

30 May 2025

Attention: Kellie Smith
Environment & Community
Ulan Coal Mines / Glencore

Project number: 23064

Dear Kellie

Investigation of air quality conditions on 27 May 2025

Please see below for the investigation of air quality conditions around Ulan Coal Mine on 27 May 2025.

1. Background

Ulan Coal Mines Pty Ltd (Ulan Coal) operates the Ulan coal mine ("Ulan Mine") near Mudgee, NSW. The mine has approval to operate under Project Approval (PA) 08_0184. Schedule 3, Condition 19 of PA 08_0184 prescribes the air quality criteria for Ulan Mine including a 24-hour average PM_{10} concentration criterion of $50 \mu g/m^3$ (incremental impact). This report has been triggered by a 24-hour average PM_{10} concentration measurement which exceeded $50 \mu g/m^3$ at one of Ulan Coal's air quality monitors on 27 May 2025. It provides an investigation of the air quality conditions on this day to assist with identifying the factors that may have influenced the measured result.

2. Approach to Investigation

The investigation involved validating data then, if required:

- Reviewing site air quality monitoring data.
- Examining weather conditions.
- Determining the potential contribution from the direction of Ulan Mine.
- Checking the forecast conditions.
- Considering other potential factors.

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3. Monitoring Program

Ulan Coal operates a network of air quality and meteorological monitoring equipment to meet the requirements of PA 08_0184. A Tapered Element Oscillating Microbalance (TEOM), referred to as D1, is used for the collection of PM₁₀ near Ulan Village. Figure 1 shows the monitoring network.

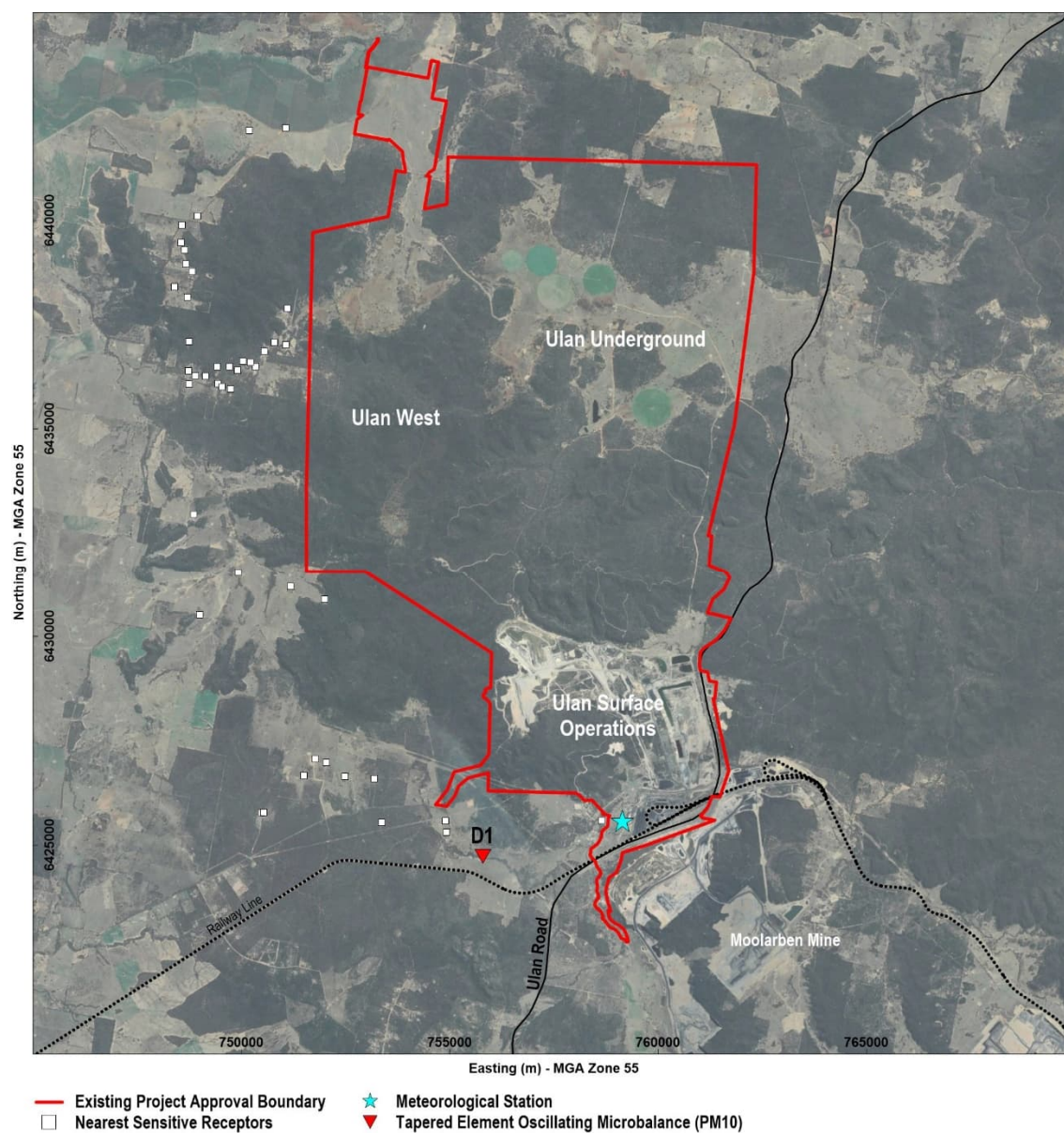


Figure 1 Location of air quality and meteorological monitoring sites

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4. Data Validation

Table 1 shows the recorded 1-hour and 24-hour average PM₁₀ concentrations at D1 for 27 May 2025. Ulan Coal uses contractors to assist with the collection and management of their air quality data. Novecom manages the data repository and alarm system (referred to as Sentinex). There were some missing data between 3 and 6 am which meant the calculated 24-hour average (106 µg/m³) did not match the average reported by Sentinex (84 µg/m³). The average reported by Sentinex was assumed to be accurate.

Table 1 Recorded PM₁₀ concentrations on 27 May 2025

Date	Hour	Recorded PM ₁₀ concentration at D1 (µg/m ³)	PA 08_0184 criterion (µg/m ³)
27/05/2025	1	13.2	-
27/05/2025	2	7.3	-
27/05/2025	3	8.3	-
27/05/2025	4	No data	-
27/05/2025	5	No data	-
27/05/2025	6	No data	-
27/05/2025	7	312.9	-
27/05/2025	8	457.7	-
27/05/2025	9	407.1	-
27/05/2025	10	245.8	-
27/05/2025	11	123.2	-
27/05/2025	12	86.5	-
27/05/2025	13	96.9	-
27/05/2025	14	128.2	-
27/05/2025	15	140.3	-
27/05/2025	16	106.1	-
27/05/2025	17	43.9	-
27/05/2025	18	13.4	-
27/05/2025	19	6.8	-
27/05/2025	20	10.4	-
27/05/2025	21	9.3	-
27/05/2025	22	7.2	-
27/05/2025	23	5.2	-
27/05/2025	24	5.1	-
Average	-	Calculated value = 106 Sentinex value = 84	50 (incremental)

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5. Investigations

5.1 Weather

The Bureau of Meteorology's forecast for Mudgee, issued on Tuesday 27 May 2025, is shown below. The forecast was for a possible shower. A maximum temperature of 17 degrees Celsius was predicted, and 40% chance of any rain. The site rain gauge recorded 19.8 mm of rainfall on 27 May.

	Tuesday May 27	Wednesday May 28	Thursday May 29	Friday May 30	Saturday May 31
Summary					
Maximum	17 C	15 C	17 C	19 C	19 C
Minimum	9 C	4 C	3 C	3 C	3 C
Chance of rain	40%	10%	5%	10%	5%
Rain amount	0 to 5 mm				

5.2 Wind

The wind conditions for 27 May are summarised as a wind-rose (Figure 2). This wind-rose shows the frequency of wind speeds and wind directions as measured by the site weather station. These winds were moderate to strong and from the west to west-southwest.

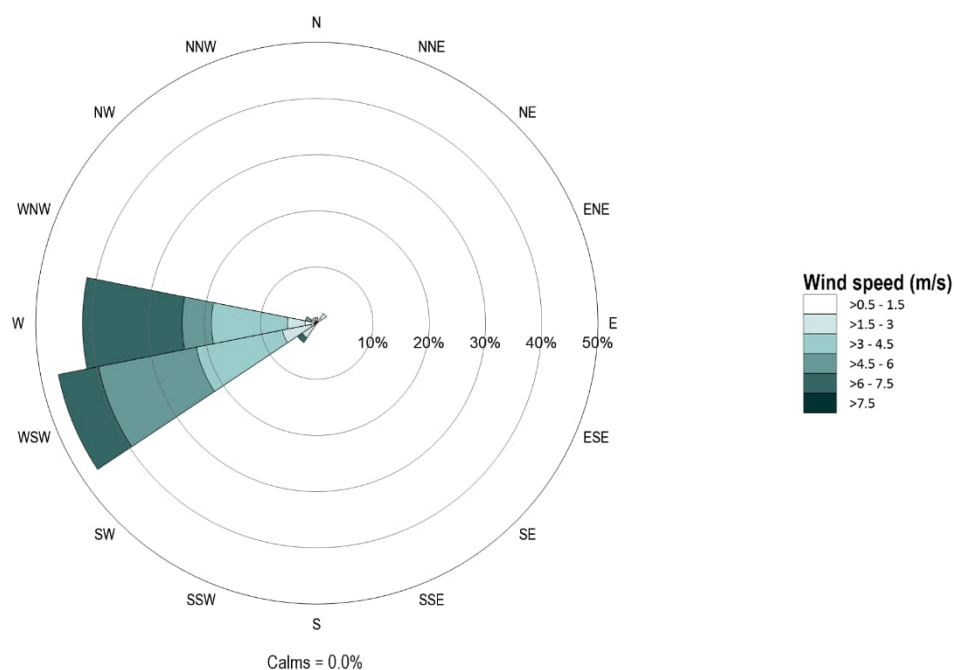


Figure 2 Wind conditions for 27 May 2025

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5.3 Air Quality (as PM₁₀)

Table 2 shows the measured 24-hour average PM₁₀ concentrations at D1. The measured PM₁₀ concentrations exceeded 50 µg/m³ at D1 on 27 May, with a value of 84 µg/m³. Also included in Table 2 are the monitored concentrations from three of closest Department of Planning, Housing and Infrastructure (DPHI) air quality monitoring stations. The regional DPHI results were also elevated, which suggests that the air quality conditions were not unique to the area around Ulan. Further investigation has been carried out.

Table 2 Measured 24-hour average PM₁₀ concentrations

Date	Measured 24-hour average PM ₁₀ (µg/m ³)				PA 08_0184 criterion (µg/m ³)
	Ulan (D1)	Bathurst (DPE)	Orange (DPE)	Merriwa (DPE)	
27 May 2025	84	91	65	87	50

Figure 3 shows the hourly averaged PM₁₀ concentrations at D1 with the concurrent hourly wind speed and wind direction data, as measured from the site weather station on 27 May. These data have been used to help explain the 24-hour average result. The wind conditions at the times of elevated PM₁₀ concentrations have been used to determine whether activities at Ulan Mine contributed to the monitored levels.

Figure 3 shows that the PM₁₀ concentrations at D1 increased to over 400 µg/m³ between 7 and 10 am. This “event” coincided with moderate winds (around 4 m/s) from the west. Ulan Mine is to the northeast of D1. Based on the west wind conditions, the activities at Ulan Mine were downwind of D1 when PM₁₀ concentrations increased at D1. This means that activities from the direction of Ulan Mine would not have contributed to this event.

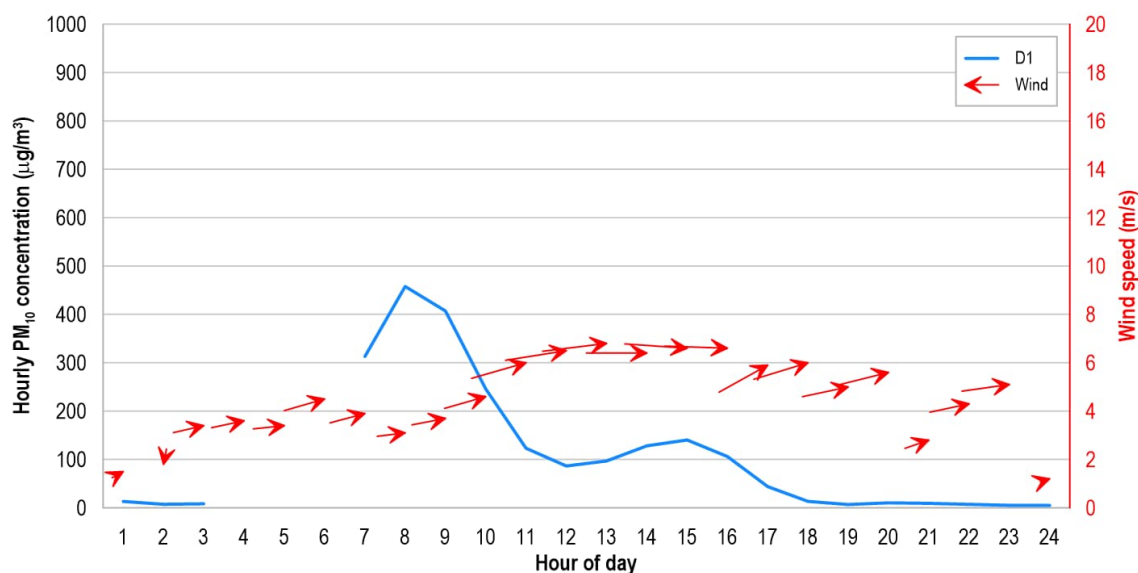


Figure 3 Hourly PM₁₀ concentration and wind measurements for 27 May 2025

5.4 Modelling

Air dispersion modelling is conducted daily to predict the likely contribution of activities at Ulan Mine to off-site air quality, based on forecast meteorological conditions. Results from the modelling are issued to staff each morning. Figure 4 shows the modelled 24-hour average PM₁₀ concentrations due to Ulan Mine on 27 May 2025. This day would not have been identified as a high-risk day in terms of potential dust impacts from Ulan Mine to D1 (Ulan Village). The forecast wind speeds were up to 6 m/s and consistent with observations. The forecast wind directions were from the west, also consistent with observations.

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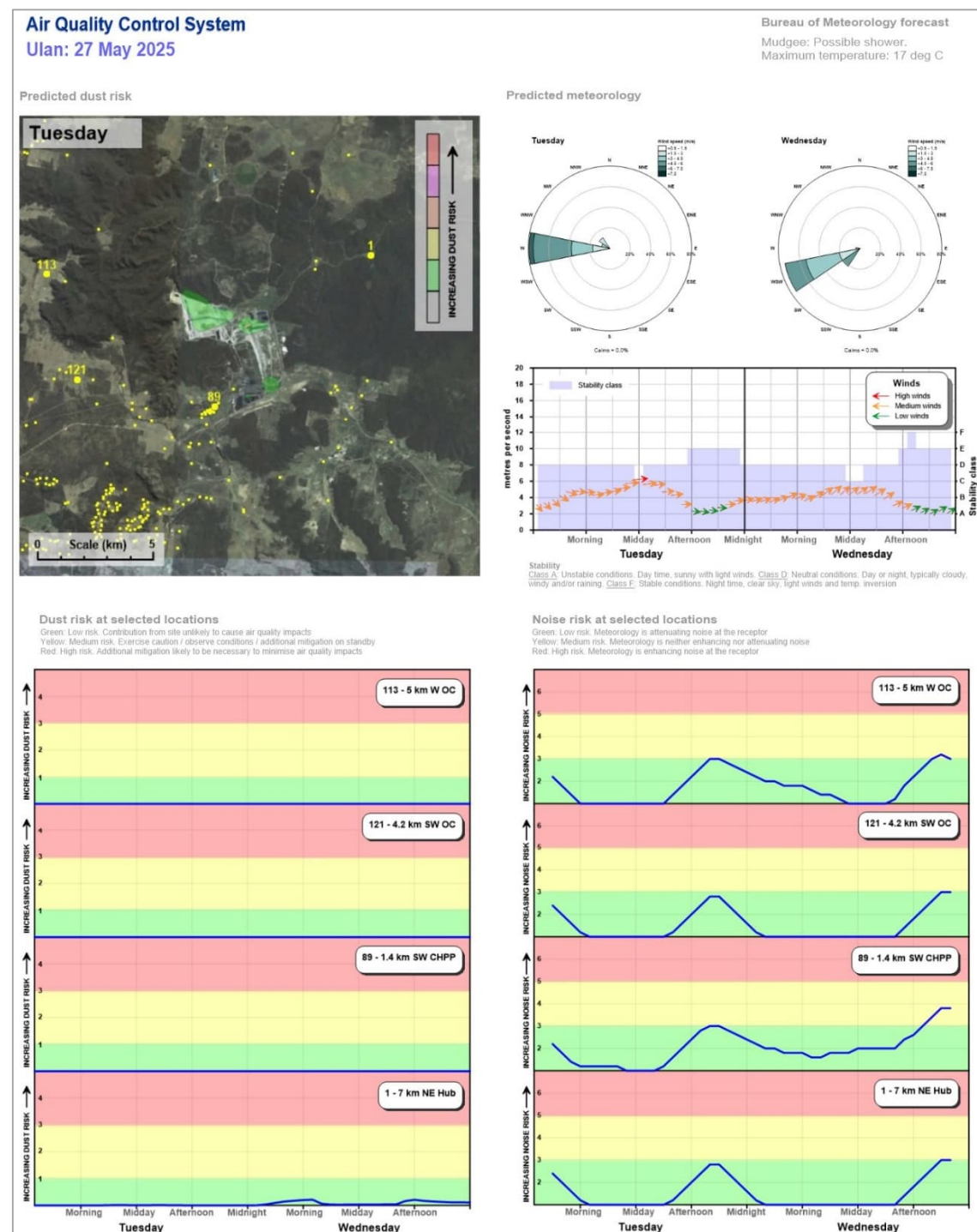


Figure 4 Environmental forecast for 27 May 2025

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5.5 Other Factors

A dust haze was reported¹ in many parts of NSW on 27 May 2025. This haze was caused by a wide-spread dust storm that originated from South Australia and travelled through Victoria and NSW. The affected areas included the south-eastern and central parts of NSW. Dust storms can be significant sources of fine particle pollution, and the event would have influenced the measured PM₁₀ concentration at D1 on this day.

6. Conclusions

The measured 24-hour average PM₁₀ concentration exceeded 50 µg/m³ at Ulan Coal's D1 monitor on 27 May 2025. A concentration of 84 µg/m³ was recorded. This event has been investigated by reviewing weather conditions, monitoring data, and forecast conditions.

The investigation led to the following key points.

- The daily forecast indicated that 27 May was unlikely to have been identified as a higher risk day in terms of potential dust impacts from Ulan Mine to D1. The forecast wind conditions were consistent with the observations.
- Activities at Ulan Mine were downwind of D1 when PM₁₀ concentrations increased between 7 and 10 am. The activities at Ulan Mine would not have contributed to this event.
- The elevated PM₁₀ concentrations at D1 were caused by a wide-spread dust storm that originated from South Australia and travelled through Victoria and NSW. The elevated concentrations at D1 were not unique to the area around Ulan.

Yours sincerely



Shane Lakmaker
Director / Atmospheric Scientist
Airen Consulting

¹ See for example <https://www.abc.net.au/news/2025-05-27/dust-haze-storm-sydney-illawarra-hazardous-conditions/105342162>