although where applicable and supported through records and interviews, commitments for further actions planned by Imerys have been considered.



## **6 Environmental audit results and recommended actions**

The content of Table 6.1 aims to indicate the mitigation measures that have to date been implemented to minimise the significance of the impacts that were identified as part of the approved EMP to indicate the progress made by the mine with regard to the implementation of the mitigation measures and commitments, as well as to recommend actions that should be taken to address the findings.

Reference can be made to the success criteria identified in Section 9.3 of the Final Rehabilitation, Decommissioning and Mine Closure Plan, (Shangoni, 2018), as well as the Annual Rehabilitation plan (Shangoni, 20018), for photographs and discussions of the rehabilitation actions completed.



## 6.1 Environmental Management Plan

Section in the Rehabilitation Plan	Activities / infrastructure	Environmental Actions or mitigation measures	Compliance review	Rating	Recommendations	
2. Concurrent and final rehabilitation	Decommissioning of infrastructure	No additional structures are planned for the mining site. The two existing buildings will be used by farmers. Therefore, the decommissioning will not involve the demolishing of buildings or structures.	Full compliance	C	n/a	
		All waste that is littered on the site must be removed, separated and disposed of in the appropriate drums or skips on the site. All old fencing, not to be used after closure, must be removed from site.				
	Reshaping and sloping		<b>Old slimes dam</b> a) Although the slimes dam walls are very steep, it is already well vegetated and further disturbance will not add value. b) Some sections on top of the slimes dam were disturbed and will require some paddocks prior to re-vegetation to control runoff water.	Full compliance	C	n/a
			<b>Large waste rock dump</b> a) Visually, the southern side wall is the most significant as it is visible from the national road. The objective is to decrease the height and reduce the slope in order to successfully re-vegetate. b) Material from the waste rock dump will also be used to fill the depression to the north of the WRD and the eastern quarry.	Full compliance	C	n/a
			<b>Topsoil stockpiles</b> Material from the topsoil stockpiles will mainly be used for final sloping and cover to promote vegetation growth. Unused topsoil will be sloped into low lying cavities to allow gradual topography with free drainage.	Full compliance	C	n/a
			<b>Quarry east</b> a) Benches will be sloped using cut and fill techniques. b) The water body to the east will remain intact while the floor to the west of this quarry will be filled with material from the north and south slopes. c) Rocky contours are proposed within main drainage lines to reduce runoff velocity and prevent siltation of the water body.	Full compliance	C	n/a
			<b>Quarry west</b> a) Benches will be sloped using cut and fill techniques. b) The water body will remain intact with sloping of the surrounding high walls limited to the current footprint of the water body. c) Prevention of siltation is again proposed using rocky bund walls within the main drainage lines towards the water body. d) Final slopes around both quarries should allow at least one section with safe and easy access for animals to reach the water.	Full compliance	C	n/a
			<b>Quarry north</b> The only objective for the northern quarry is to make it safe by sloping the benches using cut and fill techniques.	It is unsafe to access the quarry north, subsequently no sloping was done. Access to the quarry is limited, due to natural rehabilitation of the historic access roads.	N/A	The Final Rehabilitation, Decommissioning and Mine Closure Plan recommends that this quarry remains as is, with an end use of wilderness.
			Appropriate fencing, bunding or other protection measures, including warning signs, should be provided as required for public safety purposes.	Full compliance.	C	n/a
			Soil replacement	Once the final landform has been created, soil replacement can begin. The only area to be covered by topsoil will be the sloped WRD north of the N4. This will be done using the topsoil stockpile north-east of the WRD. This topsoil has been stockpiled for a few years, therefore it may be sterilised. Compaction is one of the most significant problems with replacement of soil. Compaction must be minimised by using the correct equipment. Too heavy machinery must not be used to replace	Full compliance.	C



Section in the Rehabilitation Plan	Activities / infrastructure	Environmental Actions or mitigation measures	Compliance review	Rating	Recommendations
		<p>the soil. Rather use a dozer than a grader. Soils should also only be moved when it is dry to minimise soil compaction. Provision should be made for the shrinkage, compaction or settlement of cover soil when calculating the amount of topsoil per area. it is preferred that a depth of 30cm topsoil be placed on the site.</p> <p>If needed, a network of drainage lines will be incorporated on these dumps. These drainage lines will ensure clean water run-off on the rehabilitated areas. Avoid impoundments on subsidence hollows which will cause water logging of the topsoil.</p>			
	Preparation for revegetation	<p>Areas where soil has been compacted, the following steps need to be followed:</p> <ol style="list-style-type: none"> <li>1. Break and loosen the soil crust with hand tools e.g. garden rakes for broadcast sowing;</li> <li>2. Break and loosen the soil crust with sharp-pointed hoes or forks for row sowing.</li> <li>3. In burned areas where wood ash is present, use the row-sowing method to ensure good soil-seed contact.</li> </ol>	Full compliance.	C	n/a
4. Post-rehabilitation activities	Monitoring	<p>The vegetation-monitoring programme must be developed for each case of implementation, without compromising the integrity of data gathered. A qualified ecologist with experience in assessment of rehabilitated plant communities must design the monitoring programme.</p>	Full compliance – vegetation monitoring measures were identified in the Rehabilitation Plan (Shangoni, 2013).	C	n/a
		<p>The primary objective of closure of any sloped area is to create a rehabilitated surface and topography that has the capacity to be stabilised under all environmental conditions e.g. severe rain events, veld fires, droughts etc. Erosion status of the rehabilitated land should be monitored and zones with excessive erosion should be identified for remedial action. Erosion can be quantified by insertion of marked stakes into the rehabilitated profile and recording the rate at which the stakes are uncovered. However, the norm is simply the recording of the existence of erosion in a particular location. Key objectives to improve surface stability are;</p> <ul style="list-style-type: none"> <li>• Minimisation of surface erosion (wind and water)</li> <li>• Establishment of a plant community that is self-sustaining or any other cover material which comply to surface stability</li> </ul> <p>Achievement of these objectives should be demonstrated by monitoring of the rehabilitated areas. The key objective of surface stability monitoring lies in being able to demonstrate in a quantified manner the stability of surface rehabilitation works. The monitoring programme should be developed such that loss of soil can be quantified and the stability of the vegetated areas be assessed.</p>	Full compliance	C	No further actions recommended. In March 2017, a storm event caused severe erosion. Evidence of the rectification can be seen in the Rehabilitation plan, 2018.
		<p>The functionality of the surface water drainage systems should be checked annually, preferably after the first major rains of the season, and then after any major storm. This is both to ensure that the drainage of the re-created profile matches the plan, and to permit early repair of drainage structures that are not functioning efficiently. Any water leaving the property must be monitored for the water quality.</p>	<p>Partial compliance – profiling was implemented according to the recommendations of the rehabilitation plan. After a storm event in March 2017, areas where severe erosion appeared were in-filled and reshaped.</p> <p>However, water quality is not monitored.</p>	PC	Water samples should be collected to verify that the water is not affected by the historic mining activities.
	<p>The monitoring of the compliance with the commitments made in the EMP will be done on a two-yearly basis in line with the performance assessment requirements as stipulated in the MPRDA</p>	No EMP performance assessments were conducted, as mining ceased in 2008.	NC	No further recommendations, this rehabilitation plan performance assessment will be submitted along with the application for mine closure.	
	Maintenance	Maintenance and monitoring goes hand in hand as maintenance is done due to results of monitoring. The aim of maintenance control is to keep the area stabilised by maintain good vegetation cover, soil cover, to replace soil in eroded areas, etc.	Full compliance – maintenance is conducted as necessary.	C	n/a



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## 7 Discussion of results

### 7.1 Adequacy of the document

The adequacy assessment was conducted on the Rehabilitation Plan. This section of the environmental audit report provides an indication of the ability of the Rehabilitation Plan to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis and sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility.

It was found during the audit that the Rehabilitation Plan adequately addresses the potential environmental impacts of the historic mining activities, and management and rehabilitation thereof.

### 7.2 Compliance with the provisions of the Rehabilitation Plan

Rehabilitation was implemented concurrently since cessation of mining in 2008. After the decision to formally commence with mine closure, final rehabilitation methods were implemented, as identified in the 2013 Rehabilitation Plan. As the mine area is already utilised by a local farmer for grazing and livestock watering purposes, it can be concluded that Imerys complied with the measures identified in Anref's Rehabilitation Plan.

### 7.3 Recommended actions

Recommended actions have been included in the PA table in Section 6 where applicable. Reference can also be made to the Rehabilitation Plan (Appendix 3 to the Final Closure Plan), for maintenance actions identified.

### 7.4 Access to the Closure Plan and related documents

The mine must also note the requirement as per Regulation 26(h) of GNR 982 of 4 December 2014:

*The environmental authorisation, EMPr, any independent assessments of financial provision for rehabilitation and environmental liability, closure plans, where applicable, audit reports including the environmental audit report contemplated by regulation 34, and all compliance monitoring reports must be made available for inspection and copying-*

- (i) at the site of the authorised activity;*
- (ii) to anyone on request; and*
- (iii) where the holder of the environmental authorisation has a website, on such publicly accessible website.*

As there is no permanent site office, the EMP is not available on-site at all times. However, Imerys has an established communication channel with the farmer utilising the area, through which any queries are



resolved. The Final Rehabilitation, Decommissioning and Closure Plan and its appendices were provided to all stakeholders and Interested and Affected Parties for review during the consultation period.

## **8 Conclusion**

This environmental audit report was compiled in order to comply with the relevant legislative requirements, specifically the MPRDA. It is the main purpose of this document to report to the DMR on both the compliance with, and the appropriateness and adequacy of the Rehabilitation Plan.

As the mine is in the decommissioning and closure phase, the majority of the commitments in the EMPR are not applicable anymore, as it is focussed on the operational phase. Subsequently, compliance with commitments made in the 2013 Rehabilitation Plan was measured.

## **9 Documents reviewed**

Shangoni Management Services 2013. SAMREC (Pty) Ltd: Anref Mine Rehabilitation plan. June 2013.

