



***National Environment Protection
(Ambient Air Quality) Measure***

**Summary of Submissions
received in relation to the
Draft Variation to the
National Environment Protection
(Ambient Air Quality) Measure
for Particles as PM_{2.5}
and
National Environment Protection Council's
Responses to those Submissions**

ISBN Web: 0642 323 65 8
ISBN Print: 0642 323 66 6

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June 2003



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1 INTRODUCTION

The NEPM variation establishes advisory reporting standards and a framework for monitoring and reporting PM_{2.5} data. This will enable the assessment of the effectiveness of air quality management programs that are designed to manage particles as PM_{2.5} and facilitate collection of consistent data. The advisory reporting standards are based on the protection of human health. This recognises the growing body of knowledge about health impacts associated with PM_{2.5} and the need to have a better understanding of PM_{2.5} levels in Australia.

A total of 34 submissions were received in response to the release of the draft NEPM variation and Impact Statement – 15 submissions from industry groups or individual businesses, 10 from community groups or individuals, six Government submissions and three from consultants. A list of submitters is provided in Appendix A.

The majority of submissions supported the making of the NEPM variation. This support came from community groups, government and some industries. There was, however, a full range of responses, with some community groups and individuals expressing a preference for the standard to be mandatory and some industry groups not supporting the specific proposal based on concerns that the 'advisory reporting standards' may become de facto compliance standards.

Due to the level of support in the submissions received and the absence of substantive arguments for change to the basic approach adopted in the draft, the standards and goal contained in the NEPM variation have not been changed. However, in light of the submissions, some modifications to the NEPM variation have been made, particularly in relation to the monitoring protocol.

2 COMMENTS ON THE STANDARDS

2.1 FORM OF THE STANDARD

2.1.1 Advisory Reporting Standards

The NEPM variation sets advisory reporting standards for PM_{2.5} of 25ug/m³ averaged over 24 hours, and 8ug/m³ as an annual average. The purpose of the advisory reporting standards is to establish a benchmark for reporting PM_{2.5} data from each jurisdiction. Each jurisdiction will be required to undertake monitoring with the aim of gathering data for a review of the standards scheduled to commence in 2005. This approach has been adopted in recognition of the lack of comprehensive PM_{2.5} data across Australia that would otherwise enable the impacts of breaches of compliance standards to be assessed with confidence.

2.1.2 Submissions

Submissions on the form of the standard from the majority of community groups and individuals argued that it was essential to establish a mandatory standard otherwise no further monitoring would be undertaken, nor would there be action to manage ambient particle levels. These submissions indicated concern that some sources, particularly solid fuel heaters, are not adequately controlled at present and so the NEPM variation should be mandatory in order to provide an incentive for taking further action. Several industry submissions indicated support for an approach that focused solely on gathering better information in light of the current state of knowledge.

2.1.3 Response

Advisory reporting standards are considered to be the appropriate form for a standard for PM_{2.5} at this time, given the lack of comprehensive data that would make it possible to establish compliance standards and to fully assess the impacts associated with breaches of such standards. The purpose

of advisory reporting standards is to facilitate the collection of data and provide a framework for reporting these data. Concerns that this may not be effective in immediately reducing PM_{2.5} emissions are noted. As discussed in the Impact Statement, there is currently a range of programs in place to manage particle levels. A review of the Ambient Air Quality NEPM is scheduled to commence in 2005, and the option of setting compliance standards will be considered in that review.

The NEPM variation has been amended to include a table specifying dates for the commencement of monitoring in participating jurisdictions (see 3.4 'Commencement of Monitoring').

2.2 GOAL OF THE NEPM VARIATION

The goal of the NEPM variation is to establish advisory reporting standards and to set out monitoring and reporting requirements for particles as PM_{2.5} to facilitate a future review of the nature of these standards. As outlined above, there are insufficient data to be able to develop a compliance standard at this time.

2.2.1 Submissions

Two submissions raised concerns that the goal as stated in the draft variation did not constitute a goal under the NEPC Acts and would not generate an 'environmental outcome'.

2.2.2 Response

Legal advice indicates that the NEPC Acts allow for making the NEPM variation in this form. The NEPM variation is an important first step in generating the desired environmental outcome.

2.3 DE FACTO STANDARDS

2.3.1 Submissions

The standards for particles as PM_{2.5} are advisory only, and compliance within a specified timeframe will not be required. Their primary intent is to facilitate the collection of adequate PM_{2.5} data for the full review of the Ambient Air Quality NEPM through a consistent framework for monitoring and reporting. A number of industry submissions expressed concern that the numerical values would become de facto compliance standards and could be used for licensing of major industrial sources of PM_{2.5}.

A majority of community submissions indicated disappointment that the standards were not mandatory and consequently would have only limited impact. They were also concerned that the variation may not even lead to adequate monitoring (see 3.4 'Commencement of Monitoring').

Industry submissions highlighted the need for clear communication to the effect that the advisory reporting standards would not apply at peak sites, and the need to ensure that the NEPM variation is implemented consistently between jurisdictions.

2.3.2 Response

The purpose of the NEPM variation is to facilitate data gathering to provide a more comprehensive basis for a review of the Ambient Air Quality NEPM which is scheduled to commence in 2005. As with the Ambient Air Quality NEPM, the standards in the variation do not apply at peak sites nor to the control of emissions from individual industries.

2.4 THE NUMERICAL VALUES OF THE STANDARDS

The NEPM variation establishes a 24-hour average standard of 25ug/m³ and an annual average standard of 8 ug/m³.

2.4.1 Submissions

Community submissions and some industry submissions supported the numerical values. One submission expressed concern that, at the levels set, there are still significant health impacts, particularly in relation to long-term mortality.

Some industry submissions considered the numerical values too stringent or not adequately justified. This concern appears to be based on the potential for the advisory reporting standards to be used as de facto compliance standards that may be too close to background levels in some areas to be achieved.

The majority of submissions supported the process used in the derivation of the standards. Few submissions questioned the scientific basis and the risk assessment approach used in the development of the standards.

2.4.2 Response

The introduction of advisory reporting standards will facilitate the collection of PM_{2.5} data across all jurisdictions so that NEPC will have a better understanding of PM_{2.5} levels for the Ambient Air Quality NEPM review scheduled to commence in 2005.

The standards were derived through a risk assessment process as well as consideration of what could be achieved in Australia based on current PM_{2.5} levels in four Australian cities. Accordingly, the standards are considered to represent a reasonable target, although it is recognised that in some areas of the Australia these standards may be exceeded on occasion.

The risk assessment has shown that, even if the standards were met, there would still be adverse outcomes from both short and long-term exposure to PM_{2.5}. It is considered that standards must be set that represent an improvement in current PM_{2.5} ambient levels, but are not unrealistic in the medium to long term.

2.5 APPLICATION OF THE NEPM

2.5.1 Submissions

Two submissions raised concerns that monitoring would not occur at peak sites.

2.5.2 Response

The current standards specified in the Ambient Air Quality NEPM do not apply to peak sites nor to the control of emissions from point sources. Similarly, the introduction of the PM_{2.5} advisory reporting standards will not apply to peak sites or to the direct control of point sources. However, where PM_{2.5} emissions impact significantly on regional air quality, jurisdictions may review their air quality programs to manage ambient PM_{2.5} concentrations.

2.6 PARTICLE COMPOSITION & SPECIATION

2.6.1 Submissions

A number of submissions commented on the need for a better understanding of particle type before making the NEPM variation. Several submissions stated that a better understanding of the chemical composition of particles is required.

2.6.2 Response

Currently there is a very limited understanding of chemical composition of particles, and whether different chemical species have different impacts. However, adverse health impacts from PM_{2.5}

have been identified. Application of the precautionary principle in this instance means that action should be taken despite the lack of certainty about specific particle composition.

Research on this topic is currently being undertaken in Australia and overseas. Results available from such research will be taken into account in the review of the Ambient Air Quality NEPM due to commence in 2005.

3 MONITORING

3.1 NEPM VARIATION REQUIREMENTS

The NEPM variation requires jurisdictions to monitor PM_{2.5} at existing PM₁₀ monitoring sites (although not all PM₁₀ sites will have PM_{2.5} monitors). The reference method for monitoring is the USEPA Federal Reference Method using manual gravimetric samplers. The use of tapered element oscillating microbalance analysers (TEOMs), which are widely used in a number of jurisdictions currently monitoring PM_{2.5}, will be allowed in addition to the reference method.

Implementation of the NEPM variation includes a requirement to establish sites around Australia where TEOMs and approved Federal Reference Method samplers (including Class I equivalent samplers) would be collocated to establish correlations between the two methods in Australian conditions.

3.2 INSTRUMENTATION

3.2.1 Submissions

A number of submissions raised concerns about the proposed monitoring techniques and choice of instruments. A few industry submissions argued that the methods were very expensive and more monitors using nephelometers could be deployed. They also argued that TEOMs are known to underestimate particle levels at cold temperatures.

Several community submissions expressed concerns about the cost of the proposed techniques, the accuracy of the results using TEOMs and a preference for a technique that generated daily results.

These community and industry submissions indicated that the use of nephelometers would allow consideration of a substantial historical database.

3.2.2 Response

It is recognised that there are issues associated with TEOM measurements, and some of these are considered in the Impact Statement. The reference method for monitoring PM_{2.5} for the purposes of the variation is the USEPA Federal Reference Method. Continuous gravimetric methods are not identified as preferred methods as equivalence to the USEPA Federal Reference Method has not been established. The NEPM variation therefore includes a program for collocation of monitoring equipment to enable the introduction of a reference method for monitoring PM_{2.5}.

This approach acknowledges the substantial investment that a number of jurisdictions have made in TEOM equipment and infrastructure. Although nephelometers provide an estimate of fine particle levels by light scattering, there is insufficient information in Australia about the correlations between mass based PM_{2.5} measurements and those based on light scattering. However, this does not preclude jurisdictions from using nephelometers for non-NEPM monitoring.

3.3 COLLOCATION PROGRAM

The Impact Statement indicated that nine sites nationally would be selected for a program to collocate TEOMs and gravimetric reference samplers.

3.3.1 Submissions

A number of submissions sought more detail about the collocation program. A concern expressed by community groups was whether the nine sites would adequately represent the range of climatic conditions in Australia.

Several industry submissions and several individual submissions raised concerns as to whether monitoring under the NEPM variation would generate sufficient data to adequately represent the range of Australian conditions, particularly in regional centres (such as Wagga Wagga or Armidale). Some submissions were concerned that the nine sites may not be adequate and that the NEPM variation should require more action to be taken to provide sufficient data to inform the review of the Ambient Air Quality NEPM. One consultant noted the high upfront capital cost of establishing monitoring sites and suggested that monitoring occur in two stages.

3.3.2 Response

The NEPM variation requires jurisdictions to commence monitoring and report annually on monitoring progress. As a result of concerns raised in submissions regarding the commencement date, the variation requires all jurisdictions to commence monitoring PM_{2.5} in 2004. This will ensure sufficient PM_{2.5} data are available for the review of the Ambient Air Quality NEPM scheduled to commence in 2005.

Whilst a minimum of one PM_{2.5} monitoring site per jurisdiction is required by the variation, it is envisaged that all jurisdictions will work towards comprehensive monitoring of PM_{2.5}.

As a result of the issues raised in the submissions, a monitoring protocol and an equivalence protocol have been incorporated in the NEPM variation. Under the equivalence protocol, the nominated collocation sites have been selected by jurisdictions based on available resources to represent a range of climatic conditions and particle sources.

3.4 COMMENCEMENT OF MONITORING

3.4.1 NEPM Proposal

The draft NEPM variation used for consultation stated that whilst a number of collocated sites would be established, each jurisdiction will be required to establish a minimum of one PM_{2.5} monitoring site (not necessarily collocated) by 2005.

3.4.2 Submissions

Several submissions sought clarification of when monitoring would commence as a reasonable data set is required for the review of the Ambient Air Quality NEPM review scheduled to commence in 2005.

3.4.3 Response

The NEPM variation has been amended to include a table specifying dates for the commencement of monitoring in participating jurisdictions.

Protocols for monitoring and equivalence are now detailed in the NEPM variation.

4 IMPACT STATEMENT

Several submissions raised concerns about the characterisation of the impacts as outlined in the Impact Statement.

4.1 SOLID FUEL HEATERS

4.1.1 Submissions

A number of community and individual submissions were concerned that:

- governments are not taking sufficient action to deal with solid fuel heaters, including buy back programs. Similarly, education programs to improve the operation of solid fuel heaters are not effective; and
- the health impacts of solid fuel heaters were not sufficiently addressed. For example, whilst the Impact Statement outlines the general health impacts of PM_{2.5}, more detail about the health impacts of particles specifically from solid fuel heaters is required.

One industry group argued that, whilst the industry associated with solid fuel heaters could be substantially impacted by the NEPM variation, those impacts have not been adequately assessed.

4.1.2 Response

Governments have generally aimed to work cooperatively with industry to find solutions to the impacts from solid fuel heaters.

The NEPM variation will provide a sound basis for the collection of an improved nationally consistent database and which will greatly assist jurisdictions in their ability to assess the extent of any problems in relation to PM_{2.5}. The variation will therefore assist governments in setting priorities in relation to the management solid fuel heaters.

4.2 INDUSTRY

4.2.1 Submission

An industry submission noted that the NEPM variation could lead to requirements for industry to upgrade plant or relocate, and the cost of those actions had not been considered.

4.2.2 Response

As indicated earlier, the standards specified in the Ambient Air Quality NEPM do not apply to the control of emissions from point sources. Similarly, the introduction of the PM_{2.5} advisory reporting standards will not apply to the direct control of point sources. However where PM_{2.5} emissions impact significantly on regional air quality, jurisdictions may review their air quality management programs to manage ambient PM_{2.5} concentrations.

The NEPM variation does not impact directly on industry. The cost of any programs to address specific PM_{2.5} sources undertaken by jurisdictions will vary and cannot be assessed at this time.

4.3 VEGETATION BURNING

4.3.1 Submissions

Several submissions raised concerns about controls on vegetation burning. These concerns were:

- there should be less burning because of the smoke impacts;
- the significance of bushfire smoke relative to other sources with regard to short term health impacts is not adequately reflected; and
- impacts of the NEPM variation on burning have been down-played and may be greater than anticipated.

Another submission expressed general support for the draft NEPM variation whilst requesting that it be flexible enough to allow for the continuation of hazard reduction burning.

4.3.2 Response

Fire authorities are committed to minimising the impacts of hazard reduction burning as far as possible. When hazard reduction burns are conducted, every attempt is made to minimise the smoke impacts on local communities. This includes assessment of impacts, notifying residents in affected areas in advance and avoiding burning at times when the accumulation of smoke may possibly be excessive. It is recognised that hazard reduction burning is an essential component of fire management and is only undertaken when necessary.

The risk assessment conducted as part of the development of the standards independently assessed the impact the bushfires. This document is available from the NEPC website. As the NEPM variation only applies to generally representative exposure, the non-bushfire data were considered in the Impact Statement. This does not in any way diminish concerns about the potential impacts of bushfire smoke on human health.

The NEPM variation provides flexibility as it does not set a maximum number of exceedences nor a timeframe for compliance with the standards. If compliance standards are to be introduced following the review of the Ambient Air Quality NEPM scheduled to commence in 2005, provision for a specified number of exceedences per year will be an issue for consideration at that time.

4.4 OTHER

4.4.1 Submissions and Responses

Several submissions argued that the value of a 'life' should have been included in the impact assessment to quantify the health costs avoided by reducing ambient particle levels. This is relevant to estimating the impacts of PM_{2.5}. Whilst the risk assessment indicated the impacts of PM_{2.5} and estimated the number of premature deaths that arise from different ambient levels, no dollar value for the loss of life was included.

The Impact Statement indicated that a value for a life had not been ascribed because of the difficulty in doing so, noting that estimates vary widely.

Two submissions expressed the view that the quoted health costs associated with PM_{2.5} exposure should include non-hospitalisation health costs. It is acknowledged that the costs of non-hospital health services are likely to be significant. However, it is difficult to collect such information and quantify it accurately, as reasons for persons attending GPs and pharmacies for self-medication purposes are not recorded.

A number of submissions argued that more information was required in the Impact Statement. These variously sought a 'sustainability' assessment to cover economic, social and environmental impacts or considered that the economic impacts had not been adequately assessed. The impact assessment approach used has been guided by the capacity to provide sufficient information that can be practically gathered to facilitate informed judgements about the merits of the variation. As indicated above, there are difficulties in assigning money values to all of the costs and benefits generated by the proposal. Consequently, it is considered that all impacts have been adequately assessed. This view is supported by the Commonwealth Office of Regulatory Review, which considers that the Impact Statement fulfils legislative requirements.

APPENDIX A - DETAILED SUBMISSIONS AND RESPONSES

Submitter No	Company
1	Mr Lloyd Lyons
2	Turnkey Environmental Systems Pty Ltd
3	M & K Fry
4	Mr Louis du Plessis
5	Environment Link
6	Pacific Power
7	Carter Holt Harvey
8	Australian Industry Group
9	Alcoa World Alumina - Applecross
10	Electricity Supply Association of Australia Ltd
11	Ms Suzanne Gordon
12	Minerals Council of Australia
13	Chamber of Commerce & Industry WA
14	Koonung Mullum Forestway Association
15	CH Environmental
16	CABRA (Raising Community Awareness about the health effects of Burning wood in Residential Areas)
17	The Coastwatchers Association
18	Australasian Fire Authorities Council
19	Boral Resources NSW Pty Ltd
20	Environment Protection Agency Qld
21	OneSteel - Whyalla
22	CFA Victoria
23	Lear Siegler Australasia Pty Ltd
24	Department of Primary Industries, Water & Environment
25	Environment Protection Authority SA
26	Mr Peter Hill
27	NSW Minerals Council
28	WA Government Departments
29	Armidale Air Quality Group
30	Advocates for Clean Air
31	The Crushed Stone & Sand Association of NSW
32	Australian Home Heating Assoc Inc
33	EMR Safety Network International
34	Environmental Measurements International Pty Ltd

PREAMBLE

This appendix presents a summary of public input so that stakeholders have an understanding of the views being presented to NEPC, and can trace their input into the development of this Variation.

Many issues and comments were raised in more than one submission, and in different forms. Style and expressions differ from one submission to another, and thus issues are raised in different ways having different connotations, contexts and emphases. As it is not possible in this Summary to deal with all the subtleties emerging from such variations, an attempt has been made to group similar comments together. Similarly, an attempt has been made, where possible, to provide a single response which captures the key issues raised in submissions.

Comments made in submissions have been assessed entirely on the cogency of points raised. No subjective weighting has been given to any submission for reasons of its origin or any other factor that would give cause to elevate the importance of any submission above another.

1 INTRODUCTION	
ISSUE	RESPONSE
<p>The introduction of the new term advisory reporting standard will create a great deal of confusion especially without an accompanying time goal (similar to Air NEPM goals).</p> <p>This term without an accompanying goal/s is likely create an expectation that the standards should be achieved with the first reports. A standard and goal should be proposed rather than the introduction of new and confusing term.</p> <p>5 Environment Link</p>	<p>The Variation includes both a proposed standard and goal for PM_{2.5}. The standard takes the form of a numerical value, however the Goal is to gather sufficient data to enable a review of the Ambient Air Quality NEPM scheduled to commence in 2005. It is expected that the data gathering goal will be met by 2005, however, there is no timeframe for achieving the standard.</p>
<p>The generators recognise the need to address the issue of fine particles in the atmosphere but are concerned that the variation to the NEPM, as proposed, will not necessarily result in the collection and assessment of data required to enable effective public health orientated decisions. The relatively modest requirements of the NEPM variation could appear to be at odds with the significance of the fine particles.</p> <p>6 Pacific Power</p>	<p>Changes have been made to the Variation. If made, the Variation will require all jurisdictions to commence monitoring PM_{2.5} in 2004 to ensure sufficient PM_{2.5} data is available for the review of the Ambient Air Quality NEPM scheduled to commence in 2005.</p>
<p>Section 13 (d) states that the Impact Statement must include an identification and assessment of the economic and social impacts on the community (including industry) of making the proposed measure. We consider that this requirement has not been met. Section 6.5 attempts to address our industry's issues, but it simply states the present situation in the solid-fuel industry; it does not provide any economic assessment of possible impacts. Section 6.5 notes that there might be additional product development costs but makes no attempt to quantify them. It makes no mention of the possibility of job losses in manufacturing, retail or firewood supply sectors.</p> <p>We believe the variation to the NEPM could have a serious adverse impact on the wood heater and firewood industries. We also believe low income families could suffer due to subsequent increases in heating costs.</p> <p>Section 1.4, Stakeholders, mentions the solid fuel heater manufacturing industry but it has not included heater retailing and servicing or the firewood supply industry.</p> <p>32 Australian Home Heating Association Inc</p>	<p>The Variation does not apply to the control of individual industries. Actions to manage PM_{2.5} levels will be at the discretion of individual jurisdictions. The only direct cost due to the introduction of the Variation will be to jurisdictions for PM_{2.5} monitoring. Noting this, the Impact Statement did not attempt to quantify the potential costs of strategies employed by jurisdictions to manage PM_{2.5} emissions.</p>

2 PURPOSE OF THE VARIATION	
ISSUE	RESPONSE
<p>Jurisdictions have been aware of the proposed introduction of a PM_{2.5} variation to the Ambient Air Quality NEPM since 1998 and therefore the need to obtain data in order to make a considered and objective assessment of the need for a variation. A number of the jurisdictions have not yet commenced any PM_{2.5} monitoring. Other jurisdictions have undertaken a substantial amount of monitoring since 1998 and have also made a significant contribution to reviewing this variation. It only seems fair and reasonable that the tardy jurisdictions be required to implement monitoring post haste.</p> <p>5 Environment Link</p>	<p>The Variation will require all jurisdictions to commence monitoring PM_{2.5} in 2004 to ensure sufficient PM_{2.5} data is available for the review of the Ambient Air Quality NEPM scheduled to commence in 2005.</p>
<p>It is noted (Table 6.2 of the Impact Statement) that all jurisdictions do not have sufficient monitors in place to meet NEPM requirements and there is a significant initial capital cost. However it is also noted that the jurisdictions that have already implemented monitoring now have microbalances etc in place so that their capital costs for introducing the full monitoring requirements is less on a marginal basis. To not unduly add to their capital costs but also to ensure the tardy states and territories implement PM_{2.5} monitoring then the NEPM variation should require the implementation of, at a minimum, half the full scale monitoring requirements within 3 months of the NEPM variation being made.</p> <p>5 Environment Link</p> <p>Given the demonstrated potential public health impacts due to PM_{2.5}, it is considered that the NEPM variation should be more demanding in what is required of jurisdictions, both in terms of monitoring and assessment of fine particles levels.</p> <p>6 Pacific Power</p>	<p>The Variation encourages all jurisdictions to move towards comprehensive monitoring of PM_{2.5}. Jurisdictions will be required to report annually on monitoring progress. The Variation will require all jurisdictions to commence monitoring PM_{2.5} in 2004 to ensure sufficient PM_{2.5} data is available for the review of the Ambient Air Quality NEPM scheduled to commence in 2005.</p> <p>Whilst a minimum of one monitoring station is required by the Variation, it is envisaged that all jurisdictions will work towards comprehensive monitoring of PM_{2.5}.</p>
<p>The public should be made aware of the harmful effects of fine particles and 'wood heater emissions' and 'burning off' should be identified as significant sources.</p> <p>11 Ms Suzanne Gordon</p>	<p>The Impact Statement draws attention to the adverse health impacts of PM_{2.5} and also to the role solid fuel heaters and burning practices play as sources of PM_{2.5}. Jurisdictions have a number of programs designed to communicate the adverse health effects of fine particles to the community.</p>
<p>The monitoring stations are to be located to measure 'average' exposure. This may underestimate the true position and be reflected when communicating information on air quality to government agencies, industry and the community. More accurate data would be obtained by monitoring closer to emission sources. Also, for episodes of a seasonal nature, data should reflect the timeframe (eg months) of pollution, rather than averaging data over 12 months, which can lessen the impact. This is particularly important in relation to the domestic wood-heating problem.</p> <p>16 CABRA (Raising Community Awareness about the health effects of Burning wood in Residential Areas)</p> <p>30 Advocates for Clean Air</p>	<p>The aim of the Variation, as with the Ambient Air Quality NEPM, is to monitor generally representative population exposure. Monitoring for PM_{2.5} is done for 24-hour periods. These data will be reported together with annual average data.</p>
<p>Page 6, line 37. We are very concerned that this will leave the door open for inaction. The standard must be strengthened to protect human health.</p> <p>16 CABRA</p> <p>30 Advocates for Clean Air</p>	<p>As is the case for the Ambient Air Quality NEPM, jurisdictions are responsible for implementing management strategies that are relevant to their specific needs.</p>
<p>Clearly, an issue is what particle size fraction is the appropriate indicator (as it was during the development of the PM₁₀ standard). When the PM₁₀ measure was agreed, it was supposed to be the appropriate measure for the expression of public health concerns. Now we are told that PM_{2.5} is more appropriate yet there are no moves to withdraw the less appropriate PM₁₀ measure. There has been a significant time lag for all jurisdictions in achieving the requirements of the NEPM and there has been little progress in measuring PM_{2.5}. The additional monitoring of PM_{2.5} has not occurred across the jurisdictions and so there is insufficient data for the proposed NEPM review. Given that jurisdictions will still be required to measure PM₁₀, measuring PM_{2.5} will require additional resources for most jurisdictions.</p> <p>18 Australian Fire Authorities Council</p>	<p>When the PM₁₀ standard was made in 1998, it was acknowledged that there was not sufficient health related evidence or exposure data to set a PM_{2.5} standard. Future actions included a review of the feasibility of setting a standard for PM_{2.5} in 2001. In considering setting a PM_{2.5} standard, it is recognised that PM₁₀ health effects differ from those for PM_{2.5}.</p>

2 PURPOSE OF THE VARIATION	
ISSUE	RESPONSE
<p>Section 2-2 of the Impact Statement states that PM_{2.5} monitoring is to take place to give an 'average' representation of general exposure of the population to PM_{2.5}. We are concerned that despite this intention, the standard will ultimately be applied to areas of peak concentrations (for example, areas within sub-regions of, say, 100 residents) when in fact these areas of variation have already inherently been taken into account in setting the 'average' acceptable exposure. We have observed this with respect to the NEPM standard and Goal for PM₁₀. The result of this is to effectively apply a standard based on an average exposure (set to be health protective across a range of environments regions and demographics) to each and every location (as if the standard was based on peak acceptable exposure). Consequently, it is likely that some particular community areas may not meet any future standard, whether due to PM_{2.5} from industry, motor vehicles or other sources and despite not necessarily representing a health risk. We suggest that the NEPM variation states where monitoring is not to take place, so as not to distort the original intention of the NEPM. One option may be to state that the standard is only to apply to regions or sub-regions of more than a defined number of residents. Any potential issues in smaller sub-regions may be more appropriately assessed by targeted studies, taking into account particulate species, demography etc.</p> <p>21 OneSteel - Whyalla</p>	<p>The aim of the Variation, as with the Ambient Air Quality NEPM, is to monitor average population exposure.</p> <p>PM_{2.5} monitoring is to be conducted at current PM₁₀ monitoring sites to represent average population exposure. These monitoring sites have already been agreed to by NEPC in approving the monitoring plans for each jurisdiction.</p>
<p>The proposed variation states a requirement for jurisdictions to report on results of PM_{2.5} monitoring. This would appear to allow the regulatory jurisdiction to include monitoring undertaken voluntarily by other bodies (eg industry) that has been supplied to a regulatory body, apart from the regulators own jurisdictional monitoring. This may inadvertently discourage the organisations from reporting data voluntarily to regulators or even discourage them from voluntary monitoring at all. We suggest that generally only data sourced directly by the regulatory body should be reportable to the NEPC. If industry supplied data is to be provided by the regulatory body to the NEPC, then the regulatory body should be obliged to discuss the information supply with that particular industry so that the industry has the opportunity to contribute to the submission in terms of data analysis, provision of contextual information.</p> <p>21 OneSteel - Whyalla</p>	<p>The Variation refers only to data collected by State and Territory agencies for the purposes of the Ambient Air Quality NEPM. It covers data collected by different sampling methods.</p>

2 PURPOSE OF THE VARIATION	
ISSUE	RESPONSE
<p>All Australians, even those living in impoverished areas close to air pollution hotspots, deserve protection from pollution. A practical solution to this dilemma would be to locate air pollution monitors both in areas of 'average' pollution, and also attempt to measure spatial variation and target pollution hotspots.</p> <p>26 Mr Peter Hill</p> <p>All Australians, even those living in impoverished areas close to air pollution hotspots, deserve protection from pollution. A practical solution to this dilemma would be to locate air pollution monitors both in areas of 'average' pollution, and also attempt to measure spatial variation and target pollution hotspots.</p> <p>One of the cheapest and most effective methods of identifying pollution hotspots would be to use a portable nephelometer. 6.2.1 (p31) indicates that the preferred method for measuring PM_{2.5} will be based on measurements from a HiVol sampler. Other methods will require an 'equivalence' program. There is no reason why the equivalence program should be restricted to continuous gravimetric methods such as the TEOM. Preliminary results from areas subject to wood smoke indicate that, at an ambient temperature of 5C, TEOM measurements are approximately half what a co-located HiVol sampler would read. Thus is necessary to use a pre-determined conversion formula to transform TEOM measurements into the equivalent of what a HiVol sampler would read. Any other method that can be shown to be equivalent, after transformation, to what a HiVol sampler would read, should also be considered acceptable.</p> <p>For a given season and aerosol type, nephelometer measurements can accurately predict HiVol PM_{2.5} measurements. When there is considerable spatial variability of pollution levels (as is often the case for domestic wood smoke pollution), two judiciously located nephelometers will almost certainly provide a cheaper and better prediction of average population exposure than a single TEOM. Thus the equivalence program should also consider how to deal with loss of accuracy due to spatial variation and provide methods for establishing the equivalency of nephelometers, at least for certain areas and under certain conditions.</p> <p>29 Armidale Air Quality Group</p>	<p>Monitoring undertaken under the Ambient Air Quality NEPM is designed to measure average exposure. Monitoring at point or 'hot spot' sources is a jurisdictional responsibility/decision, which is often undertaken.</p> <p>Although nephelometers provide an estimate of fine particles levels by light scattering there is not sufficient information in Australia about the correlations between mass based PM_{2.5} measurements and those based on light scattering. Until these correlations are known, nephelometers cannot be used as a reference method under the NEPM. However, this does not preclude jurisdictions from using nephelometers for non-NEPM monitoring.</p>
<p>We agree with the stated goal of the NEPM variation as a means of gathering data (Section 2.2 lines 22-24), however we are concerned that by setting standards for 24-hour and annual PM_{2.5} ambient concentrations the variation will become a surrogate enforceable limit. It is unlikely that State environmental protection authorities will see the variation in this light, but from past experience some local government authorities are likely to, as are some environmental activist groups. It is premature to set standards when so little is known of PM_{2.5} concentrations and sources around the country.</p> <p>32 Australian Home Heating Association Inc</p>	<p>There is no compliance goal associated with the advisory reporting standards. The goal of the Variation is to facilitate the collection of PM_{2.5} data. The introduction of the advisory reporting standards will facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of PM_{2.5} levels will be gained for the Ambient Air Quality NEPM review, scheduled to commence in 2005.</p>

3 PM_{2.5} IN AUSTRALIA	
ISSUE	RESPONSE
<p>The proposal sets very low 24-hour average and annual average concentrations of PM_{2.5}, which are significantly tighter than those existing under USEPA or Canadian Standards.</p> <p>8 Australian Industry Group</p>	<p>The standards have been selected as appropriate health-based benchmarks to compare PM_{2.5} levels in Australia at this time.</p> <p>While some jurisdictions may have PM_{2.5} levels that are above these standards, available data indicate that the majority of urban areas are within or only slightly over these levels. It should be noted that there is no compliance goal associated with the advisory reporting standards.</p> <p>While California has set an annual average standard of 12 µg/m³, they have significantly higher pollution levels than much of Australia. The proposed 24-hour average is on par with the New Zealand “monitoring value” and the value currently under consideration in California. It should be noted that the USEPA 24-hour standard of 65 µg/m³ is designed to measure peak exposures rather than average exposure levels (such as those monitored under the Ambient Air Quality NEPM), and as such is not considered appropriate for Australia. The 24-hour average Canadian standard is not significantly higher than the Variation.</p>
<p>Given the low average and annual concentrations proposed, it is likely that background ambient levels could in fact exceed the standard in many locations.</p> <p>8 Australian Industry Group</p>	<p>The introduction of the advisory reporting standards will facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of PM_{2.5} levels will be gained for the Ambient Air Quality NEPM review, scheduled to commence in 2005.</p>
<p>The proposed low standards may make it very difficult for new projects to achieve approval in regions where ambient levels are at the level of the standard.</p> <p>8 Australian Industry Group</p>	<p>The purpose of the Variation is to collect data. Any actions taken to manage PM_{2.5} levels are at the discretion of the individual jurisdictions and are not a requirement of the Variation.</p>
<p>The Impact Statement states that PM_{2.5} measurements made by TEOMs are underestimations as TEOMs reportedly underestimate peaks. The majority of the PM_{2.5} monitoring results in Table 3.1 of the Impact Statement, and presented in charts elsewhere in the Impact Statement, were derived by TEOM. This table shows that maximum 24-hour levels all exceed the proposed one day standard and the majority exceed the proposed annual standard. If these had been measured by a gravimetric method then the exceedences of the proposed advisory standards would be significantly greater. It is not apparent in the Impact Statement, in determining the standards, whether this anomaly has been taken into account. Even given the projected decreases in particle levels from various measures underway it is unlikely that the standards would be achievable for a great many years.</p> <p>5 Environment Link</p>	<p>It is acknowledged that the use of TEOM data may lead to some underestimation of PM_{2.5} levels in some air sheds, in particular where high proportions of volatile particles are present.</p> <p>Under the Variation, there will be a number of collocated monitoring sites established to collect PM_{2.5} data using gravimetric reference methods and other direct mass measurement methods. This will provide greater understanding of the variations between particle measurements using various methods. This data will be assessed during the review of the Ambient Air Quality NEPM, scheduled to commence in 2005.</p>
<p>Given that one of the aims of the variation is to lead to the accumulation of information to be available for the overall review of the NEPM in 2005, it is considered that the variation, or the Impact Statement, should be more definitive in the range of activities to be undertaken between 2003 and 2005 which are designed to fill the acknowledged gaps in the knowledge base of PM_{2.5} in Australia. It is considered that the limited additional monitoring, reporting and assessment that may occur under the NEPM variation will do little to fill these gaps.</p> <p>6 Pacific Power</p>	<p>The information collected through implementation of the Variation will provide a comprehensive database of PM_{2.5} data for assessment in 2005. Monitoring (at one site per jurisdiction at least) is required to commence in 2004. The equivalence program has been modified to tighten the requirements of this program.</p>
<p>Table 3.1 shows that the 24-hour PM_{2.5} standard will likely be exceeded at all of the current monitoring sites around Australia, albeit at low frequency for some. It also shows that the annual standard will likely be exceeded at up to 12 of the 19 existing monitoring sites. The fact that the proposed advisory standards are very ambitious when compared to existing levels of this contaminant needs to be highlighted in our view, so that the community do not gain an unrealistic expectation of existing air quality and the rapidity of achieving a widespread improvement or even compliance.</p> <p>9 Alcoa World Alumina - Applecross 13 Chamber of Commerce & Industry WA</p>	<p>The standards have been selected as appropriate health-based benchmarks to compare PM_{2.5} levels in Australia at this time.</p> <p>While some jurisdictions may have PM_{2.5} levels that are above these standards, available data indicate that the majority of urban areas are within or only slightly over these levels.</p>

3 PM_{2.5} IN AUSTRALIA	
ISSUE	RESPONSE
<p>The discussion (pages 8 to 9) fails to comment on why the proposed standards are so much tighter than nearly all of the other standards in existence (eg the US ambient air quality standard). If this is because these international standards are out of date, or based on older dose-response relationships that are superseded by more current information, then this should be clearly stated. We do not support the philosophy of setting tougher standards just for the sake of it. However, environmental factors, which may be indicated by the data presented, may mean that higher standards or guidelines are appropriate.</p> <p>9 Alcoa World Alumina - Applecross 13 Chamber of Commerce & Industry WA</p> <p>The proposal sets extremely low numerical values for PM_{2.5} concentrations of 24-hour average and annual average. The proposed standards are currently exceeded in many areas where they would be applied. The proposed standard is so low that background ambient levels are likely to exceed the standard in many areas, including those well-removed from industrial sources of PM_{2.5}. As proposed the practicality of the variation must come under serious question. An alternative approach may be to adopt a 98th percentile approach.</p> <p>The proposed standards are likely to cause severe difficulties in the assessment of green fields proposals. This is because in an area where the background is so close to the standard, even a small increment in PM_{2.5} in a localised area, will likely cause exceedences over much larger adjacent areas. The practical implications of this would be widespread and need further evaluation.</p> <p>The fact that the standards are set at very low numerical levels can be seen to be true by comparing the concentration limits with those set in other comparable countries. This is done in Section 3.4 of the Impact Statement.</p> <p>12 Minerals Council of Australia 27 NSW Minerals Council 31 The Crushed Stone & Sand Association of NSW</p>	<p>The advisory reporting standards have been derived using a risk assessment process using Australian monitoring data. Even at the proposed levels health effects are predicted to occur. Other countries apply their own economic, social and political processes in setting standards that may not be applicable in Australia. The standards have been selected as appropriate health-based benchmarks to compare PM_{2.5} levels in Australia at this time.</p> <p>The introduction of the advisory reporting standards will facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of PM_{2.5} levels will be gained for the Ambient Air Quality NEPM review, scheduled to commence in 2005.</p>
<p>The Impact Statement for the proposed standard unreasonably dismisses the potential importance of chemical composition. Page 7 lines 30 to 25 suggest that there is no clear evidence that chemical composition plays a role in the health effects of PM_{2.5} particles. While similar statements are made in the literature reviews on the health effects of particles, there also seems to be significant research based on the assumption that the chemical composition of particles is important. Clearly at one level chemical composition is important. The harmful effects of crystalline forms of silica and of asbestos have been known for many years and the carcinogenicity of some PAHs and other air toxics is well known.</p> <p>We find it difficult to reconcile the assumption that chemical composition is not important with the findings of Laden et al (2000). In their analysis of the six cities data, they found that “a 10 µg/m³ increase in PM_{2.5} from mobile sources accounted for a 3.4% increase in daily mortality [95% confidence interval (CI), 1.7-5.2%], and the equivalent increase in fine particles from coal combustion sources accounted for a 1.1% increase [CI, 0.3 – 2.0%]. PM_{2.5} crustal particles were not associated with daily mortality”.</p> <p>Further, current scientific capabilities allow the differentiation of PM_{2.5} based on chemical signature for PM_{2.5} generated from crustal sources, compared to that from combustion sources. Admittedly PM_{2.5} generated from similar sources could not be practically differentiated.</p> <p>Based on the relevant research and the results of the analysis of the six cities data, we would suggest that chemical composition of particles is important.</p> <p>12 Minerals Council of Australia 27 NSW Minerals Council 31 The Crushed Stone & Sand Association of NSW</p>	<p>While it is accepted that particle composition may be important, there is still uncertainty relating to the health effects of particles with respect to whether particle size or composition is responsible for the observed health effects. The literature indicates that both crustal and combustion-derived particles have been associated with adverse health impacts.</p> <p>While further research is required and is being undertaken, at present there is no clear evidence how particle composition plays a role in the observed health effects. Further, there is currently very limited particle composition data available for Australia. A 4-city study is currently under way to improve this data base.</p>

3 PM_{2.5} IN AUSTRALIA	
ISSUE	RESPONSE
<p>The Impact Statement claims that the annual average actual background concentration is approximately 5 µg/m³. Based on data from ANSTO (1999) the average PM_{2.5} mass measured at Cape Grim for the period 1992 -1998, is 6.2 µg/m³ plus or minus 3.4 µg/m³ and the maximum 24-hour concentration measured in the same period at Cape Grim was 22 µg/m³. This monitoring site, which is remote from industry and for much of the time records global background levels of PM_{2.5}, would find it difficult to comply with the 8 µg/m³ goal (annual average). Up to 79% of this material is sea salt spray and may well be “harmless”, but the fact that the annual background PM_{2.5} was 6.2 µg/m³ would limit any new proposal to increasing the annual PM_{2.5} concentration to less than 1.8 µg/m³. It is very unlikely this would be achievable, and would be extremely limiting for mining projects.</p> <p>12 Minerals Council of Australia 27 NSW Minerals Council 31 The Crushed Stone & Sand Association of NSW</p>	<p>The background concentration is based on the average of the 5th percentile 24-hour PM_{2.5} concentrations for the four cities. This value is within the range quoted for the Cape Grim site.</p> <p>As discussed above, the assessment of development projects undertaken by jurisdictions would need to take into account cumulative impacts, including the contribution from background particle levels, on a case-by-case basis. Specific information on the nature of the aerosol could be used to assess the significance of potential exceedences on a site-specific basis.</p>
<p>P28, lines 18-20. These difficulties are understandable. Nonetheless, some estimate (or alternatively a range of estimates) are required of the cost of premature mortality, in order to compare the costs of measures to control pollution with the benefits that will result.</p> <p>26 Mr Peter Hill 29 Armidale Air Quality Group</p>	<p>Noted</p> <p>There is no consensus on the value of a life, which makes it extremely difficult to quantify the impacts in monetary terms. It was considered that the numbers of deaths alone were significant enough to show the benefits that could be gained by reductions in PM_{2.5}.</p>
<p>Much of PM_{2.5} pollution occurring in residential air sheds is a result of unnecessary and deliberate fire lighting practices of wood and agriculture, where readily available alternatives could be chosen in place of burning.</p> <p>30 Advocates for Clean Air</p>	<p>Noted. These impacts have been discussed in the Impact Statement.</p>
<p>A 'socially unacceptable' tag needs to be applied to wood and agricultural burning in the same manner as it is applied to cigarette smoke in public places today.</p> <p>The real 'natural' levels of PM_{2.5} pollution produced by wild fires is more than sufficient exposure for the vulnerable in society to be forced to cope with, without other fire lighting practices that are unnecessary. There is nothing necessary or natural about a deliberately lit fire in a residential area - the only exception being required back burning to control a wild fire already in progress.</p> <p>30 Advocates for Clean Air</p>	<p>Noted.</p>
<p>We are strongly opposed to the adoption of the PM_{2.5} standard as proposed. Our concerns need to be addressed and resolved before any support would be offered by the extractive industry of NSW.</p> <p>31 The Crushed Stone & Sand Association of NSW</p>	<p>The NEPM standards are not applicable to the control of emissions from individual industries and therefore are unlikely to impact on individual mining operations. Overall, through the consultation process there was strong support for the introduction of the advisory reporting standards for PM_{2.5}.</p>
<p>We note the acknowledgement that TEOMs are known to underestimate the organic component of PM_{2.5} (Section 3.3 line 20). Yet the measurements reported in Table 3.1 are largely TEOM derived. Will uncorrected TEOM measurements be used in assessing compliance with the standards or will there be some correction factor applied? If a correction is applied it could mean that the proposed standards will be unobtainable. This serious uncertainty reinforces our view that it is premature to set numbers for 24-hour and annual PM_{2.5} concentrations.</p> <p>32 Australian Home Heating Association Inc</p>	<p>The collocation monitoring outlined in the Variation will determine whether a correction factor can be derived. For the purposes of this Variation, uncorrected data from TEOMs may be reported. This will be reviewed as part of the review of the Ambient Air Quality Measure due to commence in 2005.</p>
<p>I have come to dread the still autumn days and winter months as the smoke from the neighbour's wood burning combustion stove is all pervasive and inescapable. Thus we lose the health advantages of fresh air during these times.</p> <p>While woodsmoke is not unpleasant to the senses it can, and is, a health concern for the five occupants of my home, visitors to my home and a neighbour.</p> <p>33 EMR Safety Network – international</p>	<p>The adverse impacts wood smoke can have on the community have been discussed in the Impact Statement. Jurisdictions are implementing a number of strategies to manage wood smoke emissions. These include, but are not limited to, education campaigns, buy back schemes and smoke patrols.</p>

4 ALTERNATIVE METHODS OF ACHIEVING THE DESIRED ENVIRONMENTAL OUTCOME	
ISSUE	RESPONSE
<p>Whilst the standard is an advisory standard, given its objective of addressing health concerns, it is possible that it could be adopted as a de facto health standard and appear in EPA licence conditions.</p> <p>8 Australian Industry Group</p>	<p>The NEPM standards are not applicable to the control of emissions from individual industries.</p>
<p>The Impact Statement does not demonstrate how the NEPM variation will bring about the desired environmental outcome. It is considered that the NEPM variation requirements should be strengthened and supported by a range of activities designed to fill the acknowledged knowledge gaps. This may require some form of inter-governmental agreement.</p> <p>6 Pacific Power</p>	<p>Individual jurisdictions will be required under the Variation to report the results of any monitoring that has been undertaken. It is acknowledged in the impact assessment that this may result in driving jurisdictional programs to manage PM_{2.5}. The extent of these programs is an implementation issue for individual jurisdictions.</p>
<p>Section 4.1.5 notes that implementation of the variation will allow jurisdictions to flexibly implement monitoring as resources become available - it should be noted that this 'flexibility' may well come at the cost of consistency in approach across jurisdictions and therefore not necessarily facilitate a 'harmonious' approach as indicated earlier. Further, it should be noted that the additional monitoring impost on jurisdictions (possibly only one monitor) is modest compared with the calculated health costs related to exposure to PM_{2.5}.</p> <p>6 Pacific Power</p>	<p>As a result of comments, changes to the Variation have been made to ensure consistent collection of PM_{2.5} is being undertaken.</p>
<p>Given the knowledge gaps relevant to PM_{2.5}, Option 2 is supported in principle, but it is considered that the monitoring requirements should be increased from the proposed one site, as a minimum, per jurisdiction and that the monitoring should be in place by the end of 2003 and not prior to 2005, as permitted in the variation. The variation's monitoring timetable could result in scant additional data being available for the NEPM review in 2005.</p> <p>6 Pacific Power</p>	<p>Jurisdictions will be required to report annually on progress to implement monitoring of PM_{2.5}. The Variation has been strengthened to specify that monitoring must commence in 2004 and that jurisdictions are encouraged to introduce monitoring into existing PM₁₀ sites as soon as practicable.</p>
<p>In addition, it is considered that jurisdictions should be required to (a) investigate reasons and causes of any exceedences of the 'standards' - this is partly covered in the variation, but the requirements could be more explicitly defined (b) develop and enhance PM_{2.5} emission inventories (c) contribute to a better understanding of the occurrence and impacts of PM_{2.5} in Australia.</p> <p>6 Pacific Power</p>	<p>The Variation requires jurisdictions to report on the reasons for any exceedences of the standards that may occur. Any additional studies will be up to the discretion of individual jurisdictions as part of their normal air quality management programs.</p>
<p>If the standard is an 'advisory reporting' one, then it would be better in our view to call it a guideline. The term 'standard' even when prefaced by qualifiers, has a popular meaning of mandatory or regulatory. Many will fail to make the distinction between this standard and those others within the Ambient Air Quality NEPM. This will result in unnecessary and time-consuming effort on the part of regulatory agencies and others having to explain the status of this standard.</p> <p>9 Alcoa World Alumina - Applecross 13 Chamber of Commerce & Industry WA</p>	<p>The term "guideline" has a specific meaning under NEPC legislation. Guidelines provide guidance on how standards and goals can be achieved, and how specified environmental problems can be addressed.</p> <p>There is no goal requiring the standards to be met within a specified timeframe associated with the advisory reporting standards. The goal associated with the Variation is to facilitate the collection of PM_{2.5} data.</p>
<p>Lines 28 to 30 - the application of the standard to 'average representative' sites should be stressed and highlighted, as should its non-application to 'peak sites' near industrial sources and heavily trafficked</p> <p>9 Alcoa World Alumina - Applecross 13 Chamber of Commerce & Industry WA</p>	<p>Noted. Monitoring undertaken under the Ambient Air Quality NEPM is designed to measure average exposure. The Variation applies within the framework of the Principle Measure and therefore does not apply at peak sites.</p>
<p>Section 4.1.5. We are strongly supportive of the national approach implicit in the proposal. Furthermore, we believe that every effort needs to be made so that the implementation of the standard is essentially the same in each state.</p> <p>9 Alcoa World Alumina - Applecross 13 Chamber of Commerce & Industry WA</p>	<p>Noted.</p>
<p>Option 1 would provide more information to act upon.</p> <p>11 Ms Suzanne Gordon</p>	<p>The introduction of the advisory reporting standards will facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of current PM_{2.5} levels will be gained for the Ambient Air Quality NEPM review, scheduled to commence in 2005.</p>

4 ALTERNATIVE METHODS OF ACHIEVING THE DESIRED ENVIRONMENTAL OUTCOME	
ISSUE	RESPONSE
<p>We have concerns with the difficulty in ensuring that the standard will be used as an advisory standard, as specified in the NEPM. The claim that the standard has been derived from considerations of health effects will ensure that it is taken as a health-based goal which will need to be complied with at all locations, including isolated residences surrounding mines.</p> <p>12 Minerals Council of Australia 27 NSW Minerals Council 31 The Crushed Stone & Sand Association of NSW</p>	<p>The proposed standards have been selected at a level that would achieve significant reductions in adverse health impacts if the levels were achieved. The Ambient Air Quality NEPM standards apply at generally representative sites and not to the control of emissions from individual sources. The focus of the Variation is the collection of data.</p>
<p>We believe the Standard should be mandatory and have difficulty accepting that the proposed Option 2 will be strong enough to ensure the desired environmental outcome.</p> <p>16 CABRA (Raising Community Awareness about the health effects of Burning wood in Residential Areas) 30 Advocates for Clean Air</p>	<p>At this stage there is insufficient data to set a compliance standard. The introduction of the advisory reporting standard will facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of current PM_{2.5} levels will be gained for the full Ambient Air Quality NEPM review, scheduled to commence in 2005.</p>
<p>The proposed variation is to provide data for a review to commence in three years. Given the demonstrated time lag for jurisdictions in implementing the NEPM, it is likely the next review would commence without even the implied three years of concurrent PM₁₀ and PM_{2.5} data collection. We query the advisability of such a limited time for concurrent measurements given the seemingly dry pattern in the eastern states for the past few years. Realistically, a much longer series of concurrent measurements should be used if the equivalence between PM₁₀ and PM_{2.5} is to be established for each major air shed.</p> <p>18 Australian Fire Authorities Council</p>	<p>Noted. It is acknowledged that timing and resourcing of additional PM_{2.5} monitoring in jurisdictions and data availability will be an issue for the proposed NEPM review in 2005. Many jurisdictions are already collecting PM_{2.5} data and have been for several years. The Variation has been modified to require all jurisdictions to commence monitoring in 2004.</p>
<p>The Impact Statement argues between types of standards and concludes the advisory standard is most appropriate. This is using the standard setting process to increase the likelihood that jurisdictions will comply. We do not accept the appropriateness of setting a standard in order to obtain baseline data. This has not worked to date. The use of the words advisory standard will inevitably result in its recognition as compliance standard by the community. Thus the form of the variation is clearly recognisable as regulation by stealth.</p> <p>18 Australian Fire Authorities Council</p>	<p>Advisory reporting standards will enable jurisdictions to assess how their PM_{2.5} data compares with the health-based standards. It will be highlighted that the advisory reporting standards are not compliance standards.</p> <p>The form of the standards and their intended use and objectives is clearly defined in the Impact Statement. This form of the standard was chosen as the most appropriate at this time, given the limited Australian database of consistent PM_{2.5} measurements and the costs to jurisdictions of implementing comprehensive monitoring in accordance with a "full" NEPM standard.</p>
<p>The proposed levels have been derived from the results of the exposure analysis to provide the best health endpoints. If the jurisdictions had been reporting against a range of levels or providing frequency distributions, then the exercise would be easily assimilable into the projected NEPM review. As it is, the levels have been explicitly chosen as medium to long term improvements in health endpoints. It is difficult to reconcile the expressed short term nature of the data gathering for the proposed NEPM review against a medium to long term measure. No data is presented to show rural or long term levels for PM_{2.5} particles from different parts of the country and it must be asked whether the proposed standards would have been met when pre-European fire regimes were being applied across the landscape.</p> <p>18 Australian Fire Authorities Council</p>	<p>The endpoints chosen cover acute exposure endpoints (24-hour) as well as long term endpoints (annual). It is acknowledged that PM data are not available from rural areas.</p> <p>The proposed levels represent a significant reduction in adverse health impacts, based on a risk assessment undertaken for Australia's major cities. The proposed standards are considered to represent a reasonable target to maintain or work towards. Monitoring under the Ambient Air Quality NEPM, and under the Variation, is only required in populations of 25,000 or more. The Variation is expected to facilitate additional monitoring and improve the Australian PM_{2.5} database, providing better information on ambient levels and the need for additional management measures.</p>
<p>Use of the term "advisory" may mean that there is no compliance requirement or period but does not provide for exceedences, a point the community may not appreciate. Since the Impact Statement acknowledges that there may be reductions in PM_{2.5} levels as outcomes from management efforts directed towards other air quality objectives, our members are left to conclude that the level has been chosen for the medium to long term and that it will be validated post hoc to become a compliance standard.</p> <p>18 Australian Fire Authorities Council</p>	<p>The form of the standards and their intended use and objectives is clearly defined in the Impact Statement. As there is no compliance goal associated with the standards, exceedences are not relevant. This form of the standard was chosen as the most appropriate at this time, given the limited Australian database of consistent PM_{2.5} measurement and the costs to jurisdictions of implementing comprehensive monitoring in accordance with a "full" NEPM standard.</p>

4 ALTERNATIVE METHODS OF ACHIEVING THE DESIRED ENVIRONMENTAL OUTCOME

ISSUE	RESPONSE
<p>In our previous submission on the PM_{2.5} Discussion Paper, we stated a preference for an annual mean as a standard as opposed to a daily average. While both acute and chronic health effects clearly need to be considered, there remains a difficulty for areas such as Whyalla, South Australia, where climatic conditions (such as windblown dust during northerly wind events) significantly skew the frequency distribution for particulates (as seen with PM₁₀ and TSP). The result is that a standard for the annual mean may be met but a daily standard may be intermittently exceeded. The general community would be expected to take the results and any 'exceedences' of a standard at face value, hence the importance of the standard defining what is acceptable. Given a daily standard, at the minimum we would suggest that with a future PM_{2.5} goal (post 2005), a defined number of days allowable in excess of the standard would assist in acknowledging the varying climatic conditions in certain regions. The preference would be to put more weight to the annual mean as this more effectively accommodates natural variation.</p> <p>We support the approach of the NEPM, which allows for collection of air quality data to assist development of an appropriate standard. We encourage the collection of data that will assist understanding and management of smoke management issues, including the background levels of smoke due to wildfire.</p> <p>21 OneSteel - Whyalla</p>	<p>The goal of the NEPM Variation is to collect data to facilitate a full review of the NEPM. In the interim jurisdictions are required under the Variation to report if the standards are exceeded and the reasons why. This will assist in the review of the Ambient Air Quality NEPM due to commence in 2005. However, there is not a maximum number of allowable exceedences associated with this Variation.</p> <p>The Variation sets both an annual average and 24-hour value, both of which need to be reported against.</p> <p>Noted.</p>
<p>Irrespective of the uncertainty, the estimated health effects, including premature mortality of approximately 3,000 Australians every year, are large, significant and only too real. In view of the magnitude of these effects, we simply cannot afford to delay taking what is known to be cost effective action to minimise the damage to our health. There is absolutely no doubt that PM_{2.5} levels should be reduced as soon as possible and therefore, the sooner a mandatory standard is introduced, the better. Many of the measures to reduce PM_{2.5} pollution, such as reducing particle emissions from wood heaters or diesel engines, are relatively cheap in comparison with the enormous benefits that are predicted.</p> <p>There is some small cost associated with taking two sets of fairly similar measurements. Standards can, however, be maintained while controlling costs, because it will not always be necessary to measure both PM₁₀ and PM_{2.5}. Often one standard may be much more likely to be exceeded than the other. In that case, the authorities need only to measure whichever is most likely to exceed the standard.</p> <p>26 Mr Peter Hill 29 Armidale Air Quality Group</p>	<p>The potential serious health implications of exposure to PM_{2.5} are acknowledged by the making of the Variation. Many jurisdictions already have strategies to manage levels of PM_{2.5} in place.</p> <p>Noted.</p>
<p>Section 4 discusses three options for introducing controls on PM_{2.5} (plus the do nothing option), but it does not put the option of simply collecting more data on PM_{2.5} before deciding on appropriate standards. Unless more is known about PM_{2.5} levels around the country, it is impossible to assess what the economic and social costs of controlling PM_{2.5} are going to be.</p> <p>32 Australian Home Heating Association Inc</p>	<p>The purpose of the Variation is to collect data. Any actions taken to manage PM_{2.5} levels are at the discretion of the individual jurisdictions and are not a requirement of the Variation.</p>

5 DERIVATION OF THE STANDARD

ISSUE	RESPONSE
<p>While Table 5-5 on page 28 may be correct in the narrow sense of placing an accurate value on the narrow range of health effects it is intended to evaluate, I believe it seriously misleads the indiscriminating reader into believing that health effects cost a minuscule part of what they actually do. Part of the discrepancy is due to NEPC's decision not to place a dollar value on death. This exclusion is not made in the EC study by M Holland and P Watkiss 2002.</p> <p>4 Mr Louis du Plessis</p>	<p>While it is acknowledge that the data relating to health costs do not account for all costs, the data presented reflect reliable data made available by the Commonwealth Department of Health.</p> <p>There is no consensus on the value of a life, which makes it extremely difficult to quantify the impacts in monetary terms. It was considered that the numbers of deaths alone were significant enough to show the benefits that could be gained by reductions in PM_{2.5}.</p>

5 DERIVATION OF THE STANDARD	
ISSUE	RESPONSE
<p>Table 5.2 shows that (for Sydney) the maximum short term PM_{2.5} concentrations due to bushfire smoke significantly exceed those from other sources. However, Table 5.4 does not seem to reflect the significance of bushfire smoke relative to other sources when presenting the potential short term health</p> <p>6 Pacific Power</p>	<p>Noted. The risk assessment conducted a part of the development of the standards independently assessed the impact of bushfires. This document is available on the NEPC website. As the NEPM only applies to generally representative exposure, the non-bushfire data was considered in the Impact Statement. This does not in any way diminish the concerns about the potential impacts of bushfire smoke on human health.</p>
<p>There seems to be some ambiguity in the approach of the Impact Statement and NEPM variation with respect to the relevance of the proposed goals or standards. There is recognition in the Impact Statement that that a PM_{2.5} standard must be set that represents an improvement on current levels - if met, the health impacts due to PM_{2.5} would be reduced. The proposed standards are therefore considered to be a reasonable target, but the variation requires only modest expenditure on additional monitoring (compared with potential health cost savings).</p> <p>Furthermore, the assessment requirements, should the standards be exceeded, are not well defined. It is considered that if, as argued, PM_{2.5} is a very significant health issue, there should be greater requirements on jurisdictions to understand the occurrence of PM_{2.5} and that exceedance of the 'standards' should trigger the need for additional activity.</p> <p>6 Pacific Power</p>	<p>Jurisdictions will be required to report annually on progress to implement monitoring of PM_{2.5}. The Variation has been strengthened to specify that monitoring must commence in 2004 and that jurisdictions are encouraged to introduce monitoring into existing PM₁₀ sites as soon as practicable.</p> <p>The goal of the NEPM Variation is to collect data to facilitate a full review of the NEPM. In the interim jurisdictions are required under the Variation to report if the standards are exceeded and the reasons why. This will assist in the review of the Principal Measure due to commence in 2005. Jurisdictions are also required to report on any actions planned or being taken to manage PM_{2.5} levels.</p>
<p>Page 24, lines 10 to 14 - highlights the scantness of PM_{2.5} data for rural and regional areas. The winter situation presented for Armidale and Launceston is likely to be similar in many country and regional areas throughout southern Australia. Consequently we believe there will need to be a substantial effort made to educate the rural and regional population of Australia, so that they understand the predominant sources and causes of elevated PM_{2.5} levels in their areas, and do not seek to falsely attribute poor local air quality to convenient scapegoats such as industries that happen to be in the area.</p> <p>9 Alcoa World Alumina - Applecross 13 Chamber of Commerce & Industry WA</p>	<p>The collection of additional PM_{2.5} data should assist jurisdictions to better understand sources and causes of elevated PM_{2.5} areas throughout the country. Many jurisdictions are already conducting education campaigns to raise awareness of sources of pollution in both urban and rural areas, for example, in wood smoke affected areas.</p>
<p>Page 25, Figure 5.3. 'Premature deaths avoided' needs better explanation/definition. The relevance and severity of this health endpoint is affected by the period by which a premature death has been advanced - ie a premature death of one week or less would be considered less severe than one of a year for instance. As it reads currently there is no distinction to indicate relative severity of the measure if it is simply based on number of premature deaths.</p> <p>9 Alcoa World Alumina - Applecross 13 Chamber of Commerce & Industry WA</p>	<p>There is still a lot of uncertainty around the extent of life shortening. It is estimated that it can be up to several years, which is significant public health issue. The NMMAPS work in the USA has investigated the length of life shortening for various health outcomes due to exposure to PM₁₀.</p>
<p>The data in the impact assessment makes it clear the effects of long term exposure on mortality dominate the impacts, and because of the assumed linear dose response relationship, the effects are very sensitive to small changes in annual average PM_{2.5} concentrations. At the proposed standard, very significant mortality effects of around 1000 premature deaths remain.</p> <p>15 CH Environmental</p>	<p>Agreed.</p>

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<p>In the absence of detailed knowledge and understanding of the health studies, it difficult to comment specifically on the proposed standard that has been determined. However, it is surprising and of some concern that the proposed standard is the lowest of the countries cited, especially as those countries are all considered progressive in terms of protection of community health. Given this, we question whether NEPC has peer reviewed its study outcomes against other country standards to ascertain and justify why the proposed standard is the lowest of all countries (for example, comparing health end-point goals and checking for errors or skews in health studies referenced). While the attainment of the best possible standard is certainly desirable, if the set level of a standard is not justified it is questioned whether the additional community expenditure required to attain the standard could have achieved a greater health benefit if applied elsewhere (for example, community health programs). The approach taken in the draft NEPM variation would also seem to be somewhat idealistic and narrow in focus rather than holistic. A holistic approach would consider the costs and benefits of this change against other possible community health strategies and attempt to target expenditure towards areas of greatest benefit.</p> <p>21 OneSteel - Whyalla</p>	<p>The health studies used as a basis for the risk assessment are the same as those used by the USEPA, Californian EPA and Environment Canada in the development of their standards for PM_{2.5}. The differences occur in the exposure assessment. Australian cities experience much lower levels of PM_{2.5} than those in North America. Also, other countries apply their own economic, social and political processes in setting standards. These may not be applicable in Australia.</p>
<p>Most of the estimates of adverse health effects used in costing the PM_{2.5} standard were based on overseas results. One reason for this is that the main research in Australia relating adverse health effects to particulate pollution is based on nephelometer measurements. In Australia, the relationship between nephelometer measurements and adverse health effects were at least as strong as that between direct gravimetric measurements and health effects in overseas studies. In recent years, nephelometer, PM₁₀ and PM_{2.5} measurements have been recorded in the major Australian cities. An obvious research project is therefore to analyse the latest data and see which set of measurements is most closely related to the adverse health effects. If the cheaper and more convenient nephelometer measurements are found to be as closely associated with adverse health effects as any other measurement, we should seriously consider using them and even basing our PM_{2.5} standard on nephelometer measurements.</p> <p>29 Armidale Air Quality Group</p>	<p>Noted. Although nephelometers provide an estimate of fine particles levels by light scattering there is not sufficient information in Australia about the correlations between mass based PM_{2.5} measurements and those based on light scattering. Until these correlations are known, nephelometers cannot be used as a reference method under the NEPM. However, this does not preclude jurisdictions from using nephelometers for non-NEPM monitoring.</p>
<p>The proposed standards in Section 5 are derived from health benefit estimates, yet no account of health costs has been included. We believe that if people are forced out of low cost firewood fuel for heating there will be adverse health impacts due to inadequately heated homes.</p> <p>32 Australian Home Heating Association Inc</p>	<p>The health costs associated with hospital admissions have been estimated. The NEPM itself will not force people to stop using wood for heating. Any action taken by jurisdictions in addressing wood heater issues in individual jurisdictions would consider the social and economic issues associated with the proposed actions.</p>
<p>We consider the proposed 24-hour and annual reporting standards are too stringent. The values (25 and 8µg/m³) are equal to (for 24h) or less than (for annual averages) the lowest adopted elsewhere in the world (Section 3.4), yet the limited monitoring of PM_{2.5} done in Australia suggests not one of the 19 sites reported in Table 3.1 always meets the 24-hour standard and only 6 of the 19 always meet the annual average. We are alarmed that only 7 of 19 sites are less than the 8µg/m³ annual average value based on the lowest observed measurements. Surely this suggests an annual value of 8µg/m³ is too low and the California value of 12µg/m³ would be more appropriate, at least until more PM_{2.5} data is available.</p> <p>32 Australian Home Heating Association Inc</p>	<p>Australian cities experience much lower levels of PM_{2.5} than those in North America thereby making proposed standards in Australia more achievable than they would be in North American cities. The standards in the Variation will be reviewed in review of the Ambient Air Quality NEPM due to commence in 2005. The goal of the Variation is to collect enough data nationally to facilitate that review. The standards are health-based benchmarks against which this data can be assessed.</p>

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<p>Apart from the initial purchase price for TEOM instrumentation there are the significant cost implications of physically siting a TEOM, the municipal infrastructure to support its operation as well as the very expensive ongoing operating and maintenance costs. All of these costs are considerable and amount to \$100,000 per TEOM plus the operating costs. The number of monitoring sites could be increased from 19 to 76 if alternative monitoring equipment was used.</p> <p>3 M & K Fry</p>	<p>The preferred method for monitoring PM_{2.5} is the USEPA Federal Reference Method. Other direct mass measurement methods may be able to be used if equivalence can be demonstrated through collocation studies. This approach acknowledges the substantial investment that a number of jurisdictions have made in TEOM equipment and infrastructure.</p>

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<p>A fundamental flaw with TEOMs is that they report negative dust levels. Overall, results from a TEOM are therefore unreliable and constantly in question. By contrast, the Osiris detection technology does not report negative dust. Osiris reported results are completely dependable and at least as accurate as the TEOM when the TEOM is operating correctly.</p> <p>Osiris instruments are calibrated annually against a known very accurate gravimetric sample. These instruments can subsequently be "fine tuned" for site specific calibration by using a well established mathematical process and the built in gravimetric filter.</p> <p>2 Turnkey Environmental Systems Pty Ltd</p>	<p>It is agreed that there are issues associated with TEOM measurements, and some of these are discussed in the Impact Statement.</p>
<p>It is disappointing that the standards are not goals to be aimed at, but advisory reporting standards. The only practical result of the variation is the collocation of 9 manual gravimetric samplers with continuous gravimetric samplers (read Partisols with TEOMs) in order to obtain more data on PM_{2.5} levels in Australia and to determine the conversion factor from the readings of one instrument to those of the other. Even this modest objective is not certain to be attained, because its implementation is too dependent on jurisdictions that are allowed too much latitude</p> <p>4 Mr Louis du Plessis</p>	<p>The objective of the Variation to the Ambient Air Quality NEPM is to collect data to facilitate the review of the NEPM due to commence in 2005. At this time there is insufficient data to set a compliance goal.</p>
<p>It is clear from Section 6.2.2 (p 32) that NEPC regards the TEOM as the only candidate for routine monitoring. However, its high cost and low-temperature error means that it is not the best in all circumstances. I propose that a nephelometer also be tested at each of the 9 sites of collocation. This would establish which instrument correlates better with the Partisol, and also provide a more accurate conversion from bsp to PM_{2.5} for use in comparing Australian epidemiology based on nephelometer readings with overseas studies based on gravimetric readings.</p> <p>4 Mr Louis du Plessis</p>	<p>The preferred method of sampling under the Variation is the USEPA Federal Reference Method under which the Partisol is one monitor. Direct mass measurement methods may be able to be used if equivalence can be demonstrated through collocation studies. This approach acknowledges the substantial investment that a number of jurisdictions have made in TEOM equipment and infrastructure.</p> <p>Jurisdictions may undertake collocation studies using nephelometers for their own purposes, but this is not proposed within the Variation.</p>
<p>I have been following TEOM PM₁₀ readings in Wagga for 20 months and in the whole of NSW for 12 months. It is clear to me that raw TEOM readings give a temporally and spatially distorted view of PM₁₀ pollution in NSW, and there is reason to believe that the distortion will be worse for PM_{2.5}, because of the higher fraction of semi-volatile matter in fine particles. NSW EPA does not follow the NEPC recommendation to apply the temperature-dependent correction factor determined by CSIRO.</p> <p>The difference in cost between the TEOM and nephelometers is important because the density of the monitoring grid is important. Insistence on using a \$40,000 instrument (TEOM) as the only surrogate for the manual gravimetric method will keep the grid sparse and make it impossible to have an adequate number of neighbourhood monitoring stations, defined as stations in areas typified by uniform air quality.</p> <p>4 Mr Louis du Plessis</p>	<p>Noted.</p> <p>The Variation requires jurisdictions to monitor PM_{2.5} at a minimum of one PM₁₀ GRUB site in 2004, and encourages jurisdictions to plan for monitoring at all PM₁₀ GRUB sites when resources permit.</p> <p>The preferred method of sampling under the Variation is the USEPA Federal Reference Method. Direct mass measurement methods may be able to be used if equivalence can be demonstrated through collocation studies. This includes TEOMs. This approach acknowledges the substantial investment that a number of jurisdictions have made in TEOM equipment and infrastructure.</p>
<p>One-in-six day sampling was introduced to eliminate biasing by weekly periodicity in long-term monitoring, which is not the purpose of collocating instruments in the variation. To collect as much data as possible before 2005, the Partisol should be operated daily, so there is not much point in costing 1 in 3 and 1 in 6 operation in Table 6-5 on p 35.</p> <p>4 Mr Louis du Plessis</p>	<p>Noted. Daily operation of reference samplers is desirable for collocation, however, this will be a jurisdictional decision based on resource availability.</p>

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<p>Page 39 Lines 50-51. There is no evidence to support this statement and some to refute it. Nobody has measured smoke emission from heaters installed in Australian homes and operated by their owners. Tests by the CSIRO in an AS4013 test rig found an AS4013-certified heater to smoke worse than an old, uncertified heater and worse than an open fireplace. The AS4013 test protocol requires 20% of each new fuel mass to be burnt off before any smoke is collected. The initial stages of combustion generate the most smoke, so the emission factor stated on the AS4013 certificate bears little relation to the emission factor of the heater in domestic use. Modern high-technology wood heaters require a well-insulated flue at least 6 m long to generate enough draught. Such flues are not ensured by the standard for heater installation (AS2918).</p> <p>4 Mr Louis du Plessis</p>	<p>Whilst it is expected that, all else being equal, some reduction in emissions will be achieved through introduction of tighter emission standards, it is acknowledged that emissions are largely dependant on user behaviour.</p> <p>There are a number of programs under way to manage emissions from new and in-service woodheaters, including national installation specifications (flue height etc).</p>
<p>Page 41 Lines 7-8. Without being an apologist for open fireplaces, I point out that their air supply cannot be throttled to produce the copious smoke that one sees coming from the chimneys of wood heaters.</p> <p>4 Mr Louis du Plessis</p>	<p>Noted.</p>
<p>Page 40 lines 26-28. This is true if the encouragement and compliance activities include smoke patrols and fines, but education without compulsion is ineffective.</p> <p>4 Mr Louis du Plessis</p>	<p>Noted.</p>
<p>Insufficient weight is given in the standard to the differences in health impact of particles of different chemical composition. We would support further research being undertaken in this area.</p> <p>8 Australian Industry Group</p>	<p>There is still uncertainty relating to the health effects of particles with respect to whether particle size or composition is responsible for the observed health effects associated with particles. While further research is required and is being undertaken, at present there is no clear evidence that particle composition plays a role in the observed health effects. There is currently very limited particle composition data available for Australia, however a 4-city study is under way. The role of particle composition will be considered in the review of the Ambient Air Quality NEPM scheduled to commence in 2005.</p>
<p>The proposal provides insufficient detail on appropriate monitoring technology.</p> <p>8 Australian Industry Group</p>	<p>The preferred method of sampling under the Variation is the USEPA Federal Reference Method. Direct mass measurement methods may be able to be used if equivalence can be demonstrated through collocation studies. This approach acknowledges the substantial investment that a number of jurisdictions have made in TEOM equipment and infrastructure.</p> <p>Details of the equivalence requirements appear in Schedule 5 of the Variation.</p>
<p>There are inconsistencies with the PM₁₀ standard. There is only a 1-day standard for PM₁₀ and no annual standard. This implies that there are no long-term health effects from PM₁₀, which is illogical given that PM_{2.5} is a subset on PM₁₀. In order to achieve consistency with the PM₁₀ standard and goal then there should only be a 24-hour standard for PM_{2.5} of 25 µg/m³ with goal of 10 years with 5 allowable exceedences. It is likely that if these are achieved then the annual averages will also decrease and some of the measurement issues noted above will be taken into consideration. The need for standards for both annual PM_{2.5} and PM₁₀ should be clearly put on the agenda for consideration for the 2005 Air NEPM review. By then more data and further information on the health effects will be available from national and international studies.</p> <p>5 Environment Link</p>	<p>The need for an annual average standard for PM₁₀ will be considered as part of the overall review of the Ambient Air Quality NEPM, scheduled to begin in 2005.</p> <p>The inclusion of an annual average standard for PM_{2.5} was recommended by health specialists as part of consultation undertaken during development of the Variation.</p>
<p>In addition, the PM₁₀ standard has a standard of 50 µg/m³ with a 10-year goal that allows 5 exceedences per year. The Impact Statement states that Australian data shows a ratio of PM_{2.5} to PM₁₀ of 0.3 to 0.9 depending on location and season. This then implies that even if the goal for PM₁₀ is met the standards set for PM_{2.5} (especially without the exceedance safety net) are unlikely to be met for decades when measured gravimetrically.</p> <p>5 Environment Link</p>	<p>A review of the PM_{2.5} standards and the ability to set a compliance goal will be considered as part of the review of the Ambient Air Quality NEPM, scheduled to begin in 2005. It is then up to jurisdictions to take necessary steps to meet the compliance goal.</p>

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<p>Section 15 of the NEPC Acts requires consideration of environmental, economic and social impacts. We presume that the monitoring arising from the current variation will contribute to a better understanding of the consequence of PM_{2.5} emissions in Australia. However, it is not clear from documentation circulated with the variation that the Council will be in a position to accurately assess the need for subsequent change to the Ambient Air Quality NEPM without some study of the economic implications of PM_{2.5} control.</p> <p>In our submission to the Discussion Paper, we identified the significant costs associated with control of particulate emission from wood processing operations.</p> <p>We recommend that the monitoring of PM_{2.5} initiated by way of this variation be augmented by a comprehensive study of the economic and engineering implications of mandatory control of PM_{2.5} and/or mandatory 24-hour average/annual mean concentrations of 25 and 8 micrograms/m³ respectively.</p> <p>Information on the ability of jurisdictions to achieve a PM_{2.5} goal should be collated at the same time as information on the level of daily and annual emissions in order that a balanced decision on the need for and practicality of controls can be made.</p> <p>7 Carter Holt Harvey</p>	<p>The goal for the PM_{2.5} Variation is to collect data to facilitate the review of the Ambient Air Quality NEPM scheduled to commence in 2005.</p> <p>An important component of any proposed standard under the NEPC legislation is the assessment of potential impacts. If upon review of the current advisory reporting standard due to commence in 2005, it is decided that this standard will be changed to a compliance standard, the economic and other impacts associated with implementation shall be assessed.</p>
<p>Page 32, lines 3 to 8. We urge the use of nephelometers be included in the comparison of monitoring methods with preferred samplers at the co-located sites. Despite an apparent bias against this method in the documentation so far, we believe that in many situations it is likely to offer a reliable surrogate measure of PM_{2.5} at many locations. There is a considerable database of nephelometry data in existence and we feel it would be a great pity not to be able to use this.</p> <p>9 Alcoa World Alumina - Applecross</p>	<p>The preferred method of sampling under the Variation is the USEPA Federal Reference Method. Direct mass measurement methods may be able to be used if equivalence can be demonstrated through collocation studies. This approach acknowledges the substantial investment that a number of jurisdictions have made in TEOM equipment and infrastructure.</p> <p>Although nephelometers provide an estimate of fine particle levels by light scattering, there is not sufficient information in Australia about the correlations between mass based PM_{2.5} measurements and those based on light scattering. Until these correlations are known, nephelometers cannot be used as a reference method under the NEPM. However, this does not preclude jurisdictions from using nephelometers for non-NEPM monitoring.</p>
<p>In the light of the limited knowledge available from scientific studies on the relationship of PM_{2.5} to human health, we believe the present approach of setting an "Advisory Reporting Standard" for PM_{2.5} is appropriate. This approach encourages further data collection and analysis under Australian conditions.</p> <p>10 Electricity Supply Association of Australia Ltd</p>	<p>Noted.</p>
<p>The averaging periods and advisory standards seem reasonable in the light of current understanding but may need review in the light of further information.</p> <p>10 Electricity Supply Association of Australia Ltd</p>	<p>Noted.</p>
<p>The geographical areas of applicability of the standard are also likely to be very broad. Any standard that claims to be based on the protection of health will inevitably be interpreted as being applicable in all geographical areas where humans are likely to be found, which in practice is anywhere. In this context, the number of proposed monitoring sites for the trial period (9 according to the Melbourne Consultation Meeting) is inadequate.</p> <p>12 Minerals Council of Australia 27 NSW Minerals Council 31 The Crushed Stone & Sand Association of NSW</p>	<p>The number of monitoring sites will be constrained by available resources in each jurisdiction. The sites will be carefully chosen to ensure that a representative mix of environments is covered.</p> <p>It should be noted that the specification of [nine] monitoring locations is for the purposes of equivalence testing, and jurisdictions are encouraged to introduce monitoring at all PM₁₀ performance monitoring stations as soon as practicable.</p>

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<p>Experience with the PM₁₀ NEPM showed the importance of proper consideration being given to the technology that should be used for monitoring. At this stage, insufficient guidance is provided in the NEPM on the technology to be used and the implications of a particular monitoring approach.</p> <p>We advocate the critical importance of having a common approach to monitoring in all jurisdictions. All monitoring should be based on the development of meaningful data sets aimed at improving our understanding of the extent of the emissions and their impact on local communities.</p> <p>12 Minerals Council of Australia</p>	<p>The preferred method of sampling under the Variation is the USEPA Federal Reference Method. Direct mass measurement methods may be able to be used if equivalence can be demonstrated through collocation studies. This approach acknowledges the substantial investment that a number of jurisdictions have made in TEOM equipment and infrastructure.</p> <p>Details of the equivalence requirements appear in Schedule 5 of the Variation.</p>
<p>In our view, the TEOM monitoring device is inadequate and must be replaced. The choice to set standards assumed to affect large proportions of the population is convenient and expedient. When it is based on measurements known to have considerable inaccuracies, or be for one day in six only, the whole approach could be regarded as meaningless. From the affected community stakeholder's viewpoint the longwinded approach currently proposed offers no prospects of immediate improvement. Nor will it provoke the sense of urgency that will arise with a proper understanding of fine particle pollution. As a matter of priority four factors needed to be addressed now with meticulous accuracy.</p> <ol style="list-style-type: none"> 1. A measuring device, which is consistent and accurate, must be found. 2. The sources of fine particle pollution must be found, fully identified and measured. 3. The way the fine particles spread and disperse must be fully understood. 4. Monitoring and modelling must be undertaken to standards accepted by the community and be accurate. <p>14 Koonung Mullum Forestway Association</p>	<p>The preferred method of sampling under the Variation is the USEPA Federal Reference Method. Direct mass measurement methods may be able to be used if equivalence can be demonstrated through collocation studies. This approach acknowledges the substantial investment that a number of jurisdictions have made in TEOM equipment and infrastructure.</p> <p>The standards have been selected as appropriate for Australia at this time. The introduction of the advisory reporting standards will facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of current PM_{2.5} levels will be gained for the Ambient Air Quality NEPM review, scheduled to commence in 2005.</p> <p>Reporting requirements under the Variation will also require jurisdictions to describe any circumstances (to the extent that such information can be determined) that lead to the standards not being met. The collection of this data should assist jurisdictions to better understand sources and causes of elevated PM_{2.5} areas throughout the country.</p>
<p>There may be some ambiguity as to whether TEOMs could be classed as a "gravimetric method" or not. Suggest that need to relate it to the Australian Standards.</p> <p>15 CH Environmental</p>	<p>The TEOM is considered to be a direct mass measurement method, and there is an Australian Standard for its operation.</p>
<p>Should spell out the reporting conditions for reporting (and also for the standard) eg 0 degrees C & 1 atmosphere.</p> <p>15 CH Environmental</p>	<p>Noted. This is specified in Schedule 5 of the Variation.</p>
<p>Suggest the NEPM variation include a dictionary of terms or refer to an expanded dictionary of the original NEPM.</p> <p>It is not clear why it has been decided to proceed with a variation to the AQ NEPM as opposed to developing a separate NEPM for PM_{2.5}, given that as proposed, the status of the PM_{2.5} standard is very different to the other NEPM standards. A PM_{2.5} standard could be included in the AQ NEPM once its status is changed following the 2005 review.</p> <p>15 CH Environmental</p>	<p>Noted. The Impact Statement includes a glossary.</p> <p>Consideration of the need for a PM_{2.5} standard was a 'future action' of the Ambient Air Quality NEPM.</p>
<p>Reporting arrangements need to be clarified. There is a requirement to assess monitoring data against the reporting standard and to report all data regardless of method. This could potentially lead to reporting compliance for say TEOMs, non compliance for say partisols, and not clear for say modelling. May make explanations in subsequent evaluation confusing.</p> <p>15 CH Environmental</p>	<p>The monitoring protocol in the NEPM Variation has been amended to clarify these requirements.</p>
<p>It is not clear how the requirement for 9 monitoring stations nationwide can be ensured if only one monitor per jurisdiction is mandated. Moreover, the data base generated is not likely to provide a large improvement, if any, over the current data. I suggest the same formula as for the NEPM is necessary to allow for a better exposure assessment. Clearly, there will need to be funds allocated, but without such expenditure, it is highly probable that the data required to undertake a future review will not be available.</p> <p>15 CH Environmental</p>	<p>It should be noted that the specification of [nine] monitoring locations is for the purposes of equivalence testing. Schedule 5 specifies how the monitoring stations will be secured. Significant improvement in the database will occur if monitoring is introduced in jurisdictions where no monitoring is currently undertaken, and jurisdictions are encouraged to introduce monitoring at all PM₁₀ performance monitoring stations as soon as practicable.</p>

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<p>It is not clear how requiring monitoring by 2005 will provide the necessary data for review to commence in 2005. It is suggested that it would be more appropriate to require monitoring to commence post haste, or no later than mid 2003.</p> <p>15 CH Environmental</p>	<p>The NEPM Variation has been amended to require that monitoring for PM_{2.5} should commence in all jurisdictions in 2004. A variation to the Ambient Air Quality NEPM to develop PM_{2.5} compliance standards would not commence until the review scheduled to commence in 2005 is completed. This allows more time for data collection.</p>
<p>The health costs of fine particle air pollution are significantly affecting people with short-term illnesses, chronic conditions and long-term conditions. Health cost estimates should also include non-hospitalisation health costs, ie pharmaceutical items, visits to GPs, specialists and other health services. Many people with heart, lung, breathing, allergic conditions etc are able to manage their illness at home because of advances in medicine, but the cost is high for themselves and the health care system.</p> <p>16 CABRA 30 Advocates for Clean Air</p>	<p>It is acknowledged that the costs of non-mainstream health services are likely to be significant. However, it is difficult to collect such information and quantify it accurately, as reasons for persons attending GPs and pharmacies for self-medication purposes are not recorded. Inclusion of these costs would not have changed the approach taken in the NEPM Variation.</p>
<p>Because the proposal is described as advisory, the Impact Statement has not given sufficient regard to the sources of particles. Our members were able to make a small contribution to the Draft Impact Statement with respect to <i>Section 6.6 Fire Risk Management – Prescribed Burning</i> but in general are still dissatisfied with the way fire management practices are dealt with in section 6.6 as well as in sections 6.7, 6.8 and 6.9. The low level of impact of the variation stated in these sections seems more to do with the dispersed nature of the sources and the absence of data rather than any real recognition of the regional differences in the level of activities and the regional importance of such activities. The asserted commitment to improved management practices by the farming community in section 6.8 probably cannot be demonstrated and should not be applied equally across the country, and so the downplayed impact of the PM_{2.5} standard cannot be accepted.</p> <p>Section 6.9 downplays the impact of the NEPM on cultural burning practices by reasoning that smoke impacts occur remotely from monitoring stations. This argument does not adequately value the cultural burning practices and certainly avoids the impact of the NEPM variation on indigenous communities. The comments in section 6.10 about visibility and tourism are simplistic in their focus on city air quality and pay little regard to the likely historical or natural levels of haze.</p> <p>18 Australian Fire Authorities Council</p>	<p>NEPM implementation and associated air quality management is a jurisdictional responsibility, however, the likely impact on burn management is considered to be small. The aim must continue to be to find a balance between the risks of smoke impacts from prescribed burning on community health, and the risk of major bushfires that threaten life and property.</p> <p>Smaller scale impacts of agricultural/land development are best dealt with at the local level through existing management systems.</p>
<p>The equipment proposed to determine PM_{2.5} should include or compare nephelometry to results obtained. From an industry point of view, nephelometry equipment is easy to transport to numerous sites, produces instantaneous results, is real-time (can trace back to particular incidents) and is reasonable in terms of cost. While I am aware the current PM_{2.5} will only be monitored for regions as a whole, this data obtained, may be used in the future to set limits/guidelines on industry. To measure these limits, instruments which are reasonable in cost and easy to transport will be the equipment of choice.</p> <p>19 Boral Resources NSW Pty Ltd</p>	<p>Although nephelometers provide an estimate of fine particle levels by light scattering, there is not sufficient information in Australia about the correlations between mass based PM_{2.5} measurements and those based on light scattering. Until these correlations are known, nephelometers cannot be used as a reference method under the NEPM. However, this does not preclude jurisdictions from using nephelometers for non-NEPM monitoring.</p>
<p>Limitations in Australian exposure data have been appropriately accommodated by setting advisory reporting standards that allow for flexibility in the collection of additional data prior to the review of the NEPM scheduled to commence in 2005.</p> <p>I understand that some jurisdictions may wish to collect data regarding the chemical and physical speciation of fine particles to assist in future source apportionment and control strategy development. It would be beneficial for the variation to facilitate development of a national database regarding fine particle speciation by encouraging jurisdictions to voluntarily include any such data in NEPM annual reports.</p> <p>20 Environment Protection Agency Qld</p>	<p>Noted.</p>

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<p>I note that the misuse of the existing NEPM standards is an on-going issue, with the mistaken belief remaining in some quarters that the NEPM standard should be applied at site boundaries of industrial sources. Assuming that it approves this variation, I would encourage NEPC to take the opportunity when advertising the changes to reinforce the message that NEPM standards are intended for managing regional air quality, as monitored at locations away from local sources, and should not be applied at site boundaries of industrial sources.</p> <p>20 Environment Protection Agency Qld</p>	<p>Noted. Implementation of the NEPM and subsequent variations is a jurisdictional matter.</p>
<p>The perceived impact on industry (Section 6.3) appears to only consider the regulatory costs and not the costs of capital improvements or relocation of activities. To state that "the impact on individual companies is likely to be small as these strategies are already in place" seems to downplay the issue. The likely interpretation of the NEPM to apply at industrial boundaries (as has happened with the PM₁₀ standard, despite its intent) and the seemingly low proposed standard for PM_{2.5} will no doubt impact heavily on some industries by requiring them to upgrade or relocate operations. While this will no doubt be appropriate in some cases, it should not be understated in the Impact Statement.</p> <p>21 OneSteel - Whyalla</p>	<p>Implementation of the Variation is up to individual jurisdictions. As with the Ambient Air Quality NEPM, the Variation does not apply to the control of emissions from individual industries.</p>
<p>Whilst there is compelling evidence that particulate matter of PM_{2.5} and less does have an impact on the general health of a community, it is questionable to develop a standard for measurement that is not referenced to an established (and accurate) method for monitoring. It is therefore heartening to see that an established method developed in the US for PM_{2.5} has been specified as the reference method - ie Reference Air Samplers - but it is less heartening to see that the document still persists with the general fascination among Australian authorities for the TEOM equipment for PM₁₀ and PM_{2.5} measurement. It is especially disheartening to see this method continually represented as a "continuous gravimetric" method when the instrument itself has been known to regularly provide negative mass readings.</p> <p>Whilst I realise that many jurisdictions in Australia have a considerable investment in TEOMs, it must be recognised that measurement of PM_{2.5} and smaller particulates has proven to be very difficult with the TEOM and for all their effort, the TEOM is still not acceptable in the US as an equivalent continuous PM_{2.5} Method.</p> <p>The implementation of the PM_{2.5} Standard represents an opportunity to assess alternate methods for continuous PM_{2.5} monitoring, and to not just rely on rhetoric and hearsay to eliminate other technologies which may already exist or other technologies that may be developed in the near future for this type of measurement.</p> <p>I ask that you remove any reference to "continuous gravimetric method" as a preferred method and that any reference to this equipment be in the context of reporting data collected by this method under the general reporting requirements of Schedule 4 Clause 5 (3)a.</p> <p>23 Lear Siegler Australasia Pty Ltd</p>	<p>It is recognised that there are issues associated with TEOM measurements, and some of these are discussed in the Impact Statement. The preferred method for monitoring PM_{2.5}, for the purposes of the Variation, is the USEPA Federal Reference Method. Direct mass measurement methods are not identified as preferred methods.</p> <p>Direct mass measurement methods may be able to be used if equivalence can be demonstrated through collocation studies. This will provide a greater understanding of PM_{2.5} measurements using various methods, with the data being assessed during the review of the Ambient Air Quality NEPM, scheduled to commence in 2005.</p> <p>This approach acknowledges the substantial investment that a number of jurisdictions have made in TEOM equipment and infrastructure.</p>
<p>The Impact Statement also makes reference to USEPA Reference Air Samplers and then, in Section 6.2.2 of the Statement says, "for the purpose of this assessment, a Partisol sampler has been assumed to be the approved sampler for the PM_{2.5} method". This statement alone gives a commercial advantage to a piece of equipment that is a Reference Air Sampler, but it is not the only USEPA Approved Reference Sampler (please refer to list enclosed) and only lends credence to what someone said at the meeting that I attended. When asked what a Partisol was, someone in the audience answered "it (Partisol) was a generic term for a Reference Sampler". This is definitely not the case. Partisol is a registered trademark of a Reference Air Sampler and, by inclusion in this public, federal government document, you are giving a commercial endorsement to one particular device and manufacturer.</p> <p>I ask that any reference to "Partisol" be removed from this document and any related documents, and that reference in the document be limited to USEPA Reference Air Samplers as the preferred method.</p> <p>23 Lear Siegler Australasia Pty Ltd</p>	<p>The preferred method for monitoring PM_{2.5}, for the purposes of the Variation, is the USEPA Federal Reference Method. This includes any sampler that is designated as a reference or equivalent method.</p> <p>The reference to "Partisols" in Section 6.6.6 of the Impact Statement was used as an example for indicative costing purposes only as costing data was readily available from jurisdictions. Its reference should not be interpreted as an endorsement of the Partisol over any other sampler that is designated as a reference or equivalent method under the USEPA Federal Reference Method.</p>

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<p>Page 34 of the Impact Statement and the description of "Scenario 2". Once again the content of this statement assumes that the TEOM data is a valid data set even though there has been no assessment of this method against Reference Air Samplers in this country and TEOM has not been allocated such a status in any other country for continuous PM_{2.5} monitoring. If you are serious about the implementation of a PM_{2.5} Standard and the Draft already allows for a development of a data set for review during 2005, then why not use this as an opportunity to investigate all avenues and methodologies for validation of their use for monitoring purposes and also as a validation of existing data sets. In this country we have already been subject to the farcical implementation of a PM₁₀ Standard for TEOM which was originally supposed to be a Standard for operating the TEOM so that various jurisdictions could get consistent and comparable results. As a result this really became a government-backed endorsement for a particular commercial product and there is now a concern that we are heading down the same path for PM_{2.5} monitoring.</p> <p>23 Lear Siegler Australasia Pty Ltd</p>	<p>The collocation monitoring outlined in the Variation will determine whether a correction factor can be derived for direct mass measurement methods, eg TEOMs, and the USEPA Federal Reference Method.</p> <p>For the purposes of this Variation, uncorrected data from TEOMs will be reported. This will be reviewed as part of the review of the Ambient Air Quality NEPM, scheduled to commence in 2005.</p>
<p>The Variation does not specify the date by which a plan for monitoring PM_{2.5} is to be submitted to Council. Moreover, whilst the Variation specifies a commencement date for monitoring of PM_{2.5}, namely prior to the review of the Principal Measure in 2005, it should be noted that a minimum of one years data (preferably 2 - 3) would be required for a reasonable assessment of PM_{2.5} concentrations at a given location. We recommend that implementation dates be considered for inclusion in the Variation for both the submission of a PM_{2.5} monitoring plan and the commencement of monitoring.</p> <p>24 Department of Primary Industries, Water & Environment, Tasmania</p>	<p>Commencement dates in 2004 for monitoring have been included. PM_{2.5} monitoring is to be introduced into the PM₁₀ GRUB stations. The Variation does not require monitoring plans to be developed.</p>
<p>The Variation presents a protocol for monitoring particles as PM_{2.5} (in Schedule 4). Schedule 4 specifies that in order to enable the development of a reference method for monitoring PM_{2.5} as part of the review of the Measure, co-location of continuous and manual gravimetric samplers must be undertaken at a limited number of sites. Moreover, according to the Variation, participating jurisdictions must ensure that nationally, a minimum of nine locations house collocated samplers. Given that funding has not been identified for the conduct of such a national monitoring "equivalency" program, nor adequate consideration given to the co-ordination and project design for the conduct of such a program, we are of the opinion that further consideration is required on such issues. Moreover, the justification for "a minimum of nine locations" does not appear to be presented in the Impact Statement (or elsewhere).</p> <p>24 Department of Primary Industries, Water & Environment, Tasmania</p>	<p>The monitoring protocol has been revised in consultation with monitoring officers within individual environment agencies to provide further details of the equivalence program and the locations of sites around Australia where equivalence studies will be undertaken.</p>
<p>The Impact Statement notes that the equivalency program requires collection of data over a three year period, and that jurisdiction monitoring representatives have been asked to nominate the sites around Australia where equivalency studies are proposed to be undertaken (see Page 32). According to the Impact Statement, such sites would be established dependant on jurisdictional funding being available. This last statement does not appear consistent with the Variation, which specifically requires the set-up of co-located monitoring sites.</p> <p>24 Department of Primary Industries, Water & Environment, Tasmania</p>	<p>Schedule 5 of the Variation has been introduced to address this issue.</p>
<p>According to the Impact Statement, an Equivalency Working Group (EWG) consisting of monitoring specialists from Victoria, Queensland and Western Australia has been convened to further develop the method to be used when assessing the equivalence between different monitoring methods. Moreover, the EWG is to develop detailed protocols for data analysis and other outstanding monitoring issues prior to the making of the Variation. The appropriateness of the EWG conducting such work is questionable given the role that the Peer Review Committee (Ambient Air Quality NEPM) has been providing over the last several years.</p> <p>24 Department of Primary Industries, Water & Environment, Tasmania</p>	<p>The tasks of the Equivalence Working Group (EWG) fall outside the terms of reference and work program of the Peer Review Committee (PRC). Some members of the EWG are also members of the PRC.</p> <p>The recommendations from the EWG have been taken into account in establishing the equivalence program and the locations of sites around Australia where equivalence studies will be undertaken. This has been reviewed by the PRC.</p>
<p>In view of the very serious health effects attributed to PM_{2.5} emissions and the disproportionate contribution of diesel engines to total PM_{2.5} emissions, another potentially cost-effective strategy might be to encourage purchasers of new vehicles to consider alternatives to diesel - eg LPG, natural gas or petrol.</p> <p>26 Mr Peter Hill 29 Armidale Air Quality Group</p>	<p>Noted. It is a decision for jurisdictions to determine which strategies are appropriate to manage pollutant emissions within their air sheds.</p>

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<p>The proposed numerical concentrations for the standard are seen as being too low. There may be many locations where background levels PM_{2.5} currently exceed the proposed standards. This may place severe limitations on the ability of a new mining or quarrying project to gain approval, as any increase in existing PM_{2.5} levels would exceed the standard. Even though the standard is being put forward as an advisory standard, it is felt that it will be viewed by the general community as an absolute standard, given the suggested links to health effects.</p> <p>31 The Crushed Stone & Sand Association of NSW</p>	<p>The standards have been selected as appropriate health-based benchmarks to compare PM_{2.5} levels in Australia at this time. While some jurisdictions are expected to have PM_{2.5} levels that are above these standards, available data indicate that the majority of urban areas are within or only slightly over these levels.</p> <p>With respect to an increase in PM_{2.5} emissions leading to exceedences, there is no compliance goal associated with the advisory reporting standards.</p> <p>The Variation will facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of PM_{2.5} levels will be gained for the review of the Ambient Air Quality NEPM, scheduled to commence in 2005.</p>
<p>The Partisol manual gravimetric sampler is a low-volume sampler, not a version of the widely used HiVol. A letter received from NSW EPA explains that it is difficult and expensive to equilibrate and weigh the small samples from low-volume samplers. Furthermore, the jurisdictions are inexperienced in using such samplers. I submit that these circumstances will impede the attainment of one of the variation's main objectives, namely to accumulate a reliable set of TEOM-to-manual conversion factors by 2005.</p> <p>A wider data base could be obtained without excessive expense by relaxing the requirement that the manual gravimetric instrument be low-volume. It seems the number 9 of sites of collocation was arrived at by counting jurisdictions rather than climatic and air-quality regions. The use of cheaper HiVols at some sites would allow data to be gathered at more than 9 sites.</p> <p>Invaluable comparative data could be obtained from a few sites of quadruple collocation - TEOM, Partisol, HiVol and nephelometer. It may turn out that the nephelometer is at least adequate and possibly better than the TEOM for routine monitoring, and that the HiVol is adequate for calibrating the continuous instruments. The economy of using nephelometers and HiVols would enable Australia to have a denser network of monitoring stations in implementation of the Intergovernmental Agreement on the Environment to ensure uniform protection against air pollution.</p> <p>4 Mr Louis du Plessis</p>	<p>The preferred method for monitoring PM_{2.5}, for the purposes of the Variation, is the USEPA Federal Reference Method. Other methods, such as direct mass measurement methods, may be able to be used if equivalence can be demonstrated through collocation studies. This will provide a greater understanding of PM_{2.5} measurements using various methods, with the data being assessed during the review of the Ambient Air Quality NEPM, scheduled to commence in 2005.</p> <p>It has been determined that [nine] sites in various locations of different climatic and air quality regions in Australia will be useful in determining equivalence between methods.</p> <p>Although nephelometers provide an estimate of fine particles levels by light scattering there is not sufficient information in Australia about the correlations between mass based PM_{2.5} measurements and those based on light scattering. Until these correlations are known, nephelometers cannot be used as a reference method under the NEPM. However, this does not preclude jurisdictions from using nephelometers for non-NEPM monitoring.</p>
<p>The true impact of the economic and social aspects of the variation to the Air NEPM do not appear to have been adequately dealt with. We accept that residential firewood use is a significant source of PM_{2.5} in winter. However, we are concerned that other organic sources of PM_{2.5} have not been adequately studied or included in emission inventory estimates. If all the organic particles are incorrectly attributed to residential wood heating, as has been the case in many studies to date, the industry is likely to be decimated. Once lost, it would be very difficult to re-establish a high quality wood heater manufacturing industry if the inventory estimates prove to be incorrect.</p> <p>32 Australian Home Heating Association Inc</p>	<p>It should be noted that as there is no compliance goal associated with the standard, the only direct cost due to the introduction of the Variation will be to jurisdictions for PM_{2.5} monitoring. The Impact Statement did not attempt to quantify the potential costs of strategies employed by jurisdictions to manage PM_{2.5} emissions, from solid fuel heaters or other sources.</p> <p>The Variation will lead to the collection of PM_{2.5} data that will assist jurisdictions to better understand sources and causes of elevated PM_{2.5} in areas throughout the country.</p>
<p>Apart from the initial purchase price for TEOM instrumentation there are the significant cost implications of physically siting a TEOM, the municipal infrastructure to support its operation as well as the very expensive ongoing operating and maintenance costs. All of these costs are considerable and amount to \$100,000 per TEOM plus the operating costs. The number of monitoring sites could be increased from 19 to 76 if alternative monitoring equipment was used.</p> <p>2 Turnkey Environmental Systems Pty Ltd</p>	<p>The USEPA Federal Reference Method is the preferred sampling method under the Variation. However recognising the significant investment several jurisdictions have made in using TEOMs, this data will be reported by jurisdictions.</p>

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<p>One problem is the lack of a specified reference method. The 'numbers' in a standard only have meaning in relation to the measurement method ie without a reference method the numbers are meaningless and open to abuse and manipulation. Since one of the objectives of NEPMs is to provide certainty, I strongly urge the NEPC to specify a reference method as part of the standard. Having a preferred method is insufficient and would be unlikely to be accepted as definitive in a court (vis a vis any other method). This still enables other methods to be used for routine monitoring but the interpretation of compliance would have to be referenced (if necessary by inference based on calibration between methods) to the reference method. I therefore urge you to ensure the NEPM is changed to prescribe the USEPA method (as the only proven method) as the reference method for the NEPM and that the NEPC adopt it as an integral part of the NEPM.</p> <p>34 Environmental Measurements International Pty Ltd</p>	<p>Schedule 5 in the Variation has been introduced to address this issue.</p>
<p>The presentation team made it clear that the TEOM instrument had been selected as the equipment of choice with some Partisols mentioned. When asked to justify this selection, the point made by the team that this was the case, as monitoring stations already had this type of equipment in place. A fundamental flaw in this reasoning is that the existing equipment can only sample one dust faction size at a time (currently PM₁₀) and thus new equipment would have to be purchased by the jurisdictions to monitor PM_{2.5}. Each of the new pieces of this equipment can, of course, only sample one dust faction at a time too.</p> <p>2 Turnkey Environmental Systems Pty Ltd 3 M & K Fry</p>	<p>The preferred method for monitoring PM_{2.5}, for the purposes of the Variation, is the USEPA Federal Reference Method. Other methods, such as direct mass measurement methods, may be able to be used if equivalence can be demonstrated through collocation studies. This will provide a greater understanding of PM_{2.5} measurements using various methods, with the data being assessed during the review of the Ambient Air Quality NEPM, scheduled to commence in 2005.</p> <p>It should be noted that a number of jurisdictions already monitor PM_{2.5} using TEOMs. Data collected using continuous methods is of benefit to jurisdictions in understanding the diurnal variation of PM_{2.5} levels, so that management strategies can be better targeted.</p>

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<p>May I congratulate all those who have recently given this important matter the careful attention that it deserves. There has been extensive and continuing research into the matter of air pollution and health in numerous parts of Australia and internationally. It must be acknowledged that the NEPC has provided a major force in taking this important subject further. It has also provided additional stimulus, finances and coordination, for this continuing vital work. Congratulations and thank you NEPC.</p> <p>1 Mr Lloyd Lyons</p>	<p>Noted.</p>
<p>The steps being taken by NEPC towards the PM_{2.5} standard are commendable and to be encouraged. The public presentation was informative and covered the main topics well.</p> <p>2 Turnkey Environmental Systems Pty Ltd 3 M & K Fry</p>	<p>Noted.</p>
<p>The setting of an annual average standard for PM_{2.5} is a major step forward, and its numerical value of 8 ug/m³, if achieved, would produce a large improvement of air quality in Wagga Wagga. Depending on the allowable number of exceedences, to be decided in 2005, the daily average standard of 25 ug/m³ would probably be unattainable in Wagga, not primarily because of the numerical value, but because the occasional exceedences are usually not under the control of local authorities. The elimination of exceedences would have little effect on public health, since they do not contribute in a major way to the annual average particulate pollution in Wagga.</p> <p>4 Mr Louis du Plessis</p>	<p>Noted.</p>
<p>We note that the standard is being developed in the absence of detailed knowledge and is therefore supportive of initiatives by State Governments to collect more data on the extent of PM_{2.5} emissions. This will facilitate comparisons to be undertaken on an historical basis and also facilitate comparisons with overseas data, which is collected on a different basis.</p> <p>8 Australian Industry Group</p>	<p>Noted.</p>

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<p>Section 2.2 line 36 - 39. This is supposedly consistent with an 'advisory' reporting standard - it is also contradictory to the principle of equivalent protection embodied in the Air Quality NEPM and the NEPC.</p> <p>5 Environment Link</p>	<p>The desired environmental outcome of the Variation accords with that of the Ambient Air Quality NEPM, ie ambient air quality that allows for the adequate protection of human health and well-being. While the Variation does not include a compliance goal, the goal is to facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of PM_{2.5} levels will be gained for the Ambient Air Quality NEPM review, scheduled to commence in 2005. The form of the standard will be reviewed at this time.</p>
<p>The variation of the NEPM to include PM_{2.5} is supported.</p> <p>6 Pacific Power</p>	<p>Noted.</p>
<p>Effective PM_{2.5} management policies and programs will require that the emission sources and atmospheric processes leading to elevated concentrations are well understood. Without such information, decision making will inevitably be poorly based and ineffective in achieving the desired outcomes, while resulting in a misallocation of resources. It is not clear that the proposed NEPM variation is part of a coordinated body of work which will contribute to the development of effective air quality management</p> <p>6 Pacific Power</p>	<p>The goal of the Variation is to facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of PM_{2.5} levels will be gained for the Ambient Air Quality NEPM review, scheduled to commence in 2005. The Variation includes a monitoring protocol to ensure that the data collected in a consistent manner in all jurisdictions.</p>
<p>We support the decision to limit intervention to monitoring of PM_{2.5} by 2005 with a view to obtaining information on the need for better control of PM_{2.5} emissions.</p> <p>7 Carter Holt Harvey</p>	<p>Noted</p>
<p>Appendix, WA section, page 53, lines 39 to 41. Despite the stated intention in the Impact Statement to restrict the PM_{2.5} standard to 'average representative sites' and to quarantine its application to industrial sites and neighbourhoods, the WA appendix states a potential requirement for industry to perform PM_{2.5} monitoring in certain areas. This contradicts the stated application of the advisory reporting standard and reinforces our view that even 'advisory reporting' standards have the tendency of being regarded as mandatory or regulatory in the popular view or as in this case even in the regulatory view.</p> <p>9 Alcoa World Alumina - Applecross 13 Chamber of Commerce & Industry WA</p>	<p>There is no goal requiring the standards to be met within a specified timeframe associated with the advisory reporting standards. The goal is to facilitate the further collection of PM_{2.5} data. Jurisdictions will be encouraged not to adopt the standards as "de facto" health standards, however this is a jurisdictional matter.</p>
<p>In light of the increasing trend to use sustainability assessment for new projects of significant scale and legislation of wide potential impact we recommend that a 'sustainability assessment' that considers economic, environmental and social impacts of this measure be completed.</p> <p>9 Alcoa World Alumina - Applecross 13 Chamber of Commerce & Industry WA</p>	<p>In accordance with the NEPC Acts, the Impact Statement includes, where practicable, an assessment of the economic, social and environmental impacts of the Variation. Every effort was made to ensure that the available scientific, social, environmental and economic data was considered.</p>
<p>The variation process has been effective in bringing forward comment on the role on PM_{2.5} on human health and we believe that most of the issues have been addressed in a satisfactory way in the documents produced.</p> <p>10 Electricity Supply Association of Australia</p>	<p>Noted.</p>
<p>I support a PM_{2.5} standard strongly as any control of air quality is long awaited and certainly in need. The health effects associated with fine particles cannot be overrated.</p> <p>11 Ms Suzanne Gordon</p>	<p>Noted.</p>

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<p>We would like to state at the outset that we feel the standard is being developed in an environment of incomplete knowledge. Although there is a significant body of knowledge to indicate that adverse health effects are caused by exposure to PM_{2.5} particles, the importance of particle size, morphology and chemical composition is not fully understood. In our view the Impact Statement does not properly acknowledge this uncertainty.</p> <p>12 Minerals Council of Australia 27 NSW Minerals Council 31 The Crushed Stone & Sand Association of NSW</p>	<p>NEPC recognises that there is limited PM_{2.5} monitoring data available in Australia. Given this uncertainty and the significant immediate cost to jurisdictions if a compliance standard were set, the advisory reporting standard approach has been adopted.</p> <p>The introduction of the Variation will facilitate the collection of PM_{2.5} data across all jurisdictions so that a better understanding of PM_{2.5} levels will be gained for the Ambient Air Quality NEPM review, scheduled to commence in 2005.</p> <p>The Impact Statement notes (p7) that there is still uncertainty relating to the health effects of particles with respect to whether particle size or composition is responsible for the observed health effects associated with particles.</p> <p>While it is accepted that particle composition is important, there is still uncertainty relating to the health effects of particles with respect to whether particle size or composition is responsible for the observed health effects. The literature indicates that both crustal and combustion-derived particles have been associated with adverse health impacts.</p> <p>While further research is required and is being undertaken, at present there is no clear evidence how particle composition plays a role in the observed health effects. Further, there is currently very limited particle composition data available for Australia.</p>
<p>The Australian minerals industry acknowledges the identified health issues associated with PM_{2.5} particles and welcomes the development of a PM_{2.5} standard.</p> <p>12 Minerals Council of Australia</p>	<p>Noted.</p>
<p>Hazard reduction burns continue for most of the cooler months and many argue that this method is necessary and the only effective way of reducing fuel loads. We often experience calm days and still cold nights with inversions in the cooler months so smoke is kept close to the ground and near settlements for most of the time.</p> <p>However, more and more homes are using wood heaters and these should not be allowed to add to the fine particle pollution. The costs both financial and in quality of life are just too great. The NSW EPA's estimate that each tonne of PM_{2.5} emissions in Sydney costs the community \$40,700 does not even cover the costs of chronic effects let alone the much larger cost of pain and suffering.</p> <p>It is essential that the PM_{2.5} standard be made mandatory if only because the costs of measures to address the pollution are much less than the costs of ignoring it.</p> <p>17 The Coastwatchers Association (Eurobodalla)</p>	<p>The significant health costs associated with PM_{2.5} exposure in Australia are acknowledged. However, given the limited data on PM_{2.5} levels available, the advisory reporting standard option is considered the most appropriate. This will facilitate the collection of additional data to provide a better understanding of PM_{2.5} levels for the Ambient Air Quality NEPM review, scheduled to commence in 2005.</p> <p>Fire authorities are working in cooperation with relevant agencies such as the Bureau of Meteorology and environment agencies to manage the impacts of smoke from controlled burns on urban air sheds.</p>

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<p>The Impact Statement describes current and proposed actions by jurisdictions to reduce PM_{2.5} emissions. However, the effect of these actions on projected ambient levels and exposures has not been quantified to date. It would be highly desirable therefore to initiate action to:</p> <ol style="list-style-type: none"> determine the effect of various control actions (both currently proposed as well as other actions) on emissions of PM_{2.5} determine the costs of each action determine the effects of each control action on levels of PM_{2.5} quantify the exposure and health impacts. <p>It may be appropriate to include a requirement to undertake the above in the NEPM, or at least have a separate ministerial agreement to coordinate and fund such studies to accompany the final NEPM variation. In the absence of such data, changes to the current draft standards are unlikely to be seriously considered. As above, there are funding implications. However, the potential health benefits are very substantial, worth pursuing, and justify funding a better database that supports better standards.</p> <p>15 CH Environmental</p>	<p>As there is no goal requiring the standards to be met within a specified timeframe, and the only direct costs due to the introduction of the Variation is to jurisdictions for PM_{2.5} monitoring, the Impact Statement did not attempt to quantify the potential costs of strategies employed by jurisdictions to manage PM_{2.5} emissions.</p> <p>The quantification/projection of likely effects of control options are highly desirable, however as the effects are linked to PM₁₀ control activities, segregated PM_{2.5} quantification is difficult. The Variation will lead to the collection of PM_{2.5} data that will assist jurisdictions to better understand sources and causes of elevated PM_{2.5} in areas throughout the country. It is anticipated that this will assist in the determination of control strategies should a compliance goal be considered by NEPC during the review of the AQ NEPM, scheduled for 2005</p>
<p>The draft variation, which recognises the importance of health impacts from both short term and long term exposure to fine particles (PM_{2.5}) is strongly supported.</p> <p>20 Environment Protection Agency Qld</p>	<p>Noted.</p>
<p>From my personal perspective, I am more than happy with the long overdue intended introduction of a PM_{2.5} standard in Australia, however, at the same time, I am very disheartened by the absence in the proposal, of any suggestion for 'urgent action' for the immediate reduction of PM_{2.5}, particularly within residential areas.</p> <p>30 Advocates for Clean Air</p>	<p>The Variation does not preclude jurisdictions implementing strategies designed to manage PM_{2.5} emissions/levels if desired.</p>