



Suite 2B 14 Glen Street,  
Eastwood, NSW 2122  
Phone 61-2-9874-8644  
Fax: 61-2-9874-8904  
E-mail: Nigel.Holmes@holmair.com.au  
ACN 003-741-035  
ABN 79-003-741-035

16 July, 2004

Environ Australia Pty Ltd  
Suite 7, The Russell Centre  
159 Adelaide Terrace  
East Perth WA 6004

Attention: Brian Bell

Dear Brian,

**Comments on Draft Port Hedland Dust Modelling Assessment Report prepared for Fortescue Metals Group Limited**

Introduction

On 30 June 2004 you sent me, via email from Karla Hinkley, a copy of the Draft report for the "Port Hedland – Dust Modelling Assessment." On 5 July 2004 I returned the copy with "tracked changes" and inserted "comments" using the facility available in Microsoft word.

On 13 July you forwarded a copy of the final report and asked me for a copy of the review in form that could be made available to third parties.

This letter provides you with a consolidated set of comments that were made during the first review and some additional comments on the new report. I have not included any of the suggested editorial changes that were in my first review and confined my comments to those that dealt with technical issues.

Before providing my specific comments, it might be useful to make the general point, that modelling this type of development is extremely difficult. Most of the difficulty comes in attempting to develop realistic estimates of emissions and

*PORT HEDLAND FMG REVIEW*

particles size distributions. This report is no exception and the greatest vulnerability of the report is justifying the assumptions used to estimate emissions. This is not to say that I believe that the estimated emission are wrong, or that others would have made better estimates, but the state of knowledge makes it inevitable that there will be many areas where it will be necessary to rely on individual judgement in deciding what emission factors to use and what control efficiencies to assume.

Finally, please bear in mind that I have undertaken this review without having seen the scope of work or any requirements that may have been set by regulatory agencies.

Consolidated comments from review of 30 June 2004 report

### **End of Section 2.1**

It may be relevant to point out here that National Environment Protection Measure (NEPM) standards are used to assess air quality as measured by the NEPM network of monitors, which are sited according to a set of guidelines developed by the NEPM Peer Review Committee and are published on the NEPC website. They were not intended to be adopted as standards to be applied at the fence-line, although in some jurisdictions this has occurred and may be appropriate. It is certainly within the power of any jurisdiction to set air quality standards that they believe are appropriate.

### **After first set of bullets in Section 3**

Need to explain what you meant by "reasonable variation". Are the concentrations in the expected range? Do the concentrations vary seasonally in the way expected? Are the variations large?

### **Third paragraph in Section 3**

Perhaps this should be re-worded to note that the NEPM PM<sub>2.5</sub> standard is an advisory standard and has a slight different status from the PM<sub>10</sub> standard. The NEPM variation that created the PM<sub>2.5</sub> elaborates on the meaning of an "advisory standard".

### **Table 2**

You probably need to note that there was no PM<sub>2.5</sub> monitoring undertaken at Boodarie or South Hedland.

**Table 2**

Can you explain how you derived the background? I had thought that you had taken the minimum of the monitored level (see last sentence in paragraph above Table 2).

**Table 2**

What is the significance of the number of observations in the derived background column?

**Table 2**

I am not sure how you will use the background levels?

**Section 4.1 - Stacking**

Minimise suggests it cannot go lower. Better to say "reduce" or "control".

**Section 4.1 - Stockyards**

This reads as though you have assumed the shelter belt will give you 50% control. I suspect that it is the water spray that gives you the 50%. The shelter belt would presumably give you less than 50%.

**Section 5.3 - Fourth bullet point**

Need to unpack this. Explain how it affects results etc

**Table 3**

Frequency of occurrence of A-class stability seems low. Is it very windy? Suggest you explain why the frequency is low given that the area receives very high solar insolation.

**Table 4**

Query: Both ISC and Ausplume require the user to enter a particle density. I assume you entered 1 g/cm<sup>3</sup>? In some cases particle size distributions are reported as physical sizes (especially if they were determined by a laser particle sizer). I think you should say that the sizes in the table are aerodynamic sizes. Presumably this is the case?

**Second paragraph after Table 4**

Explain more fully why you assumed 1/3 of TSP was PM10)

### **Section 6.2 – First paragraph**

This paragraph contains a lot of information. I think it would help if you explained how “dust emissions were determined based on functions that related these parameters to a dustiness index” and what you regard as “fair agreement”.

### **Table 5**

This is an important table. I think it would help if you set out the equations that you used and the assumptions that you made about the variables that you plugged into the equations when applying EF equations where relevant. It looks a little like you are using your judgment here rather than applying an analysis of the operation to calculate the emission.

### **Section 6.3.1.4**

This part will be difficult to follow for readers unfamiliar with the area and what goes on at Port Hedland. Can you add more background discussion or refer to a place where background information can be obtained. Why do you exclude Yandi fines? What is DRI?

### **Section 6.3.2**

This is quite a complicated issue. If you apply a control factor to account for the effects of enclosure/shielding then maybe you should use the free wind speed in combination with the control. Alternatively, wouldn't it be better to stick with the same exponent and reduce the wind speed to account for the shielding rather than introduce a new exponent, which really needs to be justified?

### **Section 6.3.4 – Second paragraph**

Why 400 hours? Can you refer to a study to backup this choice?

### **Section 6.4 – First paragraph**

Arithmetical error here? Factor of ten?

### **Paragraph immediately before Section 7.1**

I think your original text does not say what you wanted to say, or at least would confuse the reader.

### **Table 9**

This looks like very good agreement between prediction and measurement.

### **Comments on current (final report)**

Presumably most readers will be familiar with the Port Hedland area and the mining operations that take place there. For those not so familiar there are

frequent references to "Mindy Mindy" ore or "Chichester" ore and to the high or low moistures that are (presumably?) well-known characteristics of these ores. While some background is provided in the early part of Section 4 it is not quite enough. To assist readers not familiar with these places and ores it would be useful to include a map showing these place and perhaps a table, listing the moisture levels and dustiness of the ores. This could be done by simply referring to other documents that are presumably being prepared in association with the dust assessment?

#### **Section 4 – Vehicle movements**

Although when the whole paragraph is read, it is clear that the report considers that keeping road surfaces clean and sealing of roads is important when controlling dust, but the argument could be put better perhaps by saying: "FMG undertake to seal areas where dust emissions are identified as unacceptably high and to maintain sealed surfaces (by sweeping, vacuuming or the application of water) to ensure that dust emissions from sealed surfaces are kept to the lowest levels practicable."

#### **Section 5.2 – Fifth bullet point**

This is an observation and does not need a response. If the roughness is underestimated then the deposition rate may be overestimated and the quantity of dust assumed by the model to be removed from the plume would be overestimated giving underestimated concentrations further downwind. It is beyond the scope of a study like this to investigate this effect. The comparison that are made later, between model predictions and measurements of ambient air quality, should give the regulators and public a realistic idea as to the overall reliability of the predictions.

#### **Section 6.2.1.2 – Third sentence**

Additionally, there are no estimates in publicly available data.....

#### **Section 6.3.3**

Is the equation correct? From the point of view of the dimensions in the equation it would seem necessary to have the right-hand term in the form  $(1 - (WS_T/WS_{10})^2)$  rather than  $(1 - (WS_T/WS_{10}^2))$ . Even with this modification it looks to me as though you could get a negative emission factor if  $WS_{10} < WS_T$ ?

#### **Section 6.3.1.4 – Third sentence**

This is hard to read/understand. Consider re-writing.

**Section 6.3.1.4 – Second paragraph**

I am not sure what you should do in the circumstances when you have no emission factor equation and really no guidance as to how to estimate the emission. It does look as though the 2 g/s is just a guess. Quite possibly it is a good guess, but it would be better if it could be connected to one of the NPI or US EPA emission factor equations. Can this be done? If not then we will have to live with what you have.

**Table 8**

The table should say what the emission is, i.e. g/s of PM<sub>10</sub>, TSP or what? It would also be helpful to explain how the figures are estimated. May be you could do this by example. Although when I try to do this I get the wrong answer! For example, if I try to estimate the emission for Car Dumping at NP, I get an estimated emission of 0.23 g/s [ $73.35 \times 10^6 \text{ tpa} \times (1 - 0.95) \times 0.002 \text{ kg/t} / (8760 \text{ h/y} \times 3,600 \text{ s/y})$ ]. This is not the same as the 0.50 g/s in the table. I am not sure what mistake I have made, but the path from the previous information to this table needs to be transparent and may need to be supplied to reviewing regulatory agency as a spreadsheet.

**Last Paragraph in Section 7 (immediately before Section 7.1).**

Can this be “proved” (or better justified) by reference to modelling, or a wind rose, or the distance it is from Port Hedland.

**Section 7.1**

Subtracting the lowest measured 24-hour concentration from the monitored data is an imperfect way of dealing with background. I cannot suggest a better way, but the way it is described in the text may invite some readers to think that background levels have been rigorously accounted for. Background can vary from day to day and this approach is far from rigorous and is really only a conservative attempt to take the contribution into account. It would be better if the text reflected this.

**Table 12 and 13 and the impacts assessment**

The town and hospital both show high annual average TSP, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations and even though the predicted changes due to the project are small the levels are above NEPM standards. Industry may well come under some pressure to suggest abatement measures that will bring the area into compliance with the NEPM standards. Table 13 shows a better outlook. However, it might be appropriate to introduce information that dust management actions are underway that will lead to a reduction from current levels earlier in this section.

16 July 2004

Please contact me if you need clarification on any of the above.

Yours faithfully,  
Holmes Air Sciences

Nigel Holmes PhD  
Atmospheric Physicist