

Summary of Public Comment

Provincial Ambient Air Quality Criteria for PM_{2.5} Ministry Intentions Paper

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Table of Contents

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Section A: Background to the Consultation Process and Responses Received	1
Introduction and Background to the Consultation Process.....	1
Description of Responses Received.....	1
Section B: Comments on Discussion Issues.....	2
Discussion Issue 1: Proposed Air Quality Criteria for PM _{2.5}	2
A. 24-hour average objective	2
B. Annual average objective	3
C. Planning goal.....	5
Discussion Issue 2: Implementing the Proposed Air Quality Criteria.....	6
Discussion Issue 3: Protection of Human Health and the Environment.....	9
Appendix 1: Common Acronyms and Abbreviations Used in Submissions and this Summary	12

Section A: Background to the Consultation Process and Responses Received

Introduction and Background to the Consultation Process

This report provides a summary of consultation comments received as part of the consultation process for establishing provincial ambient air quality criteria for particulate matter 2.5 micrometres (μm) or smaller ($\text{PM}_{2.5}$) – addressing objectives for 24-hour and annual averages, and longer-term planning goals.

An intentions paper and response form were posted for public review and comment on the ministry's website (www.env.gov.bc.ca/air/airquality) through January and February of 2008. The intentions paper provided a summary of ministry and government goals, background information concerning particulate matter and health concerns, a summary of the process for establishing provincial ambient air quality criteria for $\text{PM}_{2.5}$ to date, and ministry intentions with supporting rationale. The response form set out discussion issues and questions in relation to the ministry's intentions. Ministry representatives presented background information and responded to questions at briefing sessions hosted by the ministry in Vancouver and Prince George in January of 2008, as well as speaking on conference calls in response to requests from community airshed groups and a forest company with operations in various parts of the province.

This document has been prepared for the Ministry of Environment by C. Rankin & Associates, contracted by the ministry to independently receive, compile and review comment on the proposed direction of the ministry. The summary does not reflect the ministry's position on any issue. It provides a synopsis of the responses that are being considered by the ministry in reviewing implementation of proposed air quality criteria – without specific attribution, except to the extent required to provide context for the comments. The summary follows the headings and questions contained in the ministry intentions paper and response form – with synoptic and detailed sections, as well as general, process related and supplementary comments from respondents. Appendix 1 lists acronyms and abbreviations commonly used in submissions and this summary document.

All detailed comments have not been included in this document – but have been compiled as part of the comprehensive documentation of responses being reviewed by the ministry. All comments and references submitted through this process, through independent submissions and through direct consultations with stakeholders, will be reviewed and carefully considered by the ministry in finalizing the ambient air quality criteria for $\text{PM}_{2.5}$.

Description of Responses Received

Over twenty detailed responses, as well as an equal number of short comments or questions in response to the posted intentions paper, were received (by e-mail, fax and attached file) by March 10 2008 and have been reviewed for this summary of consultation comments. About two thirds of the respondents identified themselves as representatives of an association or business. Note that this summary does not include questions or comments made through any of the briefing sessions hosted by the ministry or conference calls at which ministry representatives provided information. In total about one hundred individuals participated in one or more of these information sessions.

Many of the responses included substantive detailed comment and recommendations for the ministry to consider. This summary of public comment attempts to capture the tenor and content of comments through summarization and specific excerpts from representative submissions.

Section B: Comments on Discussion Issues

This section contains a detailed summary of responses to questions posed in the response form. This summary reflects the range of comments received, as well as excerpts of individual submissions with specific advice or recommendations. Direct excerpts from submissions are included in quotation marks (“ ”) and square brackets ([]) indicate inferred or contextual terms. The complete set of responses and submissions received through the consultation process has also been compiled and passed to the ministry for detailed review and consideration.

Discussion Issue 1: Proposed Air Quality Criteria for PM_{2.5}

The ministry intends to establish air quality criteria for the management of PM_{2.5} – including a 24-hour average objective, an annual objective and a planning goal. The air quality objectives would be the primary tool for air management in B.C. and used to guide the ministry’s regulatory approach and direction, and ministry service planning and actions. The planning goal is a long term target for communities.

A. 24-hour average objective

The ministry intends to establish a 24-hour air quality objective of 25 µg/m³ for PM_{2.5}. This objective will be used in addressing day-to-day management issues such as issuing air quality advisories, initiating open burning restrictions in accordance with the Open Burning Smoke Control Regulation, and triggering mandatory emission reduction strategies in conjunction with local municipal bylaws.

In assessing new and existing facilities that are subject to major changes or to permit reviews, an annual 98th percentile would be used to determine achievement of the 24-hour objective (allowing a maximum of 7 exceedances per year, based on daily monitoring).

Question 1.1: Do you have any specific comments or concerns regarding adoption of the proposed 24-hour average air quality objective of 25 µg/m³ for PM_{2.5}?

Most respondents expressed support for adoption of a 24-hour average air quality objective, as well as for the proposed value of 25µg/m³ for PM_{2.5}. Several noted that the proposed value is consistent with World Health Organization criteria and that of other jurisdictions, commenting, for example, that the value is “reasonable from a public health perspective” or “provides an appropriate balance between the need for more effective episode management and avoidance of the negative effects [increased workload for the implementing agencies and public complacency] from setting it significantly lower.” A few respondents expressed a concern that the proposed objective should be lower, or “as low as possible” commenting, for example, that a level of 25 µg/m³ for PM_{2.5} would not be low enough to “seriously address the air pollution problems in interior communities.” One respondent cited the Central Okanagan Regional District guideline of 15 µg/m³ as working “very well...to improve visibility and to prevent smoke loading during periods of heavy burning.” Several respondents noted, however, that the proposed level “would be more stringent than the Canada-wide Standard (CWS) of 30 µg/m³” and that “modifications to air quality standards made in British Columbia should be harmonized with developments at the federal level, unless there is a compelling case for taking a different approach in B.C.”

Several respondents commented on the difficulties that are involved in identifying and targeting emission sources in relation to ambient air quality – citing limited or inconsistent monitoring data, limited data for background concentrations, limitations in air dispersion modeling of differing emission sources, long range transport of emissions (e.g., crossing international boundaries) and/or local differences in potential of human exposure to emissions.

A number of respondents also provided comment on the proposed 98th percentile exceedance limit for this objective with respect to assessing attainment by new and existing facilities. Several recommended that

“no exceedances of the objective be allowed, keeping with the goal [that] clean areas must stay clean” or noted that the intention of Metro Vancouver’s 24-hour average objective is that it not be exceeded. One respondent commented, based on an understanding “that the exceedance limit is being proposed as a means of assessing new emission sources...[that]...given the need to manage [these] sources on an airshed-by-airshed basis, perhaps a province-wide objective for managing degradation is not useful and should be dropped.”

In answer to this question, one respondent included a detailed discussion of the use of the Air Quality Health Index (AQHI) in relation to the Air Quality Index (AQI) and the proposed PM_{2.5} air quality objective: “It is understood that the AQHI and a 24-hour PM_{2.5} objective fulfill different roles, with the former aimed at health risk notification and the latter management of risk from a single pollutant type...to be effective and congruent these two indicators should work together, without conflicting...in theory simultaneous use of both a health risk indicator and a single-pollutant management objective should be possible and is desirable – however, in this airshed [Prince George] the AQGI [sic] health risk scale appears to downgrade the importance of the PM_{2.5} component, and to conflict with messages about the significance of this pollutant – while technically not correct, this perception must be addressed if both are to be used to manage air quality.” The respondent suggested that “the AQHI could be used along with a PM_{2.5} objective provided that SO₂ [is] included and that the AQI [is] discontinued for all AQHI constituents and PM₁₀” and recommended that “if the AQHI is used along with the PM objectives, then communication to the public on the respective roles of these two management tools is needed.”

Additional comments from respondents included:

- “It appears that a PM_{2.5} concentration of 25 µg/m³...will not result in good visibility conditions – therefore, the ministry should be mindful that even further reductions in PM_{2.5} may be necessary in future for visibility improvement purposes;”
- “An objective of 25 µg/m³ would be a reasonable short term target if it were accompanied by a clear strategy on how to reduce the ambient air quality in regions that are not currently meeting the standard;”
- “B.C. needs to set up a proper network of monitoring stations...it is patchwork at best outside of [Metro Vancouver];”
- “Changes to the existing monitoring network... will result in higher measured concentrations... and that the extent of the impact of the changes to monitoring procedures is [not] known – at least three years of high quality ambient data should be collected before the new objective is implemented;”
- “Can we also...have an objective on a shorter term (e.g., 3-hours) to deal with potential of acute respiratory response[?];”
- “In our community MoE tried something new...apportion the amount of PM that each point source emitter could contribute;” and
- “While supportive of a ‘standard’ [I am concerned that] most municipalities do not have the expertise, nor the resources to enforce air quality bylaws.”

B. Annual average objective

The ministry proposes an annual air quality objective of 8 µg/m³ for PM_{2.5}. Scientific studies indicate that higher mortality rates are associated with longer-term exposure as opposed to short-term episodic conditions. An annual average objective supports a reduction in long-term exposure. The annual average objective will be used to guide regulatory decisions and also provides a more easily understood measure of air quality that is simple to communicate to the public and to compare with other jurisdictions.

Question 1.2: Do you have any specific comments or concerns regarding adoption of the proposed annual average air quality objective of 8 µg/m³ for PM_{2.5}?

Several respondents requested clarification about the rationale that was used by the ministry in proposing this objective. For example, “[our organization] could not determine the specific analysis or scientific work or modeling which would support this level of annual average...we would ask if the government has determined the practicality of implementing such a significant target.” Respondents also raised a number of common questions about how this objective will be applied in a practical and equitable manner. One respondent noted, for example, that “in Grand Forks [the background number] has been estimated at over 4 – that would leave a range of only 4 – is the number achievable...?” Another respondent questioned: “What would the time frame be to reach the objectives? How long will data be collected before it is presumed to be statistically accurate?”

A number of correspondents expressed “support for the idea of an annual air average quality objective” but noted questions about the distinction between the proposed “objective” of 8 µg/m³ and the “planning goal” of 6 µg/m³. For example, “the intention seems to be that the ‘planning goal’ will remain a lesser voluntary goal in perpetuity, with 8 µg/m³ remaining as the actual objective...we believe that maintaining the 8 µg/m³ target indefinitely reduces the pressure that officials and communities may feel to move to the planning...or some other goal.”

Responses were divided with respect to the proposed figure of 8 µg/m³ for the annual objective. Several respondents felt that the proposed objective is “too high” or “not a progressive number” – recommending instead figures as low as 4 µg/m³ – as well as such actions as “increased funding for a monitoring program to support this [target].” One respondent recommended that “as a guide, the objective should be set so as to provide incentive for the most polluted, Interior airsheds to achieve PM_{2.5} levels comparable to those in the Southern Interior and Vancouver Island...within a decade or sooner...the Canada Wide Standard is an example of an objective that was set too high...thereby providing little incentive for...airsheds...to clean up and continue reducing the levels of this high risk pollutant.”

Other respondents advocated a higher figure than the proposed 8 µg/m³, often citing objectives from other jurisdictions for comparison. For example, “California and the US EPA have annual objectives of 12 µg/m³ and 15 µg/m³ respectively...adopting these provincial planning goals may cause undue alarm in interior communities whose ambient air exceeds the target levels – we therefore recommend that the province retract the annual and planning goal targets and engage in additional study to set reasonable health-based objectives that are broadly consistent with other North American jurisdictions.”

The importance of the air quality monitoring system and methodology for calculating particulate levels was highlighted by a number of respondents. For example, one respondent commented that “as there can be significant differences between various accepted PM_{2.5} monitoring methods, it is important to recognize that achievement with the proposed objective may be contingent on the chosen method...the ministry should...also include consideration of future improvements in PM_{2.5} measurement technology.” Another noted that “when single digit values are contemplated, consistency in monitoring methods becomes critical” and suggested that “[the ministry] designate an accepted monitoring method for B.C. and develop correlation factors for other methods to allow direct comparison.” One respondent requested “clarification [as to]...whether this objective will apply to each monitoring sites or be subject to averaging across [a number of] sites.” Several noted the tendency of TEOM monitors to “under-measure” to varying degrees relative to filter-based monitors – and noted that a proposed change on the part of the ministry regarding expected “standards” for monitoring “may impact on the ability of some communities to attain this objective.”

Additional specific comments included:

- “Strict guidelines have the potential to impact on municipal economic development instead of dealing with existing particulate generation...[control of] sources of emissions in our community [such as industrial vehicles on a provincial highway, agricultural burning and a batch asphalt

plant]...is thus outside our [municipal] jurisdiction...[an objective] must not be used to curtail possible development – rather it should be used to assess point sources and curtail their emissions...it is not enough to simply set a guideline and then record emission levels;”

- “As with the 24 hour criteria, we recommend that communities be allowed to set more stringent targets and that the ministry cooperate fully to help those communities...including taking account of them in permit and other provincial government decisions;” and
- “Statistics for five years should be used to select appropriate annual objective and planning goal...to ameliorate the effect of meteorological or emission variability.”

C. Planning goal

The proposed planning goal of $6 \mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$ is intended as a voluntary long-term goal, established in concert with community airshed planning processes, to support continuous improvement and airshed planning.

A planning goal is a means to encourage those communities already below the proposed objectives to reduce ambient concentrations to the extent practical. The ministry’s primary motive in proposing an air quality long-term planning goal of $6 \mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$ is to encourage a reduction in long-term exposure. For this reason, the ministry is proposing targets based on annual rather than 24-hour averages.

Question 1.3: Do you have any specific comments or concerns regarding adoption of a long-term planning goal of $6 \mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$?

Many respondents referred to their comments for the previous two questions, either in supporting a more explicit and “stringent” objective or goal, or in challenging “the practicality of adopting a target that appears to be one of the most aggressive [in comparison to other jurisdictions].”

Respondents frequently commented on the “voluntary” aspect of this (as well as other) proposed criteria, with most who did so suggesting “mandatory” requirements set out in legislation or other actions such as “[a] mechanism to ensure its inclusion in airshed plan[s].”

Additional specific comments included:

- “We suggest provisions for continuous improvement and keeping clean areas clean as described in the Canada Wide Standards as an alternative for long term planning;”
- “The inclusion of a planning goal is a good idea, but may not be sufficient for all decisions that need to be made in communities where PM levels are already below the proposed objectives – given that it is unlikely that a population-level threshold for PM health effects will be identified, and considering that there is some residual risk at any level of PM exposure, we suggest that an explicit prevention of significant deterioration (PSD) criterion should be added – this could take the form of a ‘no more than $X \mu\text{g}/\text{m}^3$ decrement’ in $\text{PM}_{2.5}$ over a decade or longer. ‘X’ could be as low as $1 \mu\text{g}/\text{m}^3$ – the addition of an explicit PSD criterion could help provide transparency and build public confidence that the introduction of single or multiple new sources will be managed in a manner that does not compromise existing good air quality in a community;”
- “It is our understanding that a review of background levels of $\text{PM}_{2.5}$ in B.C. was done only for coastal communities (which suggested a background of $2 \mu\text{g}/\text{m}^3$) – we recommend a similar review be done for interior communities prior to adopting a province-wide long term planning goal to ensure it does not fall within what might be considered background for some areas;” and
- “Request that all contributors to $\text{PM}_{2.5}$ be given adequate notice for compliance with consideration given to economic cycles if major capital expenditures are required.”

Discussion Issue 2: Implementing the Proposed Air Quality Criteria

The ministry intends to prepare and disseminate additional guidance for government agencies and stakeholders to further clarify how the ambient air quality objectives will be applied with respect to permit decisions and other uses.

Question 2.1: Do you have any suggestions regarding the format and content of “guidance” information (or other communications materials) to provide information concerning provincial ambient air quality criteria for PM_{2.5}?

Respondents provided substantive suggestions and considered advice for the ministry in response to this question. Several comments related to provision of more clear and “explicit” material for the application of the proposed objectives, for example, “guidance material...should include at a minimum: standard criteria for the siting and placement of monitors, monitoring equipment standards, QA/QC procedures, minimum data quality objectives, standards for the application and interpretation of data including the evaluation of areas represented by single ambient air quality monitors and procedures for the evaluation of episodic air quality episodes such as forest fires or emergency upset conditions.”

Several respondents commented that local governments and industrial operations with air emissions (i.e., “sectors that emit PM_{2.5} directly...and communities involved in airshed management planning”), in particular, require clear information and targeted guidance information. Suggestions included “clear information/advice on which communities will be expected to show attainment” and “[guidance regarding] how the predictions of PM_{2.5} concentrations from dispersion models will be used and how sources that are currently in compliance with existing objectives would be expected to meet the new objectives.”

A number of respondents expressed concern about the ministry relying on “guidance” documents (rather than enforceable regulatory provisions) for implementing the proposed criteria. One respondent commented that “we do not agree that the ministry should implement the criteria only through a ‘guidance’ document...we believe that the criteria should be enshrined in regulation and should be accompanied by mandatory steps aimed at achieving the criteria in communities that cannot currently do so – this should include a mandatory re-appraisal and amendment of existing permits in light of the new criteria.” Another felt that “we need cumulative (enforceable) area based management and accompanying plan[s] with teeth – there is a need for strengthening of EMA provisions and associated regulations – it seems locally there is a need for some tools for implementing airshed management plan in an effective way.” One respondent suggested that the ministry “should insist on permits from pollution sources with emissions greater than three tonnes per year.”

Additional specific comments and advice included:

- “Information on local PM hot spots and monitor locations, especially in relation to traffic corridors;”
- “CWS guideline for measurement/attainment against the CWS standard for PM_{2.5} should be used as a model;”
- “Don’t rely so heavily on three or more criteria [as utilized in the Air Quality Health Index] – many small towns do not have the monitoring equipment for more than one measurement – two things [might] make this feasible – improved monitoring technology in the field, and the availability of this information;”
- “Guidance on how to determine compliance – is each site stand alone or will a network average be used? – guidance is needed as to acceptable monitoring equipment, methods, sites, and data quality – what are the consequences of exceeding the objective? – need clear information as to how the 98th percentile will be applied for assessment of facility emissions;”

- “There needs to be a clear fact and scientific basis outlined for any change in the target levels by B.C. – in addition, stakeholders need to be clear on the implications and actions required when exceedances to the targets are experienced;”
- “Keep very simple – give background information – [provide] explanation of terms [e.g.,] ‘ambient’ – monitoring airshed/neighbourhood pollution;”
- “A definition of what particulate matter of 2.5 microns consists of and...the major source for [specific airsheds, for example,]...automobile emissions, particularly the PM_{2.5} produced by diesel trucks, [to] provide some clarity to the issue and pinpoint source[s where] direct monitoring would be most effective;” and
- “Providing educational material regarding ‘how to reduce particulates’.”

Question 2.2: Do you have any other comments or suggestions for effective implementation of provincial ambient air quality criteria for PM_{2.5}?

Many considered responses were made to this question. Respondents provided suggestions regarding the regulatory framework for managing air quality, measures for identifying and addressing various sources of emissions, “flexibility in relation to consistency” and monitoring of air quality, as well as making a number of other specific suggestions.

Several respondents commented on the ministry’s approach and regulatory framework for managing air quality. For example, one respondent was interested in “source measurement versus airshed management” and asked “where [will] the primary results be measured and/or managed – will the management and compliance focus be of ambient air quality take place at the airshed level or the source level?” Another respondent suggested that the ministry “should consider the adoption of sectoral regulations under the *Environmental Management Act* aimed at minimizing PM_{2.5} primary and precursor emissions.” Another felt that “the Province should define actions and take a lead role to address non-compliance with the objective.” Other specific suggestions included “pressing industry to move to best available technology (BAT), particularly in communities that do not meet the criteria,” and “[implementing the air quality objectives in conjunction with] other enforceable and effective measures aimed at improving our air quality.”

Several respondents commented that the ministry should consider “all sources” of air emissions (and not limit management efforts to “targeting industry”). Primary emissions from trucking, marine industry, passenger vehicles and woodstoves were mentioned specifically as having potentially major or significant impacts on air quality in different communities. One respondent noted that “as vehicle sources are largely outside the influence of regional governments, opportunities for limiting their impact may be realized by local governments while making land-use decisions” and recommended that “guidance...should be offered to local governments as part of the implementation of the proposed objectives.” Another respondent commented that “some existing sources (most notably asphalt plants, wood waste incinerators and open burning) suffer from current regulatory limitations, but the potential effect on management of new emission sources is a critical consideration for [our community] – in particular, new or expanded primary and secondary wood products plant emissions (sawmills, plywood, pellet and veneer plants) and biomass heating and electricity generation emissions present the greatest potential for conflict with air quality management goals in this airshed.”

A number of respondents commented on the need for “flexibility” as well as “consistency” in managing for air quality. One noted, for example, that an “integrated air management system is needed...[with] a regulatory system that enables emissions management to take into account local airshed factors, including current air quality, emission source locations and necessary levels of control technology” as well as “a strategy for creating consistent conditions for air quality management throughout the province that recognizes that managing emissions may require varying control standards dependent on local community factors.” Another respondent framed this as “management of cumulative effects, based on local air quality,

location or natural factors affecting local dispersion, and the total emission loading from each source.” One respondent felt that the ministry must “incorporate flexibility to set more stringent standards in poor airsheds” while another commented that “everyone should be on a level playing field.” Another respondent recommended that “air quality planning needs to ensure that there is a level playing field – as such planning needs to be done on a Province wide basis and furthermore should ensure that there is consistency with Federal initiatives... targets should be Region or Zone based.”

Comments regarding monitoring included: “our belief [is] that current measuring processes will not have the appropriate accuracy to measure lower particulate levels;” “it is imperative that the current monitoring network is re-designed to monitor background concentrations, human exposure concentrations as well as maximum potential impacts from single sources;” “before changes to the current TEOM network are made, it will be important to ensure the ability to accurately assess long-term trends (for example, to evaluate the effectiveness of the proposed criteria and airshed management strategies) – accurate long-term trend data and site-to-site comparisons may be more important than accurately measuring the ‘true’ value of PM_{2.5} at a particular site”; and “monitoring (and the costs associated with it) should remain the responsibility of the ministry.” Several respondents supported a review and updating of the monitoring network and methods, with concerns expressed about continuity of measurements, criteria used for establishing an appropriate provincial network (e.g., recognizing rural and urbanized community contexts) and the timeframe for establishing the network.

Additional specific comments or advice included:

- “The timelines for implementing changes should be consistent across the province;”
- “The current Canadian wide standard for PM_{2.5} is applied to communities with populations of over 100,000 people – how will the B.C. standards deal with the material distinctions that exist in rural or low population density areas?;”
- “A road show – visit each municipality and Regional District (providing background information to QA and health), role of Province (their efforts) and thoughts on role of Regional District and municipalities;” and
- “No voluntary compliance! We need legislation NOW!”

Discussion Issue 3: Protection of Human Health and the Environment

The ministry is striving to ensure that British Columbia leads the world in sustainable management. Comments or suggestions for the ministry to support maintenance of air quality and effective use of air quality objectives and criteria were welcomed.

Question 3.1: Are there any aspects of proposed ambient air criteria for $PM_{2.5}$ that could significantly affect human health or the environment that are not, in your view, sufficiently addressed by the ministry's intended policy and direction? If "Yes", what are they? What suggestions do you have for the ministry to improve the manner in which these concerns are addressed?

Respondents who answered this question were almost equally divided between "yes" and "no." A diverse range of specific suggestions for ministry were made, including:

- "The ministry's objective paper relates only to particulate size and concentration – in terms of potential health hazards, $PM_{2.5}$ are not created equal with diesel $PM_{2.5}$ being more hazardous than dust from soil or smoke from burning cedar being more irritating than smoke from hardwoods;"
- "[As] there is no zero effects level for $PM_{2.5}$, simple tools could be developed to show the benefits of reduced concentrations and the risks & costs from elevated contaminant concentrations";
- "Dr. Ian McKendry of UBC recommended in his report to the Ministry of Environment in 2006 that a limited number of 'clean' sites become part of the monitoring network... 'clean' sites would allow for a more accurate determination of background concentrations which may affect the application of the objectives;"
- "Short term hourly – the director needs more legislative flexibility for addressing [this aspect of air quality] in [an] effective way;"
- "The MOE should conduct frequent reviews with stakeholders and should monitor more industries;"
- "Will this replace PM_{10} for the advisories – it is unclear what exactly will be the bases of advisories – a very important public safety instrument – the $PM_{2.5}$ readings provide important health and safety information and should definitely be incorporated into advisories;" and
- "Making the criteria mandatory in law, together with a clear and enforceable plan of how to achieve them; shifting to long-term goals at some definable point in the future; and allowing communities to set more stringent objectives which will then inform provincial government air quality efforts in that community."

Question 3.2 Do you have any suggestions for the ministry regarding which air contaminants should be the focus for subsequent and ongoing ministry effort?

Respondents commonly recommended attention to air contaminants that are "comparable" to $PM_{2.5}$ in terms of either short term or long term risk to human health (or "the usual air contaminants") including, most commonly – SO_x , NO_x , heavy metals, ozone, H_2S , diesel vehicle emissions, 'volatile organic compounds' and greenhouse gases. Several respondents commented that they supported the focus on fine particulates, while others pointed to using a criterion of "air toxicity" as being "more meaningful." A number of respondents recommended specific activities or industries for attention or focused effort, including: "elimination of garbage burning;" painting industries; backyard burning in residential areas; land clearing burning in populated areas; "every point source emitter;" diesel emissions from trucks and trains; asphalt plants; wood heat; and "industries discussing cogen[eration] production." One respondent also commented that "if use of the Air Quality Health Index (AQHI) is continued, then setting of a health-based objective for a multi-pollutant mixture should be considered."

Question 3.3 Are there any other ways that the ministry can work with you or other interested individuals or groups in order to address your concerns and support protection of human health and the environment?

Several respondents suggested that the ministry continue working to communicate with interested parties (such as airshed planning groups and industry groups and sites with point source emissions) and engage [industry and community groups] “early in any on-going or future process of developing objectives or standards that may affect our operations [or interests].” Respondents also requested funding assistance or ministry staff support for establishing air quality advisory committees (e.g., in Grand Forks), “resource-sharing” for specific initiatives with shared objectives (e.g., “programs to address the ozone problem in the eastern Fraser Valley, greenhouse gas reduction/adaptation for the regional district and its members, air quality management plan revision, heavy duty diesel emission reduction, reduction of ammonia from agriculture facilities, air quality monitoring network improvements, woodstove exchange program, and others”), and “participant funding...[for public interest groups] to obtain expert advice that would support meaningful comment...[and] better reflect the needs of the public.”

Other specific suggestions included: “anti-idling bylaws;” “hire more ministry staff – especially enforcement;” “more funding for woodstove and wood burning furnace replacements”; and “more continuous monitoring for PM_{2.5}.”

Question 3.4 Do you have any other comments or suggestions for the ministry?

As well as addressing the specific questions provided on the response form, a number of respondents prepared separate submissions or attached additional documents, reports or other relevant information (e.g., newspaper articles) for consideration by the ministry. This information has been compiled for ministry review but has not been summarized in this document. Examples of specific comments received include:

- “Has a comprehensive review of the literature been completed? Have uncertainties and gaps in the available information been identified and subsequent research to fill in the unknowns? If not, at best these objectives are interim, while a comprehensive research program is being initiated. A definite time period for completion of such research should be set to ensure the research will be conducted diligently...Your choice of PM_{2.5} appears to be completely based on respirable particulates, and therefore focused on human health. How are the biota and the ecosystem impacted by PM? Traditionally the air/waste management programs [of the Ministry of Environment] have maintained an erroneous assumption that there is an ‘absorptive capacity’ – a level of input, below which the environment is not affected – this is tantamount to the misconceptions of matter/energy disappearing...any change in the physical environment will have consequences in the ecosystem (defined here as a system including biota through which energy passes and minerals are cycled). The question then becomes what are the effects of the standard and are these acceptable. One of the more recent criteria to be considered is sustainability: can the system be perpetuated with the standard? ...another question is what is the natural condition, recognizing spatial differentiation as well as temporal variation in any one locality? Does this standard just become a license to increase emissions or sustain them over an extended period of time? I agree with the principle of encouraging emitters to reduce their current emissions, regardless of the objectives. However, unenforceable objectives will not accomplish this! In my opinion adaptive improvement must be regulated through Good/Best Management Practices. Positive incentives (carrot) combined with enforceable practices (stick) will be required. Are these standards based on a single criterion? Will PM operate synergistically with other pollutants in the atmosphere, soil or water – sympathetically or antagonistically? A single pollutant environment is a human construct and does not exist in the environment. Similarly many of the experimental data do not reflect the real world (environment);”
- “Grand Forks has a TEOM Monitor – information to the public is not done on a ‘real time’ basis for the community – the public should have access to ‘real time’ monitoring;”

- “I live near a beach where the Comox Strathcona Regional District allows beach fires... [in the summers] we...wake up...with our bedroom filled with smoke...I have been diagnosed with asthma; I take medication, and have become a burden on the health care system. I have never smoked, I exercise, eat right, But I can’t control the air I breath. I am currently trying to get these fire pits removed. If I don’t get results...I will be asking the provincial ombudsman for help;”
- “I would like to inform you of the constant slash burning that has taken place in the Comox Valley since October 1st...on a clear day you can see a grey haze against the mountains – we have spoken to the regional district who tells you to phone the MOE, who says they have no jurisdiction over the regional district. There will be a total of 3000 acres of land that will be cleared and burned in the next few years. Something must be done, someone needs to take responsibility. The provincial Government will have to show some leadership and solve this problem. NOW would be nice. I feel Education is the answer, I would like to see some informational ads on T.V. about backyard burning, how to use a woodstove correctly, health risks associated with the burning of wood;”
- “Work with the Ministry of Agriculture and Lands to encourage better farm practices;”
- “Take back the role that this ministry played in the lives of rural communities. Demand more staff. You have been doing more with less for too long. Do more with more. If new regulations are set provide the means of achieving them: monitoring and personnel. Empower the municipal governments, businesses, and the average citizen to manage their airsheds;”
- “As an overall perspective on the process of setting ambient objectives, and addressing other air quality management needs, the province should be explicit about the need to seek a balance between improving air quality throughout the province, and accelerating health risk reduction in the most impacted communities. Ambient objectives provide the most direct indicators of results based management, since they apply at the receptor level;” and
- “**Harmonization** – the new provincial air quality criteria should be harmonized with existing local government bylaws linked to particulate matter pollution. As many local governments already have bylaws regulating woodstove use and backyard burning, the Province should ensure consistency with existing local government approaches to particulate matter pollution. **Monitoring and enforcement** – the new standards should be accompanied by the dedication of provincial resources to ensure adequate monitoring and enforcement of the proposed air quality criteria. While the intentions paper signals an intent to address monitoring, local government experience has been that provincial monitoring and enforcement of emissions standards has been minimal, due in part to provincial staff reductions. In order to move forward with the clean air agenda, the Province needs to allocate the appropriate resources to ensure that the objectives of the new Standards are met. **Climate change** – some local governments have acknowledged the need for the new air quality criteria to be sensitive to the provincial climate change agenda. In particular, air quality objectives that seek to reduce particulate matter pollution from the burning of wood may be perceived as being counter to the Province's agenda of reducing greenhouse gas emissions. In many cases, the burning of wood as a fuel source generates less greenhouse gas emissions than those fuel source; they generate less particulate matter pollution. **Incentive programs** – in order to successfully address particulate matter pollution, the Province should consider incentive programs that help communities achieve the new air quality standards. Programs with financial incentives, such as provincial woodstove exchange programs with rebates and discounts, are beneficial in helping to generate change in practices at the local level. **Timelines** – given the sensitivity of many regions to air quality issues, [our organization] believes that some local governments will find it difficult to implement the air quality criteria -within the proposed timeline. [We] recommend that the Province consider another round of regional workshops to assess the feasibility of implementing the air quality criteria within 2008.”

Appendix 1: Common Acronyms and Abbreviations Used in Submissions and this Summary

Acronym/Abbreviation	Term
AQHI	Air Quality Health Index
AQI	Air Quality Index
BAT	Best Available Technology
B.C.	British Columbia
BCMA	British Columbia Medical Association
BMPs	Best Management Practices
CO ₂	Carbon dioxide
CPPI	Canadian Petroleum Products Institute
CRD	Capital Regional District
CSRD	Comox Strathcona Regional District
CWS	Canada Wide Standards
EMA	<i>Environmental Management Act</i>
EPA	(United States) Environmental Protection Agency
FVRD	Fraser Valley Regional District
H ₂ S	Hydrogen sulphide
m	metre
m ³	cubic metre
MABC	Mining Association of British Columbia
MOE	Ministry of Environment
NO _x	Oxides of nitrogen (NO and NO ₂)
PACHA	People's Action Committee for Healthy Air
PM _{2.5}	Particulate matter 2.5 micrometres or smaller
PSD	Prevention of Significant Deterioration
QA/QC	Quality Assurance/Quality Control
QP	Qualified Professional
SO _x	Sulphur oxides (including SO and SO ₂)
TEOM	Tapered Element Oscillating Microbalance (monitoring technology)
UBC	University of British Columbia
UBCM	Union of British Columbia Municipalities
US	United States
VFPA	Vancouver Fraser Port Authority
VOC's	Volatile Organic Compounds