Peer Review
"Western-Metropolitan Rail System Phase 2 Coal Dust Monitoring Program"

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1 SUMMARY OF THE REPORT

The report relates to the presentation and analysis of results obtained during the second phase of a study commissioned by the Queensland Resources Council to assess the ongoing effectiveness of coal dust mitigation measures as detailed in the South West System Coal Dust Management Plan (CDMP) in reducing coal dust emissions due to train movements, following full implementation across all regional coal mines from December 2013. The program is a continuation of a Phase 1 study. Monitoring and subsequent analysis for the study was undertaken by personnel from the Queensland Department of Science, Information Technology and Innovation (DSITI) from February 2014 to December 2015, and reported in June 2016.

The study, which is ongoing, involves continuous measurement of airborne particulate concentrations as PM_{10} (particulates of diameter less than 10 micrometres), $PM_{2.5}$ (particulates of diameter less than 2.5 micrometres) and TSP (total suspended particulates) plus the monthly averaged deposition of particulates (dust) from the air in the rail corridor at Cannon Hill, as well as dust deposition in the rail corridor at Fairfield and Toowoomba.

The report concluded that:-

- Particulate concentrations at the Cannon Hill site complied with ambient air quality criteria with the exception of infrequent exceedences associated with activities other than coal train movements, such as rail track maintenance and smoke from fires and regional particulate sources
- Losses from coal train rolling stock are minor contributors to particulate loadings at the Cannon Hill site compared to resuspension of dusts by movements of all types of trains
- Coal particles comprise only a small fraction of deposited dusts, the main contribution being from soil minerals
- Based on the results obtained, implementation of the CDMP measures continues to be effective in reducing loss of coal dust during transport.

2 COMMENTS ON THE REPORT

2.1 BACKGROUND INFORMATION

1. Information relating to the need for, and lead-up to the report is concisely presented.
2. Background information on the properties and measures of concentrations of airborne particulates is concise and accurate, and presented in clear terms.
3. The ambient air quality standards, guidelines and goals relied upon for this report are those currently accepted in Queensland for protection of public health and amenity.
4. The wind speeds and directions relevant to the interpretation and analysis of the results were measured at the Cannon Hill site, but for the Fairfield and Toowoomba sites, these values were taken from more remote monitoring locations. It is not considered that these measured values at Rocklea would be significantly different from those which would pertain to the Fairfield monitoring site. The Toowoomba values were taken from a site at Jondaryan, approximately 40km to the north west. There being no significant topological features that would significantly alter the wind flow between the two sites it is reasonable to accept these values as being representative of those at the Toowoomba site, but it is noted that there is no explanation given for this in the report.
5. Sites are selected that are similar to those used in the Phase 1 report. Selection of the instrument placements within the general sites is based on capturing the maximum concentrations of fugitive and resuspended particulates associated with train movements in the rail corridors.
6. It is noted that particulate emissions within the regions local to the monitoring sites were not limited to rail traffic; in particular, nearby road traffic would also contribute to particulate and dust loadings.
7. At the Cannon Hill site, 5 minute averages of PM_{10}, $PM_{2.5}$ and TSP were taken, as well as monthly average dust deposition on either side of the rail corridor. At Fairfield and Toowoomba, monthly average dust depositions were measured, initially in two places at each site. Acts of vandalism at Fairfield led to the abandonment of one of the dust deposition sites.
8. Subsamples of collected dusts were analysed to determine the fractions of organic and inorganic (mineral) components. Subsamples were also analysed by the University of Queensland Materials Performance laboratory to determine proportions of black particles (as coal, soot and black rubber), inorganic and mineral matter, particles of biological origin (insect and plant fragments), and general organic particles (eg wood fibre and plastics). The proportions were based on surface area coverage, and converted to approximate percentage by mass by applying generic density factors.

2.2 RESULTS

1. The report includes in-depth and careful analysis of the data, including potential effects of rainfall, wind directions, alignment of rail corridors and rail tracks and the passage of coal, non-coal freight and passenger trains.
2. The report concludes that the measured particulate concentrations and dust deposition values complied with the relevant air quality standards, guidelines or goals, with the exception of a small number of outlier values that could be ascribed to artefacts such as track maintenance, smoke from fires or plant materials.
3. The report concludes that train movements do not contribute significantly to ambient particulate levels, specifically in relation to the loss of coal dusts from moving coal trains. This conclusion is based on the following valid points:-
   i. Pollution roses show that there are significant particulate sources outside the rail corridors which contribute high concentrations of PM_{10} $PM_{2.5}$ and TSP.
   ii. PM_{10} $PM_{2.5}$ and TSP concentrations are little affected by the passage of trains
   iii. The analysis of the collected dusts shows that the composition is mainly mineral; the fraction of "coal" is small, and generally less than rubber and diesel soot contributed by local road traffic.
4. While the results support the view that other sources contribute higher particulate concentrations at Cannon Hill than does the passage of trains, the conclusion that these external sources contribute higher exposures at the monitors relies on the quoted averages being weighted by the length of time that the wind blows from each quarter. This is not clearly stated in the report.
5. The overall conclusion is that implementation of the CDMP has been successful in controlling loss of coal dusts from moving trains, and that measured particulate loadings are probably due to resuspension of trackside material.

3 OVERALL CONCLUSIONS OF THIS REVIEW

The study used appropriate methodology and monitoring design. The report is comprehensive, logical and properly referenced.

The weight of evidence confirms that the conclusions in the report are valid and well supported by the data.

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