CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT

ACID RAIN TASK GROUP WORKSHOP

FEBRUARY 23-24, 2005
Holiday Inn Plaza la Chaudière
2, rue Montcalm
Gatineau, QC

DISCUSSION HIGHLIGHTS

INTRODUCTION

On February 23-24, in Ottawa, the Canadian Council for Ministers of the Environment held a workshop to share and discuss the major conclusions emerging from the 2004 Canadian Acid Deposition Science Assessment. An agenda and list of participants is attached in Appendix A and B respectively. The meeting aimed to achieve four key objectives:

1. To obtain stakeholder feedback and perspectives on the five-year review of the Acid Rain Strategy;
2. To present and discuss major conclusions emerging from the "2004 Canadian Acid Deposition Science Assessment;
3. To develop an understanding of the implications of the latest science to the "Canada-Wide Acid Rain Strategy;
4. To obtain stakeholder feedback on next steps regarding the Acid Rain Strategy.

The first day focused on presentations on the Five-Year Review and topics emanating from the Science Assessment. Day 2 provided participants the opportunity to respond to specific questions regarding data presented on day 1 and their implications. This report provides a summary of the responses put forth by participants to each of the questions posed.

WORKSHOP DISCUSSION HIGHLIGHTS

The following sections are structured around questions posed to the stakeholder group and have been subsequently themed. Because of duplication in comments and suggestions across subgroups, the synthesis in some cases has resulted in similar comments being categorized under different but related questions.

COMMITMENTS AND PROGRESS UNDER THE CANADA-WIDE ACID RAIN STRATEGY

What does the science suggest about when and/or if we will meet the Strategy's long-term goals of reducing acid deposition to below critical loads across Canada?

Critical Loads

- Without a scientific definition of "critical loads" and availability of critical load information for various geographic regions, it remains impossible to benchmark the impact of the loads, and determine if they are being exceeding. For example, despite improvements, there are gaps in understanding what the critical loads are for Canada, including loads for NO_X.
- Policy makers should draw from lessons already learned in eastern Canada as emissions in western Canada begin to rise, particularly with the expansion of the Alberta Tar Sands.
- Implementation of the Strategy and current commitments to emission reductions will continue to be exceeded in some parts of Canada as reduction targets will not result in critical loads being met. Therefore, further reductions are required to expedite recovery and reduce impacts.

- Canada's strategy and implementation success will be heavily influenced by the extent to which reduction commitments are achieved in the U.S as their current regulatory timetable suggests a 50-100 year timeline to reach critical loads.
- To establish critical loads, more work is needed on the effects in the north and west, with particular attention required to evaluate the impact of emissions from Manitoba smelters within Manitoba, Saskatchewan, Northwest Territories, Ontario and the U.S.

Science Gaps and Knowledge Base

- There are gaps in scientific data to support decisions on defining and determining total loads, critical loads, and their impacts, particularly in the context of cross-country variations.
- Current scientific evidence suggests that it is not possible to reduce acid deposition to below critical loads in the short-term (before 2020). However, over the longer-term (by 2030), if all current measures and promises are fully implemented, including SO_2 reductions from Manitoba smelters and further SO_2 reductions from US plants (necessary for Canada's success), it will be possible.
- Information is also needed on site-specific critical loads where the ph may have been lower than six in the absence of human sources.

Modeling

- The current models indicate that, based on the old targets, another 75% reduction is required and this should be factored into new models and considered a priority.
- Dynamic modeling is required to target loads with a particular timeframe for results. It is essential scientific developments are factored into the model and its assumptions.

IMPLICATIONS OF THE STRATEGY

How will potential reductions through long-term strategy reduce the incidence of breathing disorders or lung disease?

Assessing Health and Environmental Impacts

- There is little data on the impact on human health, the cost of recovery, and long-term health effects of acid rain-related emissions. An accurate assessment, based on regional models, is needed – one that takes a multi-pollutant approach to the reduction of NO_X, SO_X and VOC.
- As it stands now, health costs are not factored into the overall model and policy decisions and where they are, there is a fragmented approach. It is proposed that the Canadian government use progress models to do a full (and realistic) costing of all variables in order to fully assess both the health, social and economic implications.
- It is estimated that the co-benefits of a 75% reduction in SO_2 emissions in Eastern Canada, and a 25% reduction in fine particle concentrations in ambient air in Canadian cities, will results in a significant reduction in respiratory diseases such as asthma.

SCIENCE NEEDS TO FUEL POLICY DECISIONS

What are the "science areas" that we still do not know enough about to make policy decisions related to the commitments in the Strategy and the achievement of the long-term goal?

Scientific Understanding of Ecosystems

(Overall, more information is required on ecosystems from a landscape perspective).

- Questions remain around at what point do ecosystems become NO_X saturated with NO_X leaching increasing?
- There are gaps in:
  - Aquatic science – assessing the impact on aquatic ecosystems from a watershed perspective taking into account regional variations.
  - The science of sulphur reservoirs and sulphur release in ecosystems that is not deposition-related – how is this factored into the overall ecological impacts.
  - Soil science – comparing impacted areas with non-impacted areas to enable benchmarking.
  - Knowledge of the functioning of forest ecosystems as the basis for being better able to assess the ecological impacts of acid deposition including specific impacts on trees, and nutrient cycling within forest vegetation species and species variability.
  - Information sharing between scientists and between the scientific community and public needs to be enhanced. It is proposed that scientists communicate more frequently through a more formalized network and use audience-specific tools.
  - Understanding of nitrogen cycles, plant uptake of NH4 within an ecosystem context.

Monitoring

- Long-term monitoring through stations and networks are essential and require ongoing financial support (monitoring from a macro perspective – to include ecosystem monitoring direct, indirect and cumulative impacts as well as human health impacts. It was recommended that resources are needed, particularly in the west and north to bring Canada to a similar level as in the US Comprehensive Canada-Wide Monitoring Network. Improved coordination of data gathering and exchanges within North America would improve prediction and assessment. Without additional funding, it is not possible to repeat the assessment in five years particularly in light of new potential reporting requirements pertaining to environmental indicators of "recovery".
- Wet deposition monitoring in all ecoregions would help to ground truth modeling predictions.

Modeling and Mapping

- Multi-variable modeling is necessary – where a range of issues and variables can be modeled within the context of critical loads. Scenarios that take into consideration the location of harvesting, the amount being harvested, along with the effects of forest fires and their impact on critical loads should be built into the models (where not already done). In addition, improvements in the capacity to do inverse modeling with industry-specific targets identified.

- While regions have been mapped, there is more baseline information required on the impacts in western Canada and an ongoing monitoring system would help to validate model predictions, and information derived used to recalibrate the current model(s). The models also need to factor in and assess the significance of advection into Canada from sources outside Canada and the U.S. and from Canada to other regions.

Data

- More research into field results would result in more accurate assessment of deposition rates.

LONG-TERM ECOSYSTEM HEALTH

Questions 4&5: What does the new science tell us about the path to "recovery" and our need to act? On what timelines? Given our improved understanding of how ecosystems recover, do we need to define what recovery means? If so, what should that definition be?

Ecosystem Change

- Recognizing that acid deposition has already altered ecosystem functioning and will continue to have a deleterious effect, specific goals and targets that are measurable, achievable, relevant and time-related are necessary to minimize further negative ecosystem effects. According to new science, "recovery" will take as long as 120 years, however, ecosystems will never go back to their original state and it is impossible to truly define "ultimate recovery" given the lack of information on that state of ecosystems prior to acidification. Other factors will also impact recovery and acid rain should not be viewed in isolation of other airborne pollutants – hence the need for an integrated approach.

Setting Goals, Objectives and Targets

- With scientific evidence pointing to greater environmental impacts than originally predicted, a higher than 50% reduction in emissions from the provinces is necessary, particularly when taking into account cumulative impacts. The assumption could be made that the rate of recovery is predicated on the magnitude and rate of reduction in emissions with positive impacts first being evidenced first chemically, and then biologically. In some cases, zero recovery to pre-acidified state will not occur as both chemical and biologically changes, in some cases, are not reversible.
- Given that the path forward is complex, clear, measurable interim goals, objectives and targets need to be established along with a strategy for monitoring and assessing trends. Information derived throughout the monitoring process could then be used to adapt targets and goals along the way – an iterative process.
- To the extent possible, recovery indicators and minimum standards should be developed in conjunction with the monitoring program in order to be able to evaluate progress. For example, a minimum standard of ph 6 (continue using ph 6 as an indicator) and critical load for forests, yet develop more concrete indicators for terrestrial, aquatic, human, and wildlife health effects.
- The definition of "recovery" and a common understanding of what it means "on the ground" is necessary. As noted above, it may not imply returning to an original state, as that may not be possible or desirable. Ultimately, the goal should be healthy, functioning ecosystems with chemical

and biological recovery requiring unique approaches including different end-points due to their differences in recovery time. Chemical and biological recovery will take decades and indicators should be developed to monitor improvements, which could be then used to demonstrate "success stories".

INCLUDING "RECOVERY" IN THE STRATEGY

- There was general agreement that "recovery" should be addressed as part of the strategy. However, until recovery is defined with specific targets, performance measures and monitoring, along with a process to reach these targets, it may be premature.
- In terms of actions, ecosystem scientists, health practitioners need to be engaged early in the development of indices. A health-based community should be engaged in the acid rain issue and work on the creation of a human health metric that takes into account the cumulative effects of acid rain that lead to a diseased state. Ideally, the health practitioners would look at a multi-pollutant approach to health impacts.

ACTIVE MANAGEMENT

Is there a role for active management (e.g., liming, fish restocking), in the achievement of our long-term goal of biological recovery?

- Restocking is not a long-term solution, and careful consideration of the negative effects of corrective action is important. There is a role for active management as in interim measure but significant concerns about the methods:
  - it is not a substitute for mitigation through emissions reductions;
  - it is not practical to employ liming for all affected lakes/rivers – but can be used to address threats to particular species/populations;
  - alternative methods such as shoreline protection should be considered.
- Mitigation measures should be assessed for their long-term ecosystem impacts, and be considered within specific regions - it comes back to the need for more baseline information about ecosystem's functions and values. Because of the scale required, active management may be more feasible on the aquatic realm, not terrestrial and only native species should be used if restocking.
- Indicator lakes that are statistically representative could be used to benchmark changes.

Is there a need for NO_X emission reductions?

- There was general agreement to the need for reductions in NO_X emissions, however, that the focus on SO_2 should be lost in the process. More scientific information on the NO_X saturation of the terrestrial ecosystem; speed and extent of leaching into lakes and rivers; impact on biodiversity (species composition); human health; and, contribution to smog are needed.

SOCIO-ECONOMIC ANALYSIS

To what degree is there a role for socio-economic analysis of the benefits and competitiveness impacts of acid deposition mitigation?

- There is an important role for socio-economic analysis in gaining support for abatement strategies and securing commitment. An analysis may help to justify policy decisions regarding emission control measures, however, the challenge will be evaluating the real costs and benefits. An assessment of the accuracy of previous socio-economic cost/benefit analyses may be a useful starting point.
- It is important to consider the competitive distributions within Canada at a sectoral level due to disparate requirements.

What measures and tools do we need to put in place to address this issue and in what order of priority (not already identified above)?

There are a range of measures and tools depending on the issues and desired outcome.

Emissions Reductions

- Provinces should determine sector and facility reductions and targets to achieve critical loads followed by the application of a suite of sector-specific economic incentives to inspire industries to reduce emissions for SO_2 and NO_X. Specific strategies on how to implement reductions should be clearly outlined and linked with the establishment of emission inventories.
- Regional economic zones were proposed as one possible approach to emissions management.

Mapping

- Deposition and critical load high resolution mapping of all regions would help to better assess local versus long-range emissions.

Communication

- An information clearinghouse of date, knowledge and information on best available techniques available to all sectors should be established. Sectors should then be encouraged to use these techniques when capital investments are being made. An accessible and “digestible” annual report (to include emissions date both current and forecasted), bi-annual progress reports, science assessments and new science findings are needed to inform stakeholders including a report on the status of monitored ecosystems.
- Multi-stakeholder meetings would provide a forum for exchanging information and identifying areas for collaboration.
- A communication plan would help to educate stakeholders about the merits in reducing emissions and choosing alternative energy sources;
- The media could be engaged in an “air quality day” to communicate and engage the public.

Commitment

- Without the commitment of all stakeholders, implementation of the strategy will fail. Because the acid rain issue has been around for some time, there is a public perception that it has been "resolved" with the media now focusing on "new" environment and health issues. A lack of public push and involvement will reduce pressure on governments and industry to act.

Integrated Approach

- An analysis of the capacity of industries and sectors within a region to achieve emissions reductions, taking into account technological innovation, economic, environmental and social issues is needed.
- Linkages with other issues and strategies including climate change, smog, particulate matter, would enable a more accurate assessment of cumulative impacts on ecosystem and human health. Greater integration and coordination of efforts into effects would help to address resource constraints and reduce duplicative research.

Economic Valuation

- The linkages between economic valuation, science and environmental considerations need to be understood in order to better inform policy decisions.

POST 2010 STRATEGY OR RENEWED STRATEGY

Participants were asked to provide input into "Next Steps" for The Strategy. They offered the following comments.

- A post 2010 strategy should be developed and ready for Ministers by 2007 to show for signing and implementation. Part of this strategy should be a call for more environmentally sustainable economic development strategies. Specific objectives, targets, and timelines should be positioned within a framework. Federal, provincial and territorial commitments need to be clearly identified through annexes under the strategy.
- Current and future budget constraints need to be addressed if any strategy is to be effectively implemented (for research, monitoring stations, computer modeling…)
- International issues including greater engagement of the U.S. to address the transboundary movement of SO_X, and NO_X should be included in a renewed strategy.
- Given that the multi-stakeholder Acid Rain Task Group comes to an end on March 31st, 2005, it is recommended that another similar group be established to continue this work. This group could, through active provincial involvement, develop a new/renewed acid rain strategy including timely provision of funding. Concurrently, it is recommended that a new national science and monitoring coordinating group be established. Key elements of the new strategy should include many of the items identified above such as performance measures; a renewed science program; recovery; NO_X; further emissions reductions; a communications plan; co-benefits; and be based on an integrated, multi-pronged approach. In addition, elements of the existing strategy would be strengthened such

as the need to determine critical loads for much of Canada. Specific reporting requirements would be outlined.

- The implementation strategy should include timely input; a formal process to review and evaluate implementation; and a report-back mechanism. Reporting requirements would relate to: emissions; deposition; effects; opportunities for cooperation on monitoring; and industry progress. A Genuine Progress Index should be used rather than existing economic models as they are more holistic and take a wider suite of variables into consideration.
- Greater cooperation between Environment Canada and Health Canada were proposed to address human health issues. It was suggested that Environmental Medicine Specialists be brought on board to assist in determining health impacts.

APPENDIX A – AGENDA

Objectives

1. **To obtain stakeholder feedback and perspectives on the five year review of the Acid Rain Strategy**
2. **To present and discuss major conclusions emerging from the "2004 Canadian Acid Deposition Science Assessment"**
3. **To develop an understanding of the implications of the latest science to the "Canada-Wide Acid Rain Strategy"**
4. **To obtain stakeholder feedback on next steps regarding the Acid Rain Strategy**

TIME	AGENDA ITEMS	PRESENTER
February 23		
8:00-8:30	Registration and Refreshments	All
8:30-8:35	Welcome and Opening Comments	Peggy Farnsworth
8:35-8:45	Introduction and Agenda	Frank Van Gool Facilitator – Intersol Group
Taking Stock – The Canada-Wide Acid Rain Strategy for Post-2000		
8:45-9:15	Review of Commitments and Progress Made Under the "Canada-Wide Acid Rain Strategy"	Task Group Member
Science Assessment Presentations – "Sources, Transport, Effects and Recovery"		
9:15-10:00	Atmospheric Response to Past Emission Changes	Vet (EC-MSC)
10:00-10:30	Health Break	
10:30-11:15	Effects on Forests and Watershed Soils	Houle (EC-QR/QMNRWP)
11:15-12:00	Effects on Aquatic Chemistry and Biology	Jeffries/Weeber (EC-NWRI/EC-OR)
12:00-13:00	Lunch Break	
13:00-13:45	Recovery of Aquatic Ecosystems	Jeffries/McNicol (EC-NWRI/EC-OR)

13:45-14:30	Human Health Effects of Acid Aerosols	Jessiman (HC)
14:30-15:00	Health Break	
Science Assessment Presentations – "Current and Forecasted Critical Loads"		
15:00-15:45	Critical Loads: Are They Being Exceeded?	Jeffries/Ouimet (EC-NWRI/ QMNRWP)
15:45-16:30	Current and Proposed Emission Control Programs: How Will Acid Deposition be Affected?	Moran (EC-MSC)
16:30-16:45	Wrap up and Expectations for Day 2	Van Gool

February 24		
8:30-8:45	Recap of Day 1 and Introduction to Day 2	Van Gool
8:45 – 9:15	Socio-Economic Considerations of Acid Rain	Bourassa/Donohue (EC-REAB/EC-REAB)
9:15 – 10:15	Discussion #1: post mortem of the Canada-Wide Acid Rain Strategy	Table Discussion
10:15 – 10:45	Health Break	
10:45 - 12:15	Discussion #2: Implications for the Strategy	Table Discussion
12:15 - 13:15	Lunch Break	

Next Steps		
13:15-13:45	Sharing Results	All
13:45-14:45	Discussion #3: Focus on Next Steps	Table Discussion
14:45 – 15:15	Health Break	
15:15 – 15:45	Sharing Results	All
15:45 - 16:15	Wrap-up and Closing Comments	Task Group Member

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