Personal Submission

Mount Owen Continued Operations Project

March 2015

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As a residence (93) that is documented in the Mount Owen Continued Operations Environmental Impact Statement (EIS) to be subjected to increased noise from the proposed expansion and requiring mitigation measures, as well as being located just outside of the modelled area from where the impact of expansion related dust is deemed to occur, we have some serious concerns relating to modelling and assumptions contained within the EIS.

This document forms the basis of our submission and outlines our key concerns relating to the EIS and the actions we believe Mount Owen must examine and address, to ensure that nearby landholders do not find themselves significantly worse off that implied in the EIS.

We reserve the right to object to the Mount Owen Continued Operations proposal should Mount Owen insufficiently address each of the issues raised in this submission.

1. Data collection and reporting concerns

There have been some issues involving reporting accuracy observed in the environmental reports (monthly and annual) that are submitted by Mount Owen to relevant Government departments; as part of their licence conditions.

Actual environmental measurements and meteorological conditions underpin much of the modelling undertaken to determine the impact of dust and noise on surrounding residences. As a result, the presence of multiple reporting errors, which have not been publicly clarified or addressed, raise serious concerns as to the validity and quality of the data and Mount Owen's transparency in reporting and notification.

1.1 PM_{10} 3 data errors

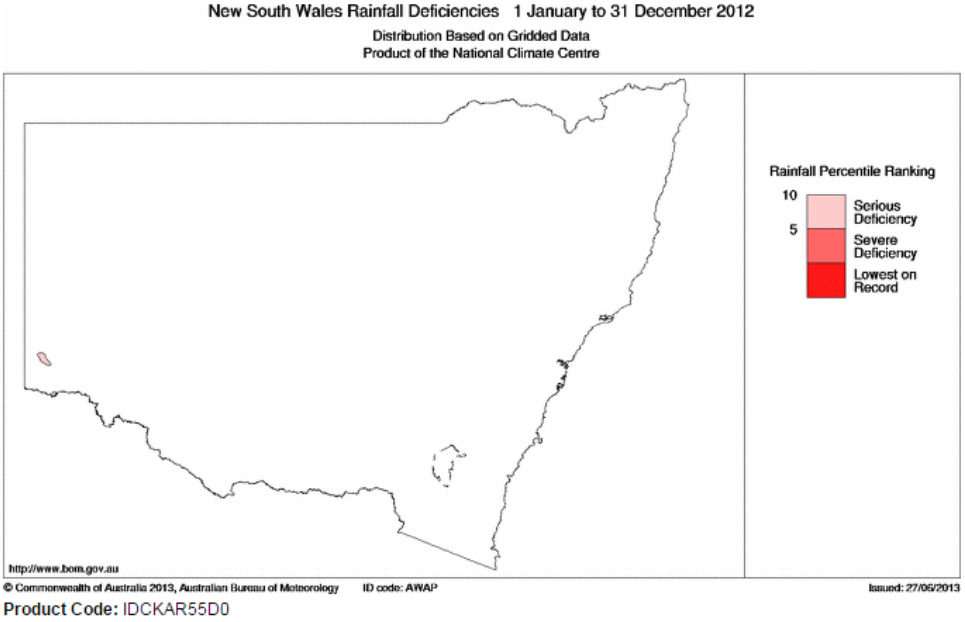
At a face to face meeting with Mount Owen representatives in October 2013, we raised the issue of why values from the PM_{10} 3 gauge had been increasing throughout 2012 and 2013, as reported in the 2012 Annual Environmental Management Report (AEMR) and the Monthly Monitoring Reports.

The 2012 AEMR stated:

PM_{10} 3 is located to the east of Glendell. The maximum cumulative rolling average was 23.03µg/m³. Whilst this is well within regulatory guidelines (<30µg/m³), it has exceeded the predicted annual average for this site which is 14.9µg/m³. It should be noted however that since the commencement of monitoring at this location in 2006, the annual average has been in the range of 18-28µg/m³. It is firmly believed that the current average for 2012 is heavily influenced by ongoing drought conditions and local agricultural practices, rather than mining as this site is located within 600m of intensive farming land.

In the first instance, we raised the Hunter Valley was not drought conditions during 2012, as clearly illustrated by the Bureau of Meteorology in Figure 1. Secondly, the closest so called 'intensive' farming land is actually an irrigated lucerne property and consequently least likely to contribute to dust problems.

Figure 1: Drought conditions during 2012



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When we examined 2013 Monthly Monitoring Reports for the PM_{10} 3 gauge, we found the increasing trend discussed in the 2012 AEMR continued throughout 2013. However, the July to September 2013 PM_{10} 3 values contained in the September 2013 report (Table 1, highlighted in yellow) were each decreased by 3 and 4 µg/m^3 in the October monthly report (Table 2), without any explanation or clarification in the Monthly Monitoring Reports or in the subsequent 2013 AEMR.

Table 1: PM_{10} particulate manner annual rolling average (September 2013)

Month	Particulate Matter (PM10) (µg/m³)				Compliance Criteria (ug/m³)
	PM10 1	PM10 3	PM10 4	PM10 5	
Oct-12	18	22	29	24	30
Nov-12	18	22	28	23	30
Dec-12	18	22	29	24	30
Jan-13	19	23	28	25	30
Feb-13	18	23	29	24	30
Mar-13	18	23	29	23	30
Apr-13	18	24	28	23	30
May-13	17	24	28	22	30
Jun-13	17	24	28	22	30
Jul-13	17	26	27	22	30
Aug-13	17	26	28	22	30
Sep-13	16	26	27	22	30

Note: all PM10 monitors are located on mine owned properties

Source: Mount Owen Mine Monthly Monitoring Report September 2013

Table 2: PM_{10} particulate manner annual rolling average (October 2013)

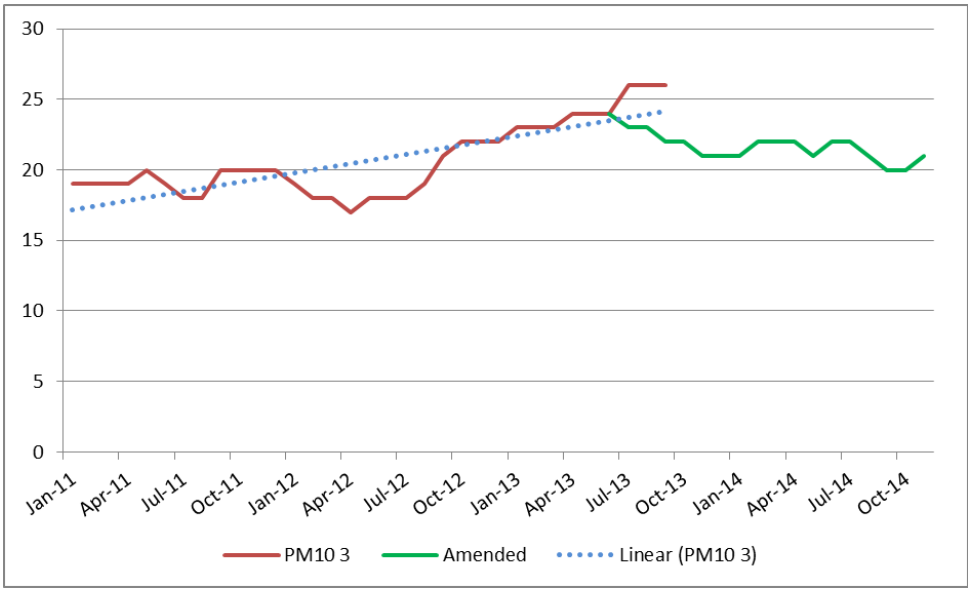
Month	Particulate Matter (PM10) (µg/m³)				Compliance Criteria (ug/m³)
	PM10 1	PM10 3	PM10 4	PM10 5	
Nov-12	18	22	28	23	30
Dec-12	18	22	29	24	30
Jan-13	19	23	28	25	30
Feb-13	18	23	29	24	30
Mar-13	18	23	29	23	30
Apr-13	18	24	28	23	30
May-13	17	24	28	22	30
Jun-13	17	24	28	22	30
Jul-13	17	23	27	22	30
Aug-13	17	23	28	22	30
Sep-13	16	22	27	22	30
Oct-13	16	22	29	21	30

Note: all PM10 monitors are located on mine owned properties.

Source: Mount Owen Mine Monthly Monitoring Report October 2013

Following on from these unsubstantiated changes, the 2013 AEMR reported a rolling average of 21.1 µg/m^3, which was approximately equal the Predicted Annual Average EIS (Yr 10) of 21 µg/m^3 (p 33). However, if the pre-amended results were used in this calculation, the actual value would be closer to 23.6 µg/m^3 – higher than the Predicted Annual Average EIS (Yr 10) value. The amendments to these PM_{10} 3 values clearly reversed the increasing trend that had been occurring (Figure 2) in the previous 12 month period.

Figure 2: PM_{10} 3 historical values - pre and post-amendment



We were informed by a Mount Owen employee that the PM_{10} 3 values in the Monthly Monitoring Reports were incorrect, as was the PM_{10} 3 information in the 2012 AEMR. We received no explanation as to why the data was incorrect, nor how the error occurred and was identified.

Whilst the PM_{10} 3 values reported prior to the amendment were below the compliance value of 30, the so called 'errors' and their subsequent reporting in Monthly and Annual Environmental Reports – which form part of their licence conditions – raise serious concerns about the accuracy and validity of the recorded data at the Mount Owen site and underpins serious concerns as to the legitimacy of the baseline data for the proposed extension dust modelling, particularly as the PM_{10} 3 gauge is located closest to those properties that may potentially be impacted upon with the proposed extension.

> **Conclusion**: We request that Mount Owen provide evidence to demonstrate that PM_{10}3 levels have not been increased and that the amended data is indeed valid and not 'patched'. Additionally we seek clarification on how the reporting 'errors' occurred, why they did not provide clarification about the errors in their reporting and changes to data in their Monthly Monitoring Reports and 2013 AEMR and what quality control processes are in place to ensure the validity and integrity of their gauge data.

2. Meteorological data validity and assumptions

There are several concerns relating to the meteorological data and assumptions that serve as baseline data for the environmental models.

2.1 Duration of meteorological data and adverse weather events

The Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales require that *'Level 2 impact assessments are conducted using at least one year of site-specific meteorological data. The meteorological data must be 90% complete in order to be acceptable for use in Level 2 impact assessments (i.e. for one year, there can be no more than 876 hours of data missing)'*.

PAE Holmes, in a 2011 report for the NSW Office of Environment and Heritage, write:

The US EPA provides similar advice in their document referred to as Appendix W (US EPA, 2003). They require that the model user should acquire enough meteorological data to ensure that the worst-case meteorological conditions are adequately represented in the model results. The report then goes on to discuss the number of years of record needed to obtain a stable distribution in model predictions. Their review notes that some studies have indicated that in excess of 10 years may be required to achieve stability in the frequency distribution of some meteorological variables however they note that such long periods are not reasonable for model input data. Further work reviewed by the US EPA, looking at approximately a 17-year dataset ,and running model predictions using sub sets of the 17-year set, indicates that meteorological data from one station over a period of approximately five years would be sufficient to adequately represent dispersion conditions in a particular area (HAS 2008).

Mount Owen analysed just three years and eight months of meteorological data before deciding upon their representative year. This is a very short period of time to analyse weather data, particularly given Australia is uniformly regarded as having one of the most variable climates in the world (CSIRO, 2014) and the inclusion of just 12 months of this meteorological data in the dust modelling only exacerbates the risk of modelling inaccuracies particularly relating to the exclusion of significant adverse weather outcomes.

The non-inclusion of any significant adverse weather events in the meteorological data used for the environmental modelling exposes nearby residences to the very real possibility of experiencing dust conditions in excess of those predicted in the modelling and being powerless to act, as they are outside of the mitigation area and lack the means and instrumentation to accurately document the occurrences.

Whilst we recognise that the meteorological data has met the standard required by the EPA (albeit the absolute minimum standard), these standards do not allow modelling for a cross section of meteorological conditions that have been experienced at the site and for the full spectrum of the resulting dispersion to be considered.

> **Conclusion:** As well as proposing that the EPA review raising the minimum standard for modelling to five years in line with United States EPA standards, we request that Mount Owen, at the bare minimum, increase the meteorological modelling to the entire three years and eight months they have meteorological data available.

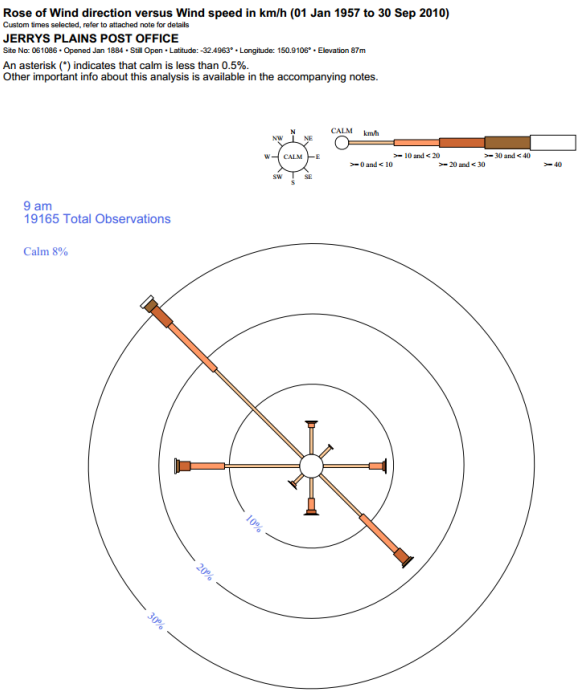
2.2 Representativeness of meteorological data – historical

The EIS states that the wind data was based on an '*analysis of the meteorological data collected at SX8 and SX13 between January 2009 and August 2012 was competed to determine the most representative 1-year period suitable for air dispersion modelling. The period chosen for modelling was the 12 month period from 1 September 2011 to 31 August 2012*' (EIS Appendix 6, page 20).

The EIS also goes on to report that *'In accordance with EPA guidelines for air dispersion modelling, the meteorological dataset needs to be >90% complete. The only periods where both SX8 and SX13 are >90% complete in the analysis period, are 2011 and 2011/2012. These two yearly datasets are also very similar to each other at both monitoring sites, in terms of the percentage of calms experienced in each season' (*EIS, page 20*)*.

Jerry's Plains, located 19km from the Mount Owen site, has wind data available from the 1950s to September 2010. An annual wind rose (Figure 3) reveals that the predominate direction for the year is from the north west (NW), accounting for over 30 per cent of all wind observations, with all strong winds (>= 40kmh) also coming from the NW. The west through north quadrant contained approximately 50 per cent of all recorded observations.

Figure 3: Wind rose for Jerrys Plains



Source: Bureau of Meteorology

The 2011-12 data selected by Mount Owen for their modelling is broken down into more detail to include the eight half-winds. SX8 data clearly indicates a predominately east to south quadrant instead of the west through north quadrant indicated by the Jerry's Plains historical data (Figure 4). Whilst the SX13 station does contain a higher proportion of the west through north quadrant observations, estimated at around 36 per cent (Figure 5), it is still significantly lower than in the historical Jerry's Plains data.

Figure 4: SX8 Wind rose 2011-12

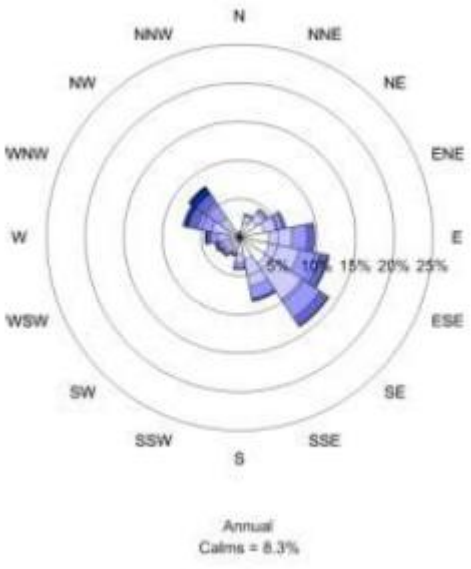
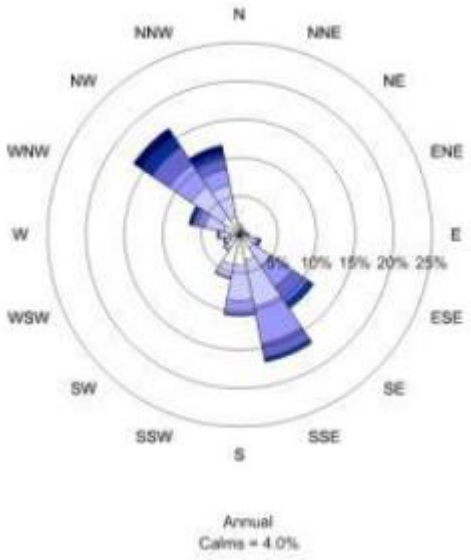


Figure 5: SX13 Wind rose 2011-12



Whilst the percentage of calms may be similar to the SX8 data, there is little evidence to suggest that the September 2011 to August 2012 wind data that is incorporated into the environmental modelling is representative of historical conditions for the area.

> **Conclusion**: We request that Mount Owen increase the meteorological modelling to the entire three years and eight months they have meteorological data available and ensure the data is in line with historical wind patterns (both direction and speed) for the area.

2.3 Representativeness of meteorological data – Mount Owen AEMRs

The direction and speed of winds included in the modelling has the potential to significantly impact upon the residences to the SW of the proposed extension. The importance of westerly and north westerly winds to dust dispersion is clearly evident through the Mount Owen Complex reporting.

The 2004-05 Mount Owen AEMR explains *'Complaints are most commonly received in the cooler time of the year (Table 8), which co-incides with the period of most adverse conditions for noise propagation (inversions) and dust generation (strong westerly winds). Prevailing weather conditions have been shown to have significant impacts upon both the level of impact and complaint frequency'*. They also mention *'Episodic dust emissions were the second most common complaint issue. This mainly related to visible dust during moderate to strong westerly wind periods in winter and spring'* (page 27).

This same commentary was repeated in the 2005-06 AEMR (page 33), 2006-07 AEMR (pages 31-33) and again in the 2007-08 AEMR (page 32 and 34).

The 2006-07 AEMR report raises an incident of '*one cumulative result from PM10 2 (Falbrook Rd) of 55 µg/m3 and one cumulative result from PM10 3 (Middle Falbrook Rd) of 60 µg/m3 that exceeded the project specific criterion of 50 µg/m3. Both of these results were recorded on 5th May 2007 and the predominant wind direction throughout the day was west to north-west'* (page 42).

The same report also refers to '*adverse weather conditions (northwest winds), which persist throughout winter and spring*' (page 50).

The 2007-08 AEMR raises '*During extreme weather conditions (very strong to gale force north westerly winds) on several occasions during winter/spring 2007, some pieces of equipment were shut down in an effort to minimise dust emissions from the site'* (page 34).

The 2007-08 AEMR also reports '*On 10th August 2007, the Falbrook Rd PM10 continuous dust monitor recorded a cumulative 24 hr average PM10 concentration of 67.9 ug/m3. The Hebden Rd PM10 monitor (upwind of Mt Owen during northwesterly winds) recorded a cumulative 24hr average PM10 concentration of 13.6 ug/m3. Hence the calculated project specific PM10 contribution was 54.3 ug/m3. Dust had been flagged as a potential problem from the early morning, due to persisting strong north westerly winds. A third water cart was commissioned and operations were altered at various times throughout the day in an effort to minimise dust emissions generated by the site. PM10 dust levels were monitored continuously throughout the day and into Friday evening in an effort to curb increasing dust levels. Strong northwesterly winds, at times reaching over 60 km/hr persisted throughout the day and into the night'* (page 48).

The importance of north westerly winds is also clearly noted in the 2008-09 AEMR, stating *'During winter and spring the north-west winds are predominate'* (page 23). This statement was also repeated in the 2010-11 AEMR (page 30) and again in the 2012 AEMR (page 31)

The AEMRs also provide a broad summary of the overall wind direction and speed by season. The 2008-09 to 2013 reporting is contained in the text below, with a summary of the data in Table 3.

2008-09 AEMR: *The predominant wind directions during summer months were east to south-east. Autumn winds commenced from the east to south-east and changed to north-west to west in May leading into winter. Winter was dominated by north-west to westerly winds. Spring was split between west to north-west and easterly to south-east with December experiencing similar patterns. Analysis of wind direction data for the reporting period revealed that seasonal wind speed and direction trends were generally consistent with previous years. Mt Owen Complex experienced wind conditions and patterns during the reporting period generally consistent with those experienced in the Hunter Valley* (page 19).

2009-10 AEMR: *The predominant wind directions during summer months were from the east to north-east. Autumn winds commenced from the east to north-east and changed to west to north-west in May leading into winter. Winter was dominated by north-west to westerly winds. Spring was split between north-west to east with December experiencing easterly winds. Analysis of wind direction data for the Reporting Period revealed that seasonal wind speed trends were generally consistent with previous years while direction trends were more southerly in summer months for the previous reporting year compared to easterly dominating winds for the Reporting Period. Mt Owen Complex experienced wind conditions and patterns during the Reporting Period generally consistent with those experienced in the Hunter Valley* (page 20).

2010-11 AEMR: *The predominant wind directions during summer months were from the east with the Autumn winds commenced from the east to north-east and changed to west to north-west in May leading into winter. Winter was dominated by north-west to westerly winds. Spring was split between north-west to east with November primarily being from the south east. Analysis of wind direction data for the reporting period revealed that seasonal wind speed trends were generally consistent with previous years while direction trends were more southerly in summer months for the previous reporting year compared to easterly dominating winds for the reporting period resulting in cooler and wetter conditions. Mt Owen Complex experienced wind conditions and patterns during the reporting period generally consistent with those experienced in the Hunter Valley* (page 25).

2012 AEMR: *The predominant wind directions during summer months were from the east with the Autumn winds commenced from the east to north-east and changed to south west to west in the winter period. Winter was dominated by west to south westerly winds. Spring was split between south east to westerly. Analysis of wind direction data for the reporting period revealed that seasonal wind speed trends were generally consistent with previous years. Mt Owen Complex experienced wind conditions and patterns during the reporting period generally consistent with those experienced in the Hunter Valley (page 28).*

2013 AEMR: *The predominant wind directions during the summer months of early 2013 were from the south and south-east with the autumn winds coming from the south-east and north-west directions. The winds predominantly came from the north-west during winter and spring before*

transitioning to south-easterly towards the end of the year. Analysis of wind direction data for the reporting period revealed that seasonal wind speed trends were generally consistent with previous years (page 26).

Table 3: Summary of AEMR wind direction discussion

AEMR	Summer	Autumn	Winter	Spring
2008-09	E to SE	E to NE changing to NW-W	NW-W	W-NW to E-SE
2009-10	E to NE	E to NE changing to W-NW	NW-W	NW to E
2010-11	E	E to NE changing to W-NW	NW-W	NW to E and SE
2012	E	E-NE	W-SW	SE to W
2013	S to SE	SE and NW	NW	NW to SE

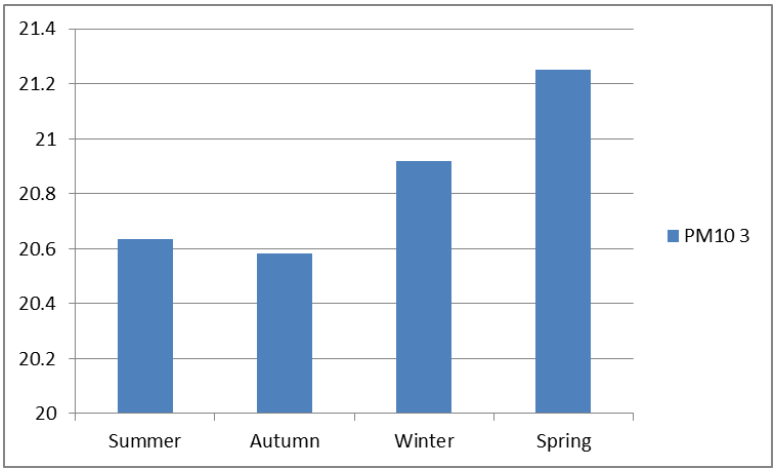
Of particular concern is while Mount Owen state that the wind speed and direction data used in the modelling was for a representative year, Table 3 clearly indicates the year they selected (denoted in yellow) was not representative over the winter months when W-SW winds featured instead of the typical NW-W of previous years.

In fact, despite regularly reporting about the risks and problems associated with winds in the west through north quadrant, Mount Owen have selected their so called 'representative year' from the only recent data not exhibiting those same problematic winds.

This omission is of considerable consequence to the Bridgman/Middle Fallbrook properties impacted upon by the proposed expansion, as it is the very direction that will cause them the most concern. This finding is further backed up by the cumulative west through north quadrants for the winter of 2012 being approximately 13 per cent lower for SX13 and 25 per cent lower for SX8.

The EIS claims that '*In general, the highest PM10 concentrations are experienced during summer and the lowest during winter*' (EIS, page 24). However, an analysis of the PM_{10}3 gauge values (the gauge closest to our residence), reveals that it is actually the winter and spring months that see the highest PM10 values (Figure 6), not the summer months.

Figure 6: PM10 3 average values by season, 2011-14, Monthly Environmental Monitoring Reports



This figure further demonstrates the importance of an accurate meteorological dataset that represents the strong NW-W winds that occur during the winter months and underpins all the environmental modelling.

> **Conclusion:** We request that Mount Owen increase the meteorological modelling to the entire three years and eight months they have meteorological data available and ensure the data is in line with historical wind patterns (both direction and speed) for the area and includes the prevailing NW-W winds in the winter months.
>
> Furthermore, we request that Mount Owen include significant adverse weather events (the strong to gale force west through north quadrant winds) that they so frequently raise in the AEMRs to determine how the properties in the Bridgman/Middle Fallbrook are impacted upon by these recurrent adverse weather events.

2.4 Meteorological reporting errors

As well as the PM_{10}3 reporting errors discussed in Section 1, the Mount Owen Complex have also had some issues with the reporting of their wind data in the AEMRs. In the 2012 AEMR they state '*Following the 2011 AEMR, an error was identified relating to wind roses in Appendix B. Upon further investigation wind directions were found to differ from Table 7 of the 2011 AEMR, however the results for gauges DD9 and DD11 for July 2011 and September 2010 still indicated no there had been no impact from the Mt Owen complex'* (page 39). This error certainly raises further question as to the accuracy and validity of the Mount Owen wind rose data and their ability to manage and report upon large data sets.

> **Conclusion**: We request that Mount Owen detail the quality control processes in place to ensure the validity and integrity of their meteorological and gauge data.

3. Noise impacts

We recognise that the issues we raise with the meteorological data in the previous sections have the same potential impact upon the accuracy and reliability on the noise impacts and modelling, and therefore will not go through the impact of the meteorological data on the modelling.

However, there are some other noise related issues that require further clarification and understanding.

3.1 Education of impacted residences

There is a need for greater consulting by Mount Owen to work with impacted residents to understand just what the potential effect will be in real terms; not just on paper.

We find ourselves within the Noise Management Zone ('*exceedance of greater than 2 dBL and up to and including 5 dBL above the relevant PSNL', EIS,* page 130), and whilst we understand there are reasonable and feasible noise mitigation measures available to us, we have no real concept of what that noise increase means to us and our day to day quality of life. How does 36 decibels compare to

40 decibels? How do both of these compare to the current noise we experience from Mount Owen? Will we have the same quality of outdoor living and the ability to still leave doors and windows open to sleep?

> **Conclusion**: We request that Mount Owen clearly demonstrate the difference in current decibels levels and what levels can be expected to the residences in the Noise Management Zone. Furthermore, we ask that Mount Owen clarify with impacted residences the mitigation options available and the success these mitigation options have in managing the increased noise to ensure an equivalent quality of life.

3.2 Low frequency noise

There are occasions when we experience what we've been led to believe is low frequency noise. This noise is noticed during the night, and it almost seems more like a vibration than just a noise. A 'pillow over the head' or any other attempt does not stop the noise and it can make sleeping immensely challenging.

Table 4.5 of Appendix 7 of the EIS records N16, one of the closest monitoring points to our residence as having '*Local rural noise sources; low-frequency mining noise continuing from the approved North Pit and the SSE*' (page 4.10).

However, the elements of '*sleep disturbance*' discussed in the EIS refer to '*typically transient noises*' that '*often have tonal characteristics*', including '*an excavator bucket striking the ground; heavy objects (rocks) being dropped into a truck tray; air horns used to control truck movement; reversing beepers; and track clatter from bulldozers* (EIS, page 131).

There does not appear to be any acknowledgment of the impact of this low frequency noise on sleeping disturbance and furthermore, Appendix J in Appendix 7 of the EIS states that '*Given the relatively low levels of low frequency noise predicted, low frequency modifying factors have not been applied to the predicted noise levels for the Project*' (page 3).

> **Conclusion**: Mount Owen outline the incidence of low frequency noise required before they need to apply modifying factors to the modelling and whether this incidence will be reviewed once expansion commences. Also they need to clarify how they plan to distinguish between approved and expansion noise sources and whether they concede that low frequency noise can also feature in sleep disturbance.

4. Operational considerations

Anecdotally, we have observed in recent years Mount Owen still running their pit when other nearby mines have 'pulled up' due to wind concerns.

> **Conclusion**: We seek clarification on whether Mount Owen has or proposes to have nominated conditions (wind speed and direction) that operations must be pulled up; either involving part or the whole pit, or whether pulling up is more arbitrary in its nature and is at

the Open Cut Examiner's (OCE) discretion. Furthermore, we request the parameters at which blasting will not occur due to prevailing wind conditions.

5. Ongoing monitoring and model validation

It is challenging for impacted residences to have an in-depth and accurate understanding of the actual noise and dust conditions experienced on their properties and how those conditions compare with 1) the expected values that were modelled in the EIS and 2) maximum values allowed under the consent of the mining licence.

Give the proposal is for an expansion rather than the entire Mount Owen Complex, there needs to be a clear, valid and transparent method of distinguishing between existing operations and those involved in the expansion. This will ensure that a residence experiencing an increase dust or noise emissions is not sidelined by using the excuse of the noise/dust arising from the original Mount Owen operations, as opposed to the expansion.

Conclusion: We request further information on the monitoring locations and timing for noise and dust, as well as Mount Owen's planned methodology for distinguishing expansion related impacts from existing mine operations.

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