

SOME TENTATIVE COMMENTS ON THE 2004 CANADA-US AIR QUALITY AGREEMENT PROGRESS REPORT

C. Scott Findlay, Director
Institute of the Environment
University of Ottawa

Tel: (613) 562-5874

Fax: (613) 562-5873

E-mail: sfindlay@science.uottawa.ca

I am embarrassed to admit it, but I am not as familiar with the C-US AQA as I should be – readers should take this fact into consideration when considering the following comments. My comments concern primarily two issues: (1) the utility of these reports for researchers and educators; and (2) important (in my view) missing information.

1. Enhancing the report's utility and value

1. The thrust of the report concerns the extent to which targets under the AQA are being met. Yet nowhere are these targets enumerated in a concise, summarized form, and most of the presented figures and tables do not include these targets (there are some exceptions, e.g. Fig. 1.) I would suggest that future reports include these targets either (a) in a summary table as an appendix; or (b) (better still) indicated explicitly in the relevant figures and tables. That way readers could see at a glance (a) where we were; (b) where we are; and (c) how far we've still got to go.
2. Virtually all of the emission data are estimates, yet I did not find any instance where associated uncertainties (e.g. estimate precision) are indicated. I realize that presenting estimates of uncertainty introduce an added level of complexity, but as a statistician, I can assure you that any estimate is (almost) useless unless an associated uncertainty is provided. I would strongly encourage the commission to provide precisions for any estimated quantity contained in this and all subsequent reports..
3. As a scientist, I am an eternal skeptic: whenever I see estimates, I immediately ask: how good are they? The report provides almost no information that would allow me to answer that question, for any set of presented estimates. But more distressingly, it provides few signposts as to where I can look to find the answer. In many cases, data are presented and the only annotation is a statement "Source: EPA and Environment Canada". This is unhelpful, especially when, for other legends, the annotation is much better (e.g. Fig. 16, which gives explicit directions to the EPA and EC NAPS databases). I would, therefore, strongly recommend that the report include a "Data sources" appendix that provides, for each figure or table, appropriate annotation. This signposting would include: (a) all data sources; (b) institutional contacts for the data, or URLs if they are in the public domain and web-accessible; (c) annotated references to published papers, internal reports, etc. where the methods used to obtain the estimates are described.

(c) is particularly important for spatially explicit information, as the information presented in maps has (as we all know) been massaged in all manner of ways. (Parenthetical, presenting this sort of information may help alleviate the “credibility” gap that a number of participants at the Feb. 11 session in Ottawa alluded to.)

4. By simply calculating estimates for all program affected sources (PASs) in a given year and plotting temporal trends, important differences between *historical* PASs and *new* PASs are obscured. To my mind, there are two questions: in terms of emissions of, say, NO_x or VOC, (a) what is the temporal trend for PASs that have been PASs for many years; and (b) how does this compare with the performance of new PASs? It seems to me that it is important to know whether declines in emissions are due primarily to better performance of traditional sources, or better (comparative) performance of new sources. Yet the report does not allow the reader to distinguish between these two possibilities.
5. On a related theme, it would be useful to know how the birth-death dynamics of PASs are changing over time. This would mean, for example, providing, for each year, (a) the number of PASs that were present in the previous year but are not present now (“death”); (b) the number of PASs that were not present the year before, but are now (“birth”); and (c) a comparison of emissions between these two samples (are newly born PASs better than those that expired? Is there some sort of Darwinian fitness associated with different emission phenotypes?).

II. Missing information not required under the AQA

In addition to the missing information described above, there is, in my view, important missing information for which formal reporting requirements probably do not exist under the current AQA. This notwithstanding, there is no question that such information should be reported as it pertains directly to the issue of improvements (or lack thereof) in air quality.

1. Clearly there are important endpoints for which substantial scientific evidence exists on their importance to air quality, and yet are not required to be reported under the AQA. Mercury is an obvious one, but it is by no means the only one: also included are POPs, ozone-depleting substances and greenhouse gases. Moreover, it is clear that the impacts of these pollutants both on human health and ecosystems depends on other factors, particularly climate-related factors. As was pointed out at the Feb. 11 discussion, the 2004 report suggests that, with respect to the endpoints identified under the AQA, air quality should be improving. But in fact the empirical evidence – and certainly the public perception – is the opposite. Hence the “credibility” gap referred to at the meeting. Part of the problem, of course, is that there are many other factors contributing to air quality than are identified in the AQA, and readers of the report are provided with no information as to trends (spatial or temporal) in these endpoints. In the past, new information has resulted in the creation of new annexes to the AQA (like, for example, the PM Annex). But why must we wait for the terms of an Annex to be

negotiated before data and information pertaining to trends in endpoints outside the original agreement are reported?

2. As many readers are doubtless aware, there is a government-wide initiative through PCO to investigate how to make regulation smarter. With respect to the whole regulation thing, there are many (particularly industry representatives, including many within Industry Canada) who are attempting to convince governments that in fact "smarter" regulation means "less" regulation. Given the administrative overhead associated with regulation, this idea is attractive. But the real issue is: does voluntary regulation actually work? It seems to me that here is a glorious opportunity for the IGC to provide some answers to this question by instituting a reporting system for "voluntary" initiatives by industry to improve air quality: who is doing it, what are they doing, and what is its impact?
3. The quality and quantity of monitoring/surveillance data, and the ability of monitoring programs to "adapt" to new information, depends on science capacity. It is my belief that the ability of the Canadian government to provide high quality, accurate and anticipatory scientific information and data has been severely compromised by budget reductions in the relevant departments (particularly NRCan, Environment Canada and Health Canada) during the last decade. Indeed, in his recent appearance before the Standing Committee on Environment and Sustainable Development, Mr. Goodale explicitly made reference to a "scientific deficit" within the federal government. The reduction in scientific capacity not only widens the credibility gap, but it also tends to confound temporal trends in collected data (whose analysis assumes that annual estimates are equally accurate and biased, an assumption that is not valid if there are systematic changes in capacity). As such, it is, I think incumbent upon the parties and the IJC to include in the report information on changes in science capacity in those domains of inquiry that have a direct effect on the quantity, accuracy and precision of the data in the annual AQA reports.

III. Information presentation

Many of the figures are poorly done. Two common errors are: (1) the use of 2-D plots with 2 ordinate scales (one on the left, one on the right) to plot two sets of data, but it is unclear as to which set of data a particular scale applies e.g. Figs 22-25 – are Canada's NO_x emissions in 2002 19 million tonnes or 22 million tonnes?; (2) attempting to plot data of wildly different magnitudes on the same graph, using arithmetic scales (e.g. Fig. 12-15) Generally this should be avoided, and if it must be done, use a non-arithmetic (e.g. natural log) scale with or without axis breaks.

IV. A final comment on the comments summary

I read the 2003 summary report with considerable interest: it is a useful document, but could be considerably more useful by the following structural changes.

1. Build an explicit taxonomy for comments, and classify all received comments according to this taxonomy (e.g. comments about progress towards stated targets, comments about the value of the emission targets themselves, comments on missing information, etc. etc.)
2. Each "stakeholder" submits a set of comments, giving N such sets. These sets will have many comments in common. So, using the taxonomy developed in (1), develop a "weight" index which captures, essentially, the "importance" of a particular comment based on the proportion of the N sets that included this comment. Thus, for each operational taxonomic unit in the taxonomy in (1), you can assign an "importance". Then publish these importance ranking as part of the report. This would then allow the parties to understand: (a) which deficiencies/issues are of the greatest concern to the (sampled!) "stakeholder" community; and (b) se how the importance of different issues changes over time.
3. Indeed, one could go 1 step further than (2): once one has the taxonomy, you could circulate this to any interested stakeholders (indeed, you could easily implement such a survey on the IJC website) and ask the public to assign importance values to each of the identified "issues". Now THAT would be a very useful exercise indeed! (I might point out that at IE, we have done several exercise like this, and in the main, I think it has worked reasonably well.)

In the spirit of the wise Montaigne, I offer these comments not as being right, but as being my own.