Jellinbah Coal Mine Mackenzie North Quarterly Air and Noise Report October – December 2024

PREPARED FOR Jellinbah Mining Pty Ltd

January 2025



BRISBANE OFFICE

164 Wharf Street Spring Hill QLD 4000 P +617 3217 8772 E info@aarc.net.au AARC.NET.AU

ABN. 71 620 818 920 ACN. 620 818 920



Document Control

Project Name:	Jellinbah Coal Mine
Report Title:	Mackenzie North Quarterly Air and Noise Report – October - December 2024
Client:	Jellinbah Mining Pty Ltd
Project Manager:	Jacinta Palmer

Version	Comments	Author	Reviewer	Date
Draft issued for client review		S	JP	22 January 2025
Final issued to client		JP	JP	XX January 2025

This document is the property of AARC Environmental Solutions Pty Ltd ('AARC') and all rights are reserved in respect of it. This document has been prepared for the exclusive of AARC's client and may not be reproduced or disclosed in any manner whatsoever, in whole or in part, without the prior written consent of AARC. AARC expressly disclaims, to the maximum extent permitted by law, all responsibility for or liability arising from the use of this document by any third party. This document has been prepared subject to the instructions and scope of work agreed to with AARC's client. Any opinions or judgements expressed herein are based on our understanding and interpretation of current regulatory standards relevant to the spific needs of the client and should not be construed as legal opinions or legal advice. Information provided by the client while instructing AARC has been assumed to be correct and complete, and, where this report relies on field information, the condition of the assessed area as at the time of conducting any field assessment. AARC assumes no liability or responsibility for any inaccuracies or omissions outside of AARC's direct control. AARC makes no statement, representation or warranty about the accuracy or completeness of information relating to items not visible, accessible, or able to be inspected at the sites at the time of the site visits.

Table of Contents

1	Execut	ecutive summary		
	1.1	Air quali	ty monitoring	4
	1.2	Noise m	onitoring	4
2	Introd	uction		5
	2.1	Project k	packground	5
	2.2	Sensitive	e receptors	5
3	Air qu	ality mo	onitoring	7
	3.1	Beta-Att	enuation Monitor (BAM)	7
		3.1.1	Equipment and methodology	7
		3.1.2	Meteorological station	7
		3.1.3	PM10 monitoring results	8
	3.2	Dust dep	position monitoring1	0
		3.2.1	Equipment and methodology1	0
		3.2.2	Dust deposition monitoring results1	2
		3.2.3	Investigation into dust exceedance Error! Bookmark not defined	۱.
4	Noise	monito	ring assessment 1	5

List of Figures

Figure 1:	Mackenzie North sensitive receptors	6
Figure 2:	Daily rainfall (mm) from October to December 2024	7
Figure 3:	24-hr average PM10 dust concentrations between October and December 2024	9
Figure 4:	Mackenzie North dust deposition monitoring sites	. 11
Figure 5:	Dust deposition data recorded between the 5 th of September and 2 nd of December 2024	. 13
Figure 6:	Wind rose graph from Jellinbah Mackenzie North station (October - November 2024)	. 14
Figure 7:	Mackenzie North noise monitoring site	. 16

List of Tables

Table 1:	List of Mackenzie North Sensitive Receptors	5
Table 2:	BAM Monitoring Schedule Error! E	Bookmark not defined.
Table 3:	Location of Mackenzie North dust deposition gauges	
Table 4:	Noise Monitoring Locations for February-March 2025 review period	



Abbreviations:

AARC	AARC Environmental Solutions Pty Ltd
AS	Australian Standard
AV	Adjustment Value
BAM	Beta-Attenuation Monitor
bg	background noise level
CV	Critical Value
dBA, dB(A)	Decibel measurement according to the "A"- weighted scale.
EA	Environmental Authority
GDA94	Geodetic Datum of Australia 1994
Hz	Hertz
Jellinbah	Jellinbah Mining Pty Ltd
L1	Noise level which is exceeded for 1% of the measurement period
L ₁₀	Noise level which is exceeded for 10% of the measurement period
L ₉₀	Noise level which is exceeded for 90% of the measurement period
L _{Aeq}	Equivalent continuous 'A-weighted' sound
L _{Amin}	Minimum 'A-weighted' noise level
LA1,adj,15min	'A-weighted' noise level which is exceeded for 1% of the 15-minute measurement period
L _{Aeq,adj,15} min	Equivalent Continuous Sound Level recorded over the 15-minute measurement period
m/s	metres per second
mg/m²/day	milligrams per square metre per day
ML	Mining Lease
NATA	National Association of Testing Authorities
PM ₁₀	Particulate Matter with an aerodynamic diameter less than 10 micrometres (μm)
TARP	Trigger Action Response Plan

1 Executive summary

This quarterly analysis report for the Mackenzie North mine assesses the air quality monitoring data during the October to December 2024 monitoring period. Air quality data was collected between September 5th and December 2nd, 2024. Noise data was not collected for this monitoring period, as this is conducted on a sixmonthly basis.

Jellinbah will continue to implement mitigation measures where required in response to elevated particulate matter, dust or noise levels, in accordance with the Air Quality and Noise management plans.

1.1 Air quality monitoring

Jellinbah monitors PM_{10} dust impacts at sensitive receptors in real-time via the BAM unit. During this monitoring period, the BAM unit was located at Jellinbah 1.

 PM_{10} dust data from the BAM unit indicated no exceedances of the EA limit of 50 μ g/m³ throughout the monitoring period.

Dust deposition analysis was also completed for this monitoring period via the dust deposition gauges set up at various locations surrounding Mackenzie North. The results showed dust levels for insoluble solids at sensitive receptor monitoring sites J3 and J6 were below the EA limit.

1.2 Noise monitoring

No noise monitoring occurred at the site during the October to December 2024 monitoring period. Monitoring is ongoing to investigate events where cumulative noise contribution from multiple surrounding mines exceeds the relevant limits for continuous periods. As part of the six-monthly assessment, the next attended monitoring is scheduled to take place in February 2025.

2 Introduction

This report has been prepared by AARC Environmental Solutions (AARC) on behalf of Jellinbah Mining Pty Ltd (Jellinbah). The purpose of this report is to assess the quarterly air quality and noise monitoring data collected from monitoring locations in the vicinity of the Mackenzie North mining operations. The monitoring period for this quarterly assessment is between October and December 2024.

This report will investigate any instances where Environmental Authority (EA) limits (Schedule B: Air, and Schedule E: Noise and Vibration) and Noise Management Plan criteria have been exceeded during the reporting period. It will also outline any recommendations, where required, for mitigation measures to prevent elevated dust and noise levels. The Air Quality and Noise Management Plans, prepared by AARC for Jellinbah, are the primary guiding reports for monitoring outside of the EA conditions.

2.1 Project background

The Mackenzie North Mine is an extension of the Jellinbah Coal Mine project, north of the Mackenzie River. The Mackenzie North operational area consists of four mining leases (MLs): ML 70445, ML 70446, ML 70448, and ML 70449. The open-cut mine has replaced the production from the finished Jellinbah Plains pit, thus maintaining overall mine production rates at currently approved levels.

Activities that have occurred during the reporting period at the Mackenzie North Mine include:

- stripping and stockpiling of topsoil ahead of mining;
- overburden removal ahead of mining in the pit;
- mining of coal seams in pit;
- crushing and hauling of coal material; and
- progressive rehabilitation activities.

2.2 Sensitive receptors

Sensitive receptors are residences or commercial locations that have the potential to be impacted by air quality or noise impacts arising from the activities at Jellinbah Coal Mine. The key sensitive receptors for potential dust and noise emissions from Mackenzie North are listed in Table 1 and shown in Figure 1.

Table 1: List of Mackenzie North Sensitive Receptors

Name	Approximate Distance to Mackenzie North Mining Lease Area (km)	Easting (GDA94 Z55)	Northing (GDA94 Z55)
Jellinbah 1 (Old Jellinbah Homestead)	6	688715	7429754
Jellinbah 2 (Jellinbah Homestead)	8	697280	7439294
Tarcoola	10	704858	7434955
Scrubee	5	701434	7428272





Figure 1: Mackenzie North sensitive receptors



3 Air quality monitoring

3.1 Beta-Attenuation Monitor (BAM)

3.1.1 Equipment and methodology

In late July 2020, Jellinbah commissioned and installed a solar-powered Beta-Attenuation Monitor (BAM) to monitor PM10 dust levels at sensitive receptors surrounding the Mackenzie North Mine. BAM units are considered a 'best-practice' methodology for monitoring PM10 dust and are more reliable than DustTrak units.

The BAM unit is solar-powered and mounted on a trailer to enable it to be moved between the sensitive receptors. Using the BAM unit, Jellinbah can monitor PM_{10} dust levels in real time via an online portal. The unit has alarms set up to notify key personnel when dust levels are approaching or exceeding, the limits defined in the EA or when adverse meteorological conditions are encountered (i.e. high wind speeds and when the wind is blowing in the direction of a sensitive receptor).

During the review period spanning between October and December 2024, the location of the BAM was near Jellinbah 1, following the recently proposed amendment to the monitoring schedule in the Air Quality Management Plan (AARC 2024). The revised schedule is based on a review of local prevailing wind directions (easterly) and historical onsite and regional PM₁₀ level monitoring. The schedule includes rotationally moving the BAM unit near the Jellinbah 1 and Jellinbah 2 sites, as they are expected to be most affected by the mine. The periods at each location are as follows

- September to February (Spring, Summer): Jellinbah 1 (west of mine)
- March to August (Autumn, Winter): Jellinbah 2 (north of mine)

The monitoring location may be modified in the future based on the data collected, complaints received, or changes in prevailing meteorological conditions.

3.1.2 Meteorological station

Jellinbah operates a meteorological station at Mackenzie North that records rainfall, temperature, wind direction, and wind speed to identify periods when nearby sensitive receivers are at risk of elevated dust levels. Access to frequent and real-time meteorological data, with alarms set on the BAM unit, means that Jellinbah can quickly alter operations (if required) to reduce the potential for impacts at sensitive receptors, following the Air Quality Management Plan and Trigger Action Response Plan (TARP) where needed. Rainfall recorded during the monitoring period is shown in Figure 2.



Figure 2: Daily rainfall (mm) from October to December 2024



3.1.3 PM₁₀ monitoring results

As per EA condition B3, the concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (µm) (PM10) suspended in the atmosphere should not exceed 50 micrograms per cubic meter over a 24-hour averaging time at any sensitive receptor downwind of operations.

The 24-hour average mass concentrations (MC) of particles during the reporting period (1st October to 30th December) is presented in Figure 3. Among the recorded data, the 24-hr average particulate matter concentrations ranged between 4.29 to 34.75 μ g/m³.

No exceedances above the EA limit of $50 \ \mu\text{g/m}^3$ were recorded during the monitoring period. Elevated PM10 levels do not often occur at Jellinbah, with the last 24-hour exceedances occurring in October 2023 and September 2024. This indicates that management and mitigation measures are implemented effectively at Mackenzie North.





Figure 3: 24-hr average PM10 dust concentrations between October and December 2024



3.2 Dust deposition monitoring

3.2.1 Equipment and methodology

Dust deposition monitoring has been undertaken at various locations surrounding the Mackenzie North Mine since February 2018. The dust deposition monitoring program monitors Jellinbah's compliance with the EA, whereby Jellinbah must ensure that dust particulate emissions generated by mining activities do not exceed the limit specified in the EA (120 mg/m²/day, averaged over one month) at any sensitive receptor.

The dust deposition gauges/bottles are intended to collect larger dust fall out particles than what is collected with the BAM unit. The dust deposition bottles are collected approximately every 30 days and sent to a NATA accredited laboratory, where the samples are analysed for ash content, combustible matter, total soluble matter, total insoluble matter, and total solids, in order to assist in determining the potential source of dust emissions.

It is worth noting that as the dust deposition bottles are sent off and analysed on a monthly basis, it is difficult to implement immediate mitigation measures in response to a single elevated level of dust deposition. Jellinbah is able to implement mitigation measures if it becomes apparent that dust deposition levels are significantly elevated upon receiving the previous month's data. This includes a review of the associated meteorological factors (such as wind direction) which may have since changed, potentially reducing the need for additional mitigation measures or significant changes to the current level of mitigation measures being applied.

Dust deposition monitoring locations surrounding Mackenzie North are listed in Table 2 and can be seen in Figure 4.

Site ID	Sensitive Receptor	Easting (GDA94 Z55)	Northing (GDA94 Z55)	Description
J2	-	696,930	7,434,336	Approximately 2km north of the Mackenzie North Mining Leases.
J3	Yes	688,933	7,429,662	Old Jellinbah Homestead (Jellinbah 1).
J4	-	691,714	7,429,806	Approximately 3km east of Old Jellinbah Homestead and J3.
J5	-	690,525	7,427,550	Approximately 3km south-east of Old Jellinbah Homestead and J3.
	Vac	607.407	7 420 274	Indinada Homesteed (Indinada 2)
- 10	res	697,497	7,439,274	Jelindan Homestead (Jelindan 2).
J7	-	699,159	7,429,044	Approximately 3km west of Scrubee (across Mackenzie River).
J8	-	696,412	7,429,438	Eastern side of Mackenzie River Anabranch (within the Mackenzie North Mining Leases (ML 70445).

 Table 2:
 Location of Mackenzie North dust deposition gauges





Figure 4: Mackenzie North dust deposition monitoring sites

3.2.2 Dust deposition monitoring results

Dust deposition monitoring data collected for the locations in Table 2 during the reporting period can be seen in Figure 5. Due to wet weather (Figure 2), dust deposition samples were only collected from the J3, J4 and J6 sites during December. As a result, Figure 5 shows the sample results for October to December with only the results from the monitoring sites available. Dust bottles are collected mid-month and the last collection was on 2nd December 2024.

Dust deposition gauges J3 and J6 monitor dust impacts at sensitive receptors. Results greater than the EA limit of 120 mg/m²/day identified at monitoring locations J3 and J6 may require management action. Dust deposition gauges J2, J4, J5, J7 and J8 are for interpretational purposes only and are not located at sensitive receptors. Elevated dust levels (>120 mg/m²/day) at the interpretational sites are not considered exceedance events.

The dust deposition results in Figure 5 indicated no concentrations of insoluble solids above the EA limit at any sensitive receptor location. However, high concentrations of insoluble solids were recorded at the interpretation site J8 during October, and November.





Figure 5: Dust deposition data recorded between the 5^{th} of September and 2^{nd} of December 2024

3.2.3 Analysis of dust deposition results

The concentration of insoluble solids at interpretation site J8 was observed to be relatively high (Figure 4) during the monitoring periods compared to all other sample sites, which were well below the EA limit of >120 mg/m2/day. The insoluble solid concentrations remained consistent over the monitoring periods, recording 153 and 152 mg/m²/day in October and November, respectively.

Figure 6 shows the recurrence frequency, by cumulative percentage, in which the hourly wind direction at each velocity range repeatedly occurs over the analysed period of October to November. During this period, the prevailing winds were from the north-east direction.

Considering the wind direction, the location of site J8, and the low concentrations of insoluble solids recorded at all other sample sites, the dust deposition results suggest mining activities were at a higher than usual intensity. However, adequate mitigation measures are in place, resulting in localised elevated levels of dust. Thus minimising potential impacts on other sample sites.



Figure 6: Wind rose graph from Jellinbah Mackenzie North station (October - November 2024).

4 Noise monitoring assessment

Noise monitoring was not conducted for the monitoring period October to December 2024 as it is a sixmonthly exercise and was last conducted on the night of 8th to 9th August 2024 between 10:02 pm and 2:51 am for the July to August 2024 monitoring period. The purpose of the noise assessment was to investigate any exceedances of the EA noise limits in relation to the Mackenzie North mine. The assessment also considered the extent to which the mine operations contribute to noise levels compared to surrounding mines such as Curragh and Yarrabee.

Attended noise monitoring is scheduled to be conducted in February 2025. As per the August 2024 monitoring period, the next period will consist of attended night-time monitoring at four (4) sensitive receptors and simultaneous overnight unattended noise logging at two (2) locations near the neighbouring mines to assist with noise source identification (as shown in Table 5 and Figure 7).

#	Nearest	Monitoring location	Coordinates (UTM) ¹	
	receptor		Easting (m)	Northing (m)
Sens	sitive locations			
A	Jellinbah 1 (Old Jellinbah Homestead)	Located beside the dirt track which merges with the dirt track between Jellinbah 1 and 2 sites. This site was chosen as representative of the homestead but removed from mechanical noise occurring at the homestead itself. Approximately 250 metres east of the homestead.	689016	7429800
В	Jellinbah 2 (Jellinbah Homestead)	Located beside the dirt track on the western side of the property, approximately 200 metres west of the nearest residence.	696996	7439286
с	Scrubee	Located on the northern side of an intersection of dirt tracks, approximately 400 metres east of the homestead.	701877	7428401
D	Tarcoola	Located on the southern side of an intersection of dirt tracks, approximately 850 metres south-east of the homestead.	705637	7434470
Add	itional monitoring lo	ocations		
L1	Curragh North Mine	Located in a triangular fenced site beside a dirt track, approximately 700 metres north of the Curragh North mine disturbance area. This site is accessed via a north-south track on the southern side of the dirt track between Mackenzie North mine and Jellinbah 1.	691165	7426631
L2	Yarrabee Mine	Located beside a bend in the dirt track leading to Scrubee homestead, approximately 900 metres west of the Yarrabee mine disturbance area.	703972	7426930

Table 3: Noise Monitoring Locations for February-March 2025 review period

Note: 1: Recorded coordinates were indicated to be +/- 5 metres accuracy according to the phone GPS application





Figure 7: Mackenzie North noise monitoring site