Doctors for the Environment Australia
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Submission on the Port Waratah Coal Services Terminal 4

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Submission from
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Doctors for the Environment Australia (DEA) is an independent, self-funded, non-government organisation of medical doctors in all Australian States and Territories. Our members work across all specialties in community, hospital and private practice. We work to minimise public health impacts and address the diseases – local, national and global – caused by damage to our natural environment.

Completeness of the assessment

Impacts of the current proposal do not stop at the perimeter fence. The loading of an extra 70 million tonnes per annum of coal is covered by this planning assessment process, but that 70 Mtpa has to be brought to port in 9,855 trains per year making 19,710 trips through each suburb along the coal corridor. This extra transport task has significant health and environmental effects but does not have its own planning review process so we believe it is appropriate for these effects to be considered during the PAC process. This is implicitly recognised by the proponent as they have presented an analysis of rail corridor noise, and rail corridor coal dust emissions but want to exclude rail corridor diesel exhaust emissions, and ignore the impact of the rail corridor noise.

The export of an extra 70 Mtpa of coal, when burnt, adds a very large annual burden of 185 million tonnes of CO_2 to the global carbon dioxide emissions, equal to 34% of Australia's emissions.[*] The burning of the coal occurs off site from the coal export terminal, but is an integral part of the coal export industry. Climate change induced by carbon emissions will have serious consequences for health around the world. These health effects include food insecurity in poorer countries, deaths during heat waves in all countries, injury and air pollution related illness during more intense wild fires, extension of tropical diseases to temperate latitudes, and more extreme weather events. As a result of Scope 3 emissions there are increasingly negative international perceptions of Australia's willingness to share the burden of mitigation. In the fullness of time, these perceptions are likely to impede our ability to function cooperatively and without disadvantage in many international agreements including economic ones

[*]Australian annual emissions to June Quarter 2010= 548 Mt, Aust nat greenhouse gas inventory report. Factors & Methods workbook, Aust Greenhouse office, 2004, each tonne of coal burned for electricity creates 2.648 t CO_2 emissions.

Although there is a chapter on health in the project proposal this falls well short of the health impact assessment (HIA) appropriate to such a project. A HIA should examine both the positive and negative impacts on health, assessment of the likely risks particularly to vulnerable populations such as children, the elderly, and those with chronic disease, based on local demographic and health status data.

DEA believes that without considering the rail corridor impacts, the scope 3 emissions, and a comprehensive HIA the project assessment is incomplete.

Air Quality

The air quality analysis in the original proposal was widely criticised for taking 2010 as the baseline year for modelling air quality impacts. By starting from a year with atypical low levels of particulate air pollution the chance of the project creating exceedances was minimised. Environ's response to this in Appendix C 4.7.1, lists a number of reasons for using 2010 baseline data but none of these is more plausible than the suggestion that using this year deliberately understates the air quality problem. However, we do acknowledge that sensitivity analysis was undertaken in order to account for years in which pollution was greater.

Fig 1 shows the relative levels of PM_{10} from Lower Hunter EPA monitoring sites from 2006 to 2012 showing that 2010 had lower PM_{10} levels than years before or since, leading to overly optimistic conclusions about the probability of exceedances of the air quality standards.

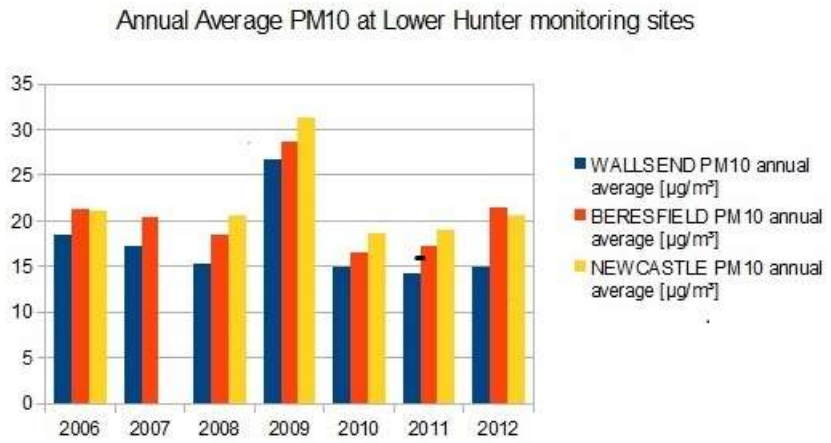

Fig 1. Annual average PM_{10} at Lower Hunter EPA monitoring sites

The handling of air pollution impacts is inadequate as it takes the overly simplistic approach of claiming that air quality will mostly be below the NEPM standard and is therefore acceptable. Dr McKenzie states "Predicted cumulative levels on the exceedance days are in the range of 50-80ug/m^3 which represents a relatively small risk to health". As a respiratory physician Dr McKenzie may not appreciate that the main mortality burden from fine particulate air pollution is through cardiac deaths, and that these can be triggered by air pollution at levels below the current Australian standards.

Current scientific thinking about air pollution as expressed by Dr C Arden Pope, one of the world authorities on the health effects of air pollution during a recent visit to Newcastle is that the health effects of particulates occur even at very low levels, and there is no threshold at which they can be considered safe (Pope, Burnett et al. 2009). An increase in particulate pollution, even below the NEPM standard, will cause an increased health burden on the population exposed. The increased risk for each individual is small, but as every person in the community is exposed it becomes a significant health problem. Estimates of the exposure- response relationship is in the range of 3% to 15% increase in mortality for every 10µg/m^3 of annual mean $PM_{2.5}$. The estimate with the best adjustment for confounders is of 6% for every 10µg/m^3 increase. Examples of this research include Cesaroni et al in Rome – for every 10µg/m^3 increase in $PM_{2.5}$ there was a 3% increase in non-accidental mortality and 10% increase in Ischemic heart disease mortality (Cesaroni 2013). This was independent of NO2 impacts on mortality. In the UK, 1% increase in premature mortality for every µg/m^3 increase in $PM_{2.5}$ (chronic exposure) – note this is 10% for every 10µg/m^3 (Yim 2012). In Canada the association was 15% increase in non-accidental mortality and 30% increase in Ischemic heart disease mortality for every 10µg/m^3 increase in $PM_{2.5}$ (Crouse 2012).

Air quality impacts from stockpile and loading operations

New developments that will produce particulate air pollution will impose an additional health burden on the community unless an air pollution offset can be identified, such as closing an existing coal loader so there is no net worsening of air quality.

To quote Appendix O, Executive Summary (Page 4)

"*The dust management and monitoring measures set out in the EA for the project's construction and operations are appropriate for the modified design. These include best practice measures such as reactive / predictive air quality control system that incorporates real time particulate matter monitoring*."

The air pollution control measures in table 15, Appendix O, mention extra water spray on dusty days but do not include ceasing operations during extreme dusty conditions. Figure 2 shows the existing Kooragang coal loader operating on 17th October 2013, a day with a strong dry westerly wind, carrying dust from operations to the suburb of Stockton close-by. On that day EPA monitoring shows the 24 hour average PM_{10} upwind of the Kooragang coal loader at Wallsend was 50.7µg/m^3 and downwind at Fullerton Street Stockton was 75µg/m^3. Existing practice by the proponent does not protect vulnerable adjacent residents. If T4 is allowed to proceed the license should include prompt cessation of operations when local dust monitoring indicates a problem.

Figure 2. Kooragang coal loader operating in a dry westerly wind

The predicted increase in maximal 24 hour average PM_{10} concentration during operation at 70 Mtpa ranges from 1µg/m^3 at Stockton to 6.8µg/m^3 at Sandgate. It is claimed that this will not result in any additional exceedances of the NEPM standard; however this seems an unrealistic claim and must be highly dependent on the choice of background year for the modelling. It doesn't pass the common sense test that there will never be a day with PM_{10} of 45µg/m^3 at Sandgate that would be pushed over the 50µg/m^3 limit by the additional particulates from T4.

Air quality impacts from rail transport

Objections to the original proposal lead to analysis of dust impacts along the rail corridor (Appendix C, Environ's response to air quality matters) however this response has the following flaws:

Dust from empty coal wagons was ignored, however empty wagons have been shown to release about twice as much PM_{10} dust as full wagons (CTAG 2013). The preferred project response was based on the ARTC studies done at Mayfield and Metford. These studies have been widely discredited. In the Mayfield study there was no accurate record about what type of trains were passing, and at the monitored site most trains travel at walking speed. The Metford data analysis was flawed and has been referred to the NSW Chief Scientist for re analysis.

DEA does not find these responses satisfactory, and believes there remains a strong likelihood of a respiratory health burden being imposed on the people living adjacent to the rail corridor.

Impact on groundwater

Chapter 8.2.3 on groundwater recognises the long history of Kooragang Island being used as a toxic waste dump, and the problem of mobilisation of groundwater contamination as subsoils are squeezed by the massive weight of coal stockpiles. This could carry toxic contaminants to the Hunter River, to other parts of Kooragang Island, and potentially into process water used for dust suppression. Various mitigation measures are proposed and the community is unable to assess their effectiveness.

Noise

Noise can cause serious health problems and is not just a nuisance. Most of the health impact is from night noise, with its associated sleep disturbance. Epidemiological evidence shows physiological effects from noise at 40 dB and health effects from night noise in the range 40 to 55 dB, as shown in Table 3 from World Health Organization (WHO) Night Noise guideline (Hurtley 2009) reproduced here.

Average night noise level over a year $L_{night,outside}$	Health effects observed in the population
Up to 30 dB	Although individual sensitivities and circumstances may differ, it appears that up to this level no substantial biological effects are observed. $L_{night,outside}$ of 30 dB is equivalent to the no observed effect level (NOEL) for night noise.
30 to 40 dB	A number of effects on sleep are observed from this range: body movements, awakening, self-reported sleep disturbance, arousals. The intensity of the effect depends on the nature of the source and the number of events. Vulnerable groups (for example children, the chronically ill and the elderly) are more susceptible. However, even in the worst cases the effects seem modest. $L_{night,outside}$ of 40 dB is equivalent to the lowest observed adverse effect level (LOAEL) for night noise.
40 to 55 dB	Adverse health effects are observed among the exposed population. Many people have to adapt their lives to cope with the noise at night. Vulnerable groups are more severely affected.
Above 55 dB	The situation is considered increasingly dangerous for public health. Adverse health effects occur frequently, a sizeable proportion of the population is highly annoyed and sleep-disturbed. There is evidence that the risk of cardiovascular disease increases.

Table 3
Effects of different levels of night noise on the population's health

Quote from the World Health Organisation night noise guideline:

Below the level of 30 dB $L_{night,outside}$, no effects on sleep are observed except for a slight increase in the frequency of body movements during sleep due to night noise. There is no sufficient evidence that the biological effects observed at the level below 40 dB $L_{night,outside}$ are harmful to health. However, adverse health effects are observed at the level above 40 dB $L_{night,outside}$, such as self-reported sleep disturbance, environmental insomnia, and increased use of somnifacient drugs and sedatives.

Therefore, 40 dB $L_{night,outside}$ is equivalent to the lowest observed adverse effect level (LOAEL) for night noise. Above 55 dB the cardiovascular effects become the major public health concern, which are likely to be less dependent on the nature of the noise. Closer examination of the precise impact will be necessary in the range between 30 dB and 55 dB as much will depend on the detailed circumstances of each case.

What is the appropriate noise standard?

The WHO recommended Night Noise Guideline for Europe is $L_{night, outside}$= 40 dB and the Interim Target of $L_{night, outside}$ = 55 dB.

The NSW draft planning guideline for wind farms specifies a maximum noise level of 35 dB at any residence, or 5 dB above background noise, with stipulation that noise from existing wind farms is not counted as background noise. The wind farm guidelines specifically rules out the argument that an individual proposal only adds a little to existing noise pollution from other wind farms, but the noise analysis for the rail corridor for T4 relies on this argument.

The ARTC "guideline rail noise goals" for 1m from the façade of any residence is 65 dB daytime and 60 dB at night*.

From a health perspective, noise is noise regardless of the source and there should be one standard for noise pollution across the energy sector. DEA believes that the appropriate standard to reduce adverse health effects is at most the WHO interim night noise standard of 55 dB.

Operational noise

Fern Bay and Stockton will have night noise 3 dB above the project specific noise limit PSNL when T4s3 & KCTs4 are operating together. This is presented as if it is not a problem, that there will be exceedance of the noise limit under certain weather conditions, but no remedy is proposed.

Rail corridor noise

Average noise levels are predicted to rise by 0.5 to 2 dB. Daytime exceedances already affect houses within 110m, increasing to 130m with T4, and night time exceedances currently out to 320m would increase to 370m. (Although in table 52, night time noise is shown as 60 dB out to 450m)

* These are average noise levels, so daytime is LAeq(15 hr) and night time LAeq(9hr) which means : Level A weighted equivalent, averaged over 15 hours, measured outside rather than inside residences

Effect of different standards

The additional trains to supply T4 increase the noise affected zone to 370m at the 60 dB level, however if we use the interim WHO standard of 55 dB the affected zone extends to a distance of 655m on both sides of the rail line, and the 40 dB zone extends to 3.7Km*.

Economic stability

There is a health effect from employment or unemployment, and while the proposed new coal loader operations would generate 80 direct jobs and a claimed 389 local indirect jobs.

Approval of the project would increase the dependence of the Lower Hunter on a coal industry which according to many international reports must be curtailed if humanity has any hope of addressing climate change. The fourth coal loader would increase the local economy's vulnerability to falling commodity prices compared to an economy diversified across a range of industries.

The health impacts on individuals and communities from local unemployment have been well documented. (Dooley, Fielding et al. 1996) Epidemiologic studies have confirmed a causal association between unemployment and all-cause mortality, suicide rates, and increased mental illness such as depression and substance use. (M.W., Sandifer et al. 1985) Mass unemployment, in particular, of men who had been continuously employed for at least five years prior to redundancy was associated with a doubling in mortality of those aged 40-59.

While the coal loader would provide jobs, Newcastle's unemployment rate is currently low at only 5.2% so there is no lack of jobs in Newcastle. The health benefits of regional economic stability outweigh the benefits of the extra jobs T4 would create.

*Noise drops off 6 dB for each doubling of distance, which is applicable to a point source. A line source such as a continuously full road drops off at only 3 dB per doubling of distance. The point source equation has been used, which is a conservative assumption. Drop = 20 x log (far/near)

Specific comments in relation to Appendix D

The proponents have included Dr David McKenzie's response to community concerns about air pollution relating to the T4 terminal. Dr McKenzie is neither a public health physician nor an epidemiologist, and this must be taken into account when he comments on epidemiological studies. Apart from the comments in the text above, we would like to add the following:

1. Dr McKenzie's references are outdated. There has been an explosion of population-level studies examining the impact of small increases of $PM_{2.5}$ on morbidity and mortality, often at levels below current Australian NEPM standards/guideline values. The failure to acknowledge this literature means that his assessment is inadequate. For example, see: (Cesaroni et al. 2013), (Yim and Barrett 2012), (Crouse et al. 2012).

2. Perhaps reflecting a lack of attention to recent studies, Dr McKenzie states that he has not been able to find reports of increased admissions to hospital or deaths during the East Coast dust storm (point 3.5, page 4). While Johnston et al, 2011, have not looked at the impact of the dust storms of 2009, a study of air pollution monitoring results from Sydney from 1994-2007 included six event days attributable to dust storms. These days were associated with a 15% increase in non-accidental mortality three days later (Johnston).

3. In point 3.6, page 4, Dr McKenzie states that the medical literature is inconclusive about the impacts of particulates on health compared to other pollutants. The recent literature demonstrates that different pollutants impact on mortality independently of each other. For example, Cesaroni et al showed that $PM_{2.5}$ impacted on mortality in Rome independently of NO2, which also impacted on mortality. (Cesaroni 2013)

4. In point 3.8, page 4, and again in point 4.9, page 7, Dr McKenzie outlines that limits for air pollution set by the EPA and other agencies are there to protect the most vulnerable. While we have no disagreement with this statement, we, as many community members are likely to agree, do not accept the notion that therefore they can be exceeded at will. The most vulnerable, including children and the elderly and those with chronic diseases are worthy of protection.

5. In point 4.2, page 5, Dr McKenzie outlines a number of criticisms of air pollution studies, stating that they are retrospective and restricted to one city. Again, this reflects the lack of a thorough review of the literature. Both Yim et al and Crouse et al, (Yim and Barrett 2012), (Crouse et al. 2012), were prospective studies over a very large area – the UK and Canada respectively. He also states that it is likely that studies that do not demonstrate a link between air pollution and ill health are less likely to be published. While this may be true, it would be a brave policy maker who disregards the published evidence.

6. In point 7.1, page 16, Dr McKenzie states that there was no difference in the age of death between coal miners with accelerated decline in lung function and those that did not and therefore, the fact that those with an accelerated decline in lung function experienced more chest illnesses including chronic bronchitis and asthma and are likely to have a poorer quality of life is not of concern to him. Again, most members of the community, and hopefully policy makers would agree that quality of life is as important as the age of death.

7. In his conclusion, Dr McKenzie states that the fumes and gases from Diesel exhausts are more likely to dissipate than particulate matter. However, he fails to acknowledge that diesel exhausts also contribute significantly to particulate matter pollution, which will travel as far and remain in the atmosphere as much as any other particulate matter pollution of the same particle size. This is especially important as the International Agency for Research on Cancer (IARC) classifies diesel engine exhaust as "carcinogenic to humans," based on sufficient evidence that it is linked to an increased risk of lung cancer, as well as limited evidence linking it to an increased risk of bladder cancer.

Conclusion

In spite of the reduction in size of coal put through the proposed T4 expansion, Doctors for the Environment Australia still consider that the increased risk to the health of the people of Newcastle and the surrounding communities is not worth any possible benefits from the expansion. When you also consider the additional scope 3 emissions from the project, the risks to the health of the population at large are sufficient to justify the assertion that this project should not go ahead.

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