YORKE PENINSULA LAND OWNER'S GROUP
EXTRACT FROM SUBMISSION TO DMITRE:

TOPIC: AIR QUALITY

8th November 2013

2.3 Air quality/Dust emissions

Given the sheer size of the mining operation, dust emissions pose one of the biggest threats to Yorke Peninsula's community health and environment.

2.3.1 The type of dust considered

The modeling in the MLP focuses on two types of dust:

- Ambient PM_{10} concentrations – ie particles with a diameter of less than 10 um) and
- Total suspended particulate matter (TSP); ie the total amount of particles suspended in the air regardless of particle size.

No modeling of $PM_{2.5}$ is included even though we understand that this measurement will soon become the industry standard.

A recent Senate inquiry recognized that current measurement standards ie the PM_{10} and $PM_{2.5}$ are inadequate.

Rex must explain

- **why it failed to consider or undertake any modeling of $PM_{2.5}$ dust emissions.**

2.3.2 Total amount of dust generated and dispersal distances

- At the mine site huge amounts of dust will be generated by the mining operation itself and by wind-blown dust from the exposed surfaces of the huge waste rock dumps, the exposed pit faces and the exposed haul road surfaces.

- At Ardrossan, the port infrastructure will generate further dust concentrations.

- As detailed in the table below., over 1.6 million kg of TSP (ie the total amount of particles suspended in the air regardless of particle size – referred to as 'nuisance dust') will be emitted each year, including over 620,000 kg per year of PM_{10}.

Append ix 5.6C, Appendix B.3.1: Summary of TSP and PM_{10} Emissions

Source of Eis	Amount TSP emissions	Amount PM_{10} Emissions

	(kg/year)	(kg/year)
Pit Activities (including haul roads within the pit)	687,570	369,775
Loading and Unloading Activities	68,957	29,026
Wind Erosion from Exposed areas	19,249	9,625
Haul Roads outside of pit	808,462	201,564
Crushing Activities	22,500	9,000
Port Operations	6,111	2,444
TOTAL EMISSIONS	1,612,849	621,434

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2.3.3 PM10

- Rex Minerals' Dust Predictive Map (Figure B5.4, based on full production for all days with no limitations on operations, and **all 'so-called' dust controls applied** shows maximum levels of dust that would be experienced in a 24 hour period. As shown, PM10 emissions extend from the north of Ardrossan township, covering a wide area to the south of Black Point, moving inland and also extending well into the Gulf, raising issues of sea water contamination from dust settling on the surface of the water.

- High concentrations of dust (in excess of NEPM guideline of 50 ug/m3) are predicted
    - at the mine site itself where concentrations will reach 200 up/m3 and
    - at the Port where in excess of 50 up/m3 will occur around the conveyer transfer point and the ship loading locations.

- A large area outside of the mine itself will experience a 24 hour maxima of 25 or greater.
    - The settlements of Rogues Point and Pine Point will experience predicted 24 hour maxima of between 30 and 40 up/m3,
    - Black Point and Ardrossan will, experience predicted maxima of 22 – 25 up/m3.

- A section of St Vincent's Gulf adjacent to the mine falls within the 50+ range, and a much larger area is predicted to have dust concentrations in excess of 25 up/m3.

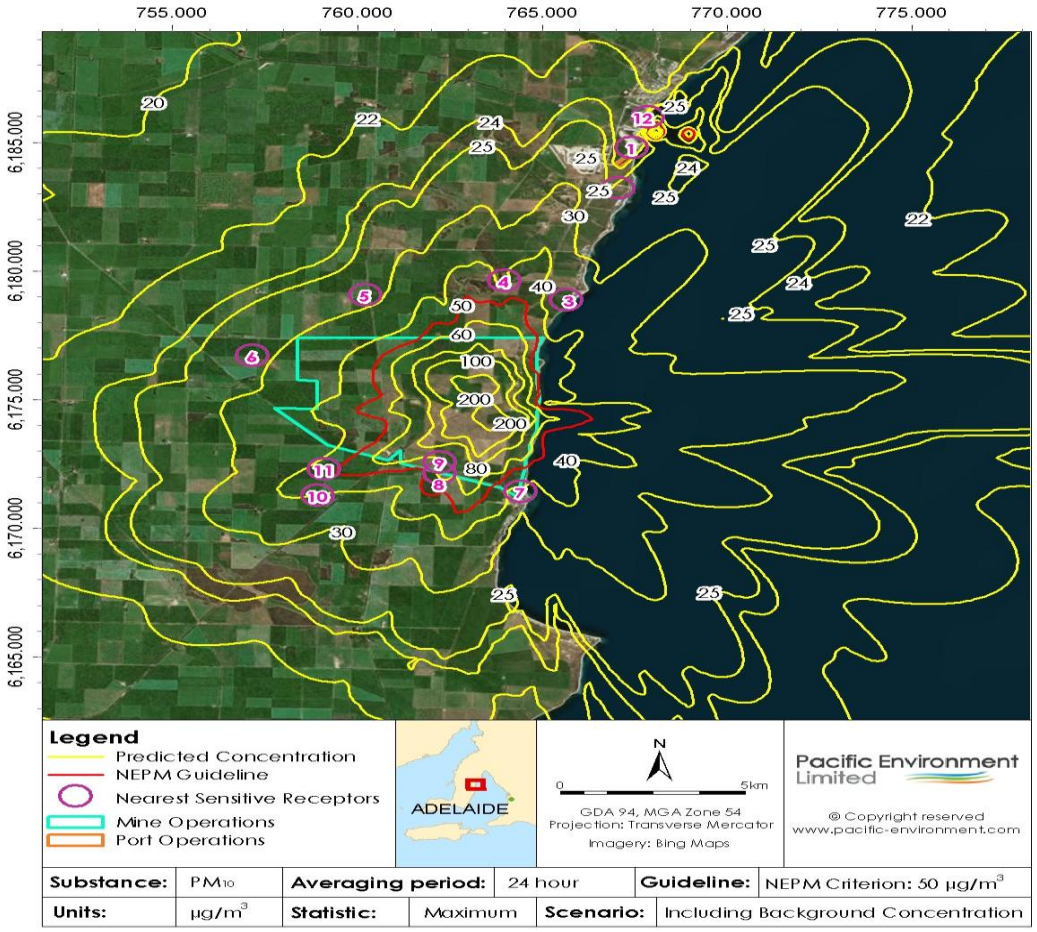
Rex Minerals' argue that, according to the model, full compliance with the NEPM criterion of 50 up/m3 is predicted at receptors 1 – 7 (including Rogues Point) and receptors 10 to 12. Receptor 8 would comply on all but 1 day per year, and receptor 9 on 3 days per year.

These predictions seem highly questionable given that baseline data found that NEPM air quality standards were exceeded on **6** occasions during 2012 as a result of strong northerly winds. And these high levels occurred without the 1.4 million tons of dust that the mining operation will generate.

Given this huge amount of additional dust generated by the mine, it is highly unlikely that there will be only three days of 'extreme climatic conditions'. Yorke Peninsula has far more than only three or six windy days per year as evidenced by the winds that have buffeted the region in the last month or so.

Figure B.5.4 shows the predicted PM10 impacts from the revised haul road dust emissions scenario. The increased is very limited. (Note that this Figure reflects the results from remodeling work undertaken at the request of the EPA. (see page.. for further comments). When compared with the original Map (Figure 9.2) there is a slightly increased footprint of the 50 Mg/m3 contour.

Figure B.5.4: Predicted maximum 24-hour PM_{10} Concentration (Mine Operations) – including background concentration



How much more PM10 dust will there be compared with pre-mining levels?

- PM10 concentrations in the region bordering the mining site currently have very low dust levels across all months.
- Although there was a considerable amount of missing data, figures indicate that during the dust monitoring period (January 2012 to November 2012) low PM10 concentrations were recorded across all months, varying from 8.4 to 21.1 depending on the location of the dust collectors. (Table 8.1 MLP 8.2, 25)
- The average for the whole period was a very low 12.8.
- There were six instances when the National Environment Protection (Ambient Air quality) Measure (NEPM) guideline of 50 ug/m3 were exceeded which, it was noted, occurred on days with high northerly wind speeds.

Even if the mine manages to comply with NEPM criterion (50ig/m3), it is inevitable that residents within at least a 10 km radius of the mine site will be exposed to considerable increases in dust concentrations once mining commences than is currently the case. And given that this will be a 24/7 operation, these increased dust levels will be present around the clock, rather than on isolated occasions, as is currently the case.

While Rex Minerals are keen to stress that dust levels will be below the NEPM criteria, experiences in other locations suggest there is a major dysjunction between what a regulator considers acceptable and what the local community, accustomed to living in a relatively dust-free environment, consider to be acceptable .

For example, dust emissions constitute one of the major criticisms raised by residents at the regular CCG meetings regarding the Kanmantoo copper/gold mine. Kanmantoo mining personnel assure local residents that the dust emissions are still well below the standards set by the regulator. But this is not considered satisfactory by residents. Kanmantoo is a very small mining operation compared with the proposed Hillside mine and so dust levels are far below those anticipated at Hillside.

Rex Minerals must explain :

- **How much more dust (especially PM10) will local communities (notably Pine Point, Rogues Point, James Well and Black Point) as well as surrounding farms actually experience compared with the baseline situation? More specifically:**
- **On how many days will PM10 concentrations approach or actually reach the maximum 24 hour levels depicted in Figure 8.5.4?**
- **On how many days will increased levels (compared with pre-mining days) be experienced?**
- **What is the average level of PM10 concentrations that we can expect?**
- **On how many days will that average be exceeded?**

2.3.4 How effective will the dust control measures be?

The predicted maximum 24 hour PM10 concentration shown above reflects the dust levels expected with all dust control measures in place Rex are clearly placing considerable reliance on their dust suppression methods, but these seem totally inadequate.

Table 7.4 in Appendix 5.6C illustrates what we had assumed were the main dust suppression measures at the mining site. Subsequent advice indicates that further modelling was undertaken at the request of the EPA, resulting in some changes to the suppression measures.

Specifically, the new modelling involved the replacement of salt sprays with water sprays to control all haul road dust. We understand that the reason for this change was that the EPA did not accept the prediction that salt sprays would produce a 93% - 97% efficiency rating.

Using water sprays, the control efficiency factor for haul road dust is a lower 83.5%.

The substitution of water spray for salt spray does nothing to address our concerns about the totally inadequacy of the dust suppression measures.

2.3.4.1 Water sprays

Water sprays will now be used to control:

- All wheel generated dust, both inside and outside the pit.
- Materials handling dust emissions from activities outside the pit.
- Dust emissions from crushing activities.
- Wind erosion dust emissions from exposed areas

There will be only two water trucks available for these tasks. This number was totally inadequate when the intention was to use salt sprays as well as water sprays, but given the rejection of salt sprays and the increased reliance on water sprays, two trucks will be even more inadequate.

The efficiency for this control measure varies from 65% to 85%. – ie far from 100% effective. Assuming that most of the water available for use will be from salt water pumped back from the port of Ardrossan or ground water (which according to the MLP has a higher salt content than seawater) the extensive use of water sprays is likely to be highly detrimental to the environment and to future plans for returning the mine site to cropping and grazing land.

2.3.4.2 Pit retention

This assumes that that the dust generated within the pit will remain in the pit. It constitutes the main dust control measure for dust emitted from blasting, use of heavy plant machinery (excavators etc inside the pit) and open pit maintenance.

- Dust emissions from blasting are considered to make a significant contribution to overall dust emissions (MLP 8-31). However, the control efficiency in relation to CE_{tsp} is 50% while control efficiency for CE_{pm10} is estimated at 5%. These values are extremely low.
- Similarly low levels of efficiency are anticipated for
  - controlling dust from the use of excavators/shovels/front end loaders within the pit
  - open pit maintenance by bulldozers

2.3.4.3 Wind erosion from waste rock dumps

- There will be no dust measures in place to control wind-borne dust erosion from the waste rock dumps.
- The MLP talks of progressive rehabilitation of open areas and stabilization of soil stockpile through the planting and establishment of annual grasses. But this will not occur while the waste rock dumps are in active use, And even then, it is not clear whether and how long such revegetation will take.

2.3.4.4 Real time monitoring

The MLP argues that real-time monitoring systems will be put in place to inform when additional dust suppression, adjustment or shutdown of the operations is required.

Rex Minerals needs to explain:

- **What are the additional dust suppression measures?**
- **Under what specific conditions will shutdown of operations occur?**
- **Who will monitor compliance with this?**
- **What criteria will be used to determine when such measures need to be implemented?**
- **And how will the waste rock piles be "shut down" given that no control measures will be in place for each one while they are in active use?**

Appendix 5.6C Table 7.4: Dust Sources from Mine Operations with Dust Controls and Control Efficiencies

Description of Activity	Description of Dust Control	Control Efficiency	
		CE_{TSP}	CE_{PM10}
Ore loaded into crusher	Water Sprays Enclosure	85%	85%
Unloading of ore at ROM pad	Water sprays on unloading trucks	70%	70%
Unloading of waste rock at waste rock dumps	Water sprays on unloading trucks	70%	70%
Wheel generated dust from transport of copper ore in pit	*Salt sprays on road (now water sprays?)* *Pit Retention*	97%	93%
Wheel generated dust from transport of waste rock in pit	*Salt sprays on road (now water sprays* *Pit Retention*	97%	93%
Wheel generated dust from transport of copper ore outside pit	*Salt sprays on road (now sater sprays?*	93%	93%
Wheel generated dust from transport of waste rock in pit	*Salt sprays on road (now water sprays?*	93%	93%
Drilling Operations	Pit Retention, Fabric Filter for Drilling	99.5%	99.1%
Blasting Operations	Pit Retention	50%	**5%**
Wind erosion from ROM pad stockpile	Water Sprays , Wind Breaks	65%	65%
Wind erosion from copper ore main stockpile	Water Sprays Wind Breaks	65%	65%
Wind erosion from waste rock dumps	**No controls (disturbed monthly)**	**0%**	**0%**
Primary crushing of copper ore	Water Sprays, Enclosure	85%	85%
Conveying from Primary crusher to main stockpile	Water Sprays, Wind Breaks	65%	65%
Conveying from main stockpile to SAG mill	Water Sprays Enclosure	85%	85%
Use of excavators/shovels/front end loaders within the pit	Pit Retention	50%	**5%**
Use of excavators/shovels/front end loaders at the ROM pad	Water Sprays	50%	50%
Open pit maintenance (bulldozers)	Pit Retention	50%	**5%**
ROM pad stockpile maintenance (bulldozers)	Water Sprays	50%	50%
Main stockpile maintenance (bulldozers)	Water Sprays	50%	50%

From table 7.4 6

2.3.6 Potential impact on environment and communities of dust

2.3.6.1 How hazardous will the dust be?

One of the key questions posed by the community is what types of contaminants are likely to be contained within the dust.

- ***Copper Sulphide***

  Dust blown from the low grade copper stockpile may contain sulphides which are known to contaminate crops and pastures.

- ***Uranium***

  Uranium will end up in the dust produced by the excavation process, the proposed 'blending' operation and the crushing process as well as being blown from the exposed waste rock piles.

  Radon gas from uranium decay will accumulate in the pit at mine's end. This will potentially cause a health risk. Thorium and uranium, their decay product radium, and its decay product radon, will continue to occur for tens of millions of years at almost the same concentrations as they do now.[3] As radon itself decays, it produces new radioactive elements called radon daughters or decay products. Unlike the gaseous radon itself, radon daughters are solids and stick to surfaces, such as dust particles in the air. If such contaminated dust is inhaled, these particles can adhere to the airways of the lung and increase the risk of developing lung cancer.

- ***Diesel fumes***

  These are now recognized as carcinogenic.

  All of the haul trucks at Hillside will be diesel, including up to 34 Extrac Quiet (xq) 793 Cat D Haul Trucks which are not compliant with U.S Environment Protection Agenecy Tier emissions standards.
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  Diesel emissions was not included in the table detailing dust sources (see Table 7.4 above). Yet diesel fumes could pose a significant public health risk for nearby residents and an occupational health and safety issue for he mine workers themselves.

2.3.6.2 What impacts will the dust have?

At the mine site

If the dust suppression measures do not meet the predicted efficiency levels, the implications for surrounding communities and the environment will be considerable.

The MLP (8-31) has identified a range of potential impacts on air quality during construction and mining operations.

Table 8.3-3: Air quality potential impacts during construction and operations (including rehabilitation) at the proposed ML and EML

Potential impact ID	Potential impact description
ML-A1	Decrease in air quality resulting in human health impacts at neighbouring sensitive receptors from dust emanating from mining operation.
ML-A2	Human health impacts resulting from the contamination of rainwater tanks with dust from the mining operation.
ML-A3 & EML-A1	Decrease in ambient air quality resulting in public nuisance at neighbouring sensitive receptors from dust emanating from Hillside
ML-A4	Decrease in ambient air quality from odour emanating from the site impacting neighbouring sensitive receptors.
ML-A5	Reduced native plant growth or abundance resulting from increased dust deposition resulting from mining operations.
ML-A6	Reduced agricultural crop growth rates/yields from increased dust deposition on leaves.
ML-A7	Degradation of marine environment from dust deposition resulting from the mining operations.

- ***Impact on health of local residents***

  There are approximately 600 residences located within an 0.1 – 5 kms of the mine. Elevated dust levels could cause major health problems, especially for those suffering from asthma or other associated breathing disorders.

  - In respect to PM10 dust emissions, the MLP (8-33) acknowledges that "*Without monitoring and operational controls it is likely that PM10 impact levels higher than NEPM guidelines from the site will occur, which could have negative impacts on the health of the local community* The risk is rated moderate to high.

  - In respect to nuisance dust, it notes: *Without dust emissions controls and operational restrictions "it is highly likely that the mining operation would generate substantial volumes of dust and almost certain that this dust would create a significant nuisance for the local community…(MLP 8-35)*

  - While the MLP concludes that nuisance dust deposition impacts would not be significant, it acknowledges that *" the averaging times available in relation to dust deposition monitoring for the evaluation of nuisance dust* ***did not provide the resolution required for the evaluation of nuisance dust impacts occurring over shorter time periods"***.

- ***Crop contamination***

  The MLP notes that "*There is some evidence that dust can* inhibit light transferal to leaves and therefore slow the rate of photosynthesis and plant growth." But again, we are assured that with dust controls in place it is unlikely that there will be any impacts.

  However, there is documented evidence that crops and vegetation located more than 5 kms from open cut mines on Eyre Peninsula are dying as a result of being smothered in dust. There is a high probability that the same will occur in relation to Hillside.

We are assured that "*ongoing monitoring is….proposed to be undertaken by Rex to address any community concerns*', Appendix 5.6C 9.2.3 –46).

- ***Rainwater contamination***

  - Contamination of rain water tanks is of critical concern, particularly in relation to local retirement/holiday locations that rely exclusively on tanks as their sole source of drinking water.

  - The MLP (8-35) acknowledges that "*dust deposition from mine related activities in rainwater tanks is possible at the nearest receptors ….reliant on rain water (Rogues Point and James Well residents)* which are totally reliant for tanks.

  - One suggestion by Rex is that *first flush systems will be discussed with concerned residents and that tanks are sampled for baseline results before mine operations commence.*

  - It seems that only one rainwater tank at Rogues Point and one at James well has been sampled to date. If the intention is to limit testing after mining commences to these 2 only, then this is not acceptable. Two tanks out of the several hundered at these locations are not a representative sample. Nor has there been any discussion with most local residents in these locations about the viability of first flush systems.

At the port of Ardrossan

- The MLP notes that

  The storage and handling of concentrate at the port site could possibly result in increased dust generation throughout the life of the project. Without adequate design and operational controls this dust would be likely to travel beyond the site boundaries and potentially have impacts on the human health, amenity and quality of grain stored at Viterra. Dust and particulates from port operations entering the coastal and marine environment have the potential to smother marine flora and fauna (see Section 8.4.9). Dust emanating during construction and operation of the Option 1 of the port facility may impact coastal flora".

  The list of potential impacts are detailed in Table 8.4-1 below.

Table 8.4-1 Air quality potential impacts during construction, operation and closure at the corridor and port site

Potential impact ID	Potential impact description
MPL-A1	Decrease in ambient air quality resulting in human health impacts at neighbouring sensitive receptors from dust and particulates generated by the port operation.
MPL-A2	Contamination of grain at Viterra storage facility with base metals in dust generated by concentrate handling operations at the port facility
MPL-A3	Reduced native plant growth or abundance resulting from increased dust and particulate deposition arising from port operations (option 1)
MPL-A5	Decrease in ambient air quality resulting in public nuisance at neighbouring sensitive receptors from dust emanating from the port operation

MPL-A6	Degradation of marine environment and negative impact on marine flora and fauna from concentrate dust and particulates generated from the port operations entering the ocean

Again, though we are assured by Rex that *"extensive dust control systems are proposed for the port operations that will effectively control dust emissions".*

2.3.6.3 On-going monitoring of dust control measures.

As a community, we are being asked to place a great deal of trust in the proponent's dust/control measures and the "active dust management/monitoring systems" But for the community to have any faith that these measures will prevent the negative impacts that may occur:

DMITRE, the EPA and Rex Minerals must

- **Give unconditional guarantees that all of the controls and monitoring proposed in the MLP will achieve the efficiency levels predicted**
- **Guarantee that there will be no negative impacts on the health and well being of local residents, on the water and marine life in St Vincent's Gulf and on surrounding crops, livestock and environment.**

- **Explain in detail**
  - **What monitoring will be in place to gauge the effects of these remedial actions**
  - **How independent will that monitoring be**
  - **Under what conditions will mining activities be reduced or suspended.**
  - **What information will be provided to the community on a regular basis to enable public scrutiny of the levels of dust concentrations in neighboring areas and the effectiveness of dust control strategies**

- **Given that the proponents themselves will be responsible for day-to-day management of dust suppression levels, DMITRE and the EPA must**
  - **Provide details on the timeliness and effectiveness of the reporting systems they will put in place to ensure Rex Minerals comply with all regulatory requirements.**
  - **Provide details on the mechanisms to be used to provide independent feedback to the community on compliance levels, including when and how the community will be notified of any breaches of that compliance.**