Doctors for the Environment Australia
www.dea.org.au

Observations concerning the Air Quality section of Environmental Impact Statement for Acland Stage 3 (Chapter 9) by medical experts from Doctors for the Environment Australia

Five air quality criteria are listed, each with an expressed upper value.
These are:

- PM10 maximum 24-hr average (50ug/m3); 5 allowable exceedances a year.
- PM2.5 maximum 24-hourly average (25ug/m3)
- PM2.5 annual average (8ug/m3)
- Total Suspended Particulates (TSP) annual average (90ug/m3)
- Deposited dust which is ascribed a nuisance guideline level of 120mg/m2 averaged over a month.

All 5 air quality criteria were set by the Department of Environment and Resource Management (DERM). Of the above criteria only PM10 24-hourly averages and dust levels have been monitored.

PM2.5 measurements were not taken "*because dust monitoring around open cut coal mining activities has shown that coarse particles (those greater than 2.5um) dominate the particulate size distribution (Smith, 2004)*". (The author of the reference, P. R. Smith, is an employee of the NSW Minerals Council). The assertion appears to rest upon a diagram sourced from the USEPA which shows PM2.5 to be dwarfed by PM10 and larger particles in the case of mining, and a table from an Australian Coal Association Research Program (ACARP) paper that indicates PM2.5 to constitute 4% of TSP and 10% of PM10 in mining situations (no error bars or qualification of the nature of the mining is provided in Smith's industry supportive review paper).

According to the National Pollutant Inventory (NPI), coal mining is the second biggest source of PM2.5 http://www.npi.gov.au/npidata/action/load/emission-by-source-result/criteria/year/2010/destination/ALL/substance/92/source-type/ALL/subthreshold-data/Yes/substance-name/Particulate%2BMatter%2B2.5%2Bum
The omission is therefore serious. Particularly in view of federal data which shows the mine produces 65,000 kg PM2.5 per year.
http://www.npi.gov.au/npidata/action/load/emission-by-individual-facility-result/criteria/state/QLD/year/2010/jurisdiction-facility/Q020NAC001
This should have raised the question of the concentration in the air being breathed by inhabitants.

There are no data for NO2 or SO2, but there is no adequate rationale for omitting these data. On the contrary, the presence of orange blast clouds reported by the community are produced by NO2 as indicated in the Queensland Government fact sheet. http://mines.industry.qld.gov.au/assets/safety-and-health/fume_fact_sheet_30_8_11.pdf

TSP concentrations were not measured, rather they were "assumed" to be double the PM10 concentration (presumably derived from Smith's review and the above mentioned ACARP reference which showed PM10 as constituting 40% of TSP)!

Air quality monitoring (for dust) was done at 24 separate sites in the vicinity of the mine. The location of all but one of these sites is shown in Figure 9-6 of the EIS. Nine of these sites were private residences. PM10 measurements were made from only 6 of the above sites of which 4 were private residences.

Meteorological information indicated that wind direction was predominantly from the east. It is notable that the majority of the dust monitoring stations and all but one of the PM10 measuring sites were to the east or north east of the mine, upwind when the predominating wind prevailed.

It can be inferred from Figure 9-7 that a total of 76 (24-hourly average) PM10 measurements were made in the period 18/03/03 to 18/09/08. These measurements were made at from 4 to all 6 of the sites on 16 separate occasions 3 to 8 months apart. Monitoring became less frequent as the mine expanded.

Only 3 PM10 samplings occasions and 15 PM10 measurements were recorded after the opening of Stage 2 of the mine by Premier Anna Bligh on 21 March 2007. Wind conditions when PM10 samples were taken are not shown. Perhaps they were not recorded!

The reported average 24-hour PM10 concentration of 14ug/m3, the maximum 24-hour average PM10 concentration of 45ug/m3 and the 95th percentile of all 24-hour average PM10 concentrations of 24ug/m3 were derived from the above 76 readings. Calculations based on Figure 9-7 give an average 24-hour PM10 concentration of 17ug/m3 (10 readings) and a maximum 24-hour PM10 concentration of 26ug/m3 from the monitoring site at Jondaryan.

In my opinion, PM10 monitoring was inadequate and provides a poor baseline for predictions as to likely conditions if stage 3 proceeds.

Monthly dust deposition rates from 2006 to 2008 at 14 of the 24 measurement sites are reported on page 9-11 as ranging from 29-112mg/m2/day with the claim that DERM's monthly average dust nuisance level was not exceeded. However Table 9-4 on the following page indicates the range differently at 29-197mg/m2/day, indicating that DERM's stated monthly average nuisance threshold of 120 mg/m2/day was exceeded at one of the sites (AD14).

Furthermore Table 9-4 showed maximum recorded deposition rates of between 1.09 and 7.9 the nuisance threshold, the averaged maximum from the 14 sites being 2.5 times the threshold nuisance level.

Monthly dust deposition rates from 2006 to 2008 at 3 additional sites close to the Jondaryan rail coal loading facility (situated about 1.5 km east of the town) were similar to the above with one exception this being a site to the east (upwind) of the loading facility which recorded the lowest values of all 17 sites. These findings are shown in Table 9-5.

It should be noted that the EIS does not disclose the total durations or actual periods over which dust measurements were made. It should also be noted that stage 2 of the mine did not commence till March 2007.

A further 4 sites, bringing the total to 24, were monitored from 2007 to 2009 (Table 9-6). Data from these sites from the south east, south, southwest and west of the existing mine and

proposed expansion are used in the EIS to provide baseline dust deposition data for stage 3 of the project. Three of these sites recorded very high readings. Average values were 1.9 times the nuisance threshold, with the averaged maximum being 16.2 times the nuisance value.
The authors of the EIS claim these latter high "baseline" values were influenced by agricultural activity. There is however no mention that a chemical analysis of the deposited dust was made to support this claim.

Table 9-7 provides "Adopted background particulate levels" of three "Air Quality Indicators":

- a 24-hour PM10 of 24ug/m2 which is equivalent to the 95th percentile PM10 concentration from 76 readings shown in Figure 9-7
- an "Annual average TSP concentration "of 28ug/m3 that was derived by doubling the average PM10 concentration from the same 76 readings shown in Figure 9-7(!) and
- a "Dust deposition rate" of 49mg/m2/day which is claimed to be the average dust deposition rate from the 14 sites monitored in 2006 to 2008. This value is however different to the dust deposition average value for these sites revealed in Table9-4. The value derived from Table 9-4 is 60.57!

I regard the credibility and relevance of the above values as dubious.

Calculated total PM10 and TSP emissions in 2008, 2025 and 2036 measured in grams/second are provided in Table 9-10. The table adds up the individual dust sources to give total estimates. Examination of the table shows that both total PM10 and total TSP emissions are expected to increase by a factor of 2.5 by 2025 and 3.0 by 3036 over the 2008 emission figures. Further modelling (Ausplume version 6.0 dispersion model) based on the above total PM10 and TSP estimates taking into account local topography, wind conditions etc. then give estimates of 24-hourly PM10, annual TSP and annual dust deposition at 22 residencies that are in close proximity to proposed mine boundary. No estimates are provided for the town of Jondaryan which is situated approximately 14.5 km southwest of the existing mine and 9km southwest of the proposed expanded mine.

Table 9-11 "Predicted dust concentrations and deposition rates at nearby sensitive receivers" modelled air quality estimates at the 22 residencies for the year 2008 (presumably in part as a test of the models validity). Three of the sites that were modelled (Sensitive receivers 2, 3 and 4) corresponded to locations that were monitored for PM10 in 2006-2008 (Monitoring locations AD19, AD4 and AD13). All 3 are to the northeast of the existing mine. Interestingly, in all cases the modelled (and presumed to be average) PM10 concentrations were much higher (by factors of 6.6, 5.5 and 4.1) than the averaged readings from the individual sites revealed in Figure 9-7.

Confusingly, the next table (Table 9-12) compares observed maximum 24-hour PM10 concentrations with modelled maximum 24-hour PM10 concentrations at the above 3 sites. It is noted that modelled (and presumed to be average) 24-hour PM10 concentration estimates in Table 9-11 are identical to the maximum modelled concentrations presented in Table 9-12! The discrepancy between observed and estimated concentrations at the above 3 sites is reduced to factors of 3.8, 1.9 and 2.2, assuming that maximum values were modelled. Whichever the case, it is unclear whether the basis of the discrepancy between observation and model lies predominantly with the representativeness of the readings taken at the sites, with the model's assumptions, or a combination of both.

Five of the sites that were modelled for dust deposition (Sensitive receivers 1, 3, 4, 6 and 9) corresponded to locations that were monitored for dust deposition in 2006-2008 (Monitoring locations AD2, AD4, AD11, AD12 and AD 13). In all cases, the modelled deposition was higher than

the observed deposition (by factors of 1.0, 1.5, 1.7, 1.2 and 1.7 respectively). These discrepancies, although smaller than was the case with either interpretation of the PM10 data, suggest that the greater error was associated with the predictive model.

Tables 9-13 and 9-14 are identical in format to 9-11 applying to "Predicted dust concentrations and deposition rates at nearby sensitive receivers" but for the years 2025 and 2036. As was the case with Table 9-11, it is unclear whether the columns headed "24-hr PM10 (ug/m3)" represent average estimates or maximum estimates. Whichever the case, on average the PM10 estimates are 1.6 times greater by 2025 (mean 24-hr PM10 70ug/m3) and 2.5 times greater by 2036 (mean 24-hr PM10 108ug/m3) than in 2008 (mean 24-hr PM10 43ug/m3). Note that the maximum acceptable 24-hourly average is set at 50ug/m3, with most of the predicted concentrations at the individual residences being well in excess of this value. No estimates were made for Jondaryan.

Tables 9-13 and 9-14 also list the "Annual TSP (ug/m3)" and "Annual Dust Deposition (mg/m2/day)" predictions for the 22 residences in 2025 and 2036. Mean annual predicted TSP concentrations were 37ug/m3 by 2025 and 46ug/m3 by 2036. With the exception of estimates for the private residences listed as Sensitive receivers 16 and 17 in 2036 all estimates were below the maximum acceptable concentration of 90ug/m3. Mean predicted annual dust depositions were 64mg/m2 /day by 2025 and 78mg/m2/day. Again with the exception of the same 2 residences mentioned above all estimates were below the nuisance value of 120 mg/m2. No estimates were made for Jondaryan.

No predictions were made concerning a likely deterioration in air quality in Jondaryan from the proposed increase in passing coal transport and use of the Jondaryan rail coal loading facility. This is despite the fact that the site, which is about 1.5km east of the town, will be operative 24-hours a day with up to 8.8 B-quadruple 200-tonne truck loads arriving and unloading per hour, in order to accommodate the mines projected 10 Mtpa coal production rate!

Conclusions

There must be concern over the validity of existing data in the EIS; it is shoddy, inadequate and inconsistent. However, taking some of the measurements at face value, within the limits of the study there is evidence of excessive exposure to pollutants. It is likely that the inhabitants as far away as Jondaryan have been subject to this pollution for a number of years.

The failure to measure particulate PM 2.5 data is based on questionable data from ACARP. This is a major omission for scientific evidence is accruing of the potential serious health impacts of PM2.5.

The failure to measure other pollutants for example SO2 and N02 is a serious omission.

The modelled pollution impacts of phase 3 are expected to be well above the ambient air quality goal of 50 µg/m3.

Failure to measure pollution at Jondaryan is a major omission.